



## PROGRAMME SPECIFICATION

Part 1: Information	
<b>Awarding Institution</b>	University of the West of England
<b>Teaching Institution</b>	University of the West of England
<b>Delivery Location</b>	Global College of Engineering and Technology, Muscat Oman
<b>Study abroad / Exchange / Credit recognition</b>	
<b>Faculty responsible for programme</b>	Faculty of the Environment & Technology (FET)
<b>Department responsible for programme</b>	Engineering Design and Mathematics
<b>Professional Statutory or Regulatory Body Links</b>	
<b>Highest Award Title</b>	BEng(Hons) Automation and Robotics Engineering
<b>Default Award Title</b>	
<b>Interim Award Titles</b>	BEng Automation and Robotics Engineering Diploma of Higher Education Automation and Robotics Engineering Certificate of Higher Education Automation and Robotics Engineering
<b>UWE Progression Route</b>	None
<b>Mode of Delivery</b>	Full-time and part-time
<b>ISIS code/s</b>	<b>H67G</b>
<b>For implementation from</b>	September 2018

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### Part 2: Description

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.

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 requirements for the purposes of the Higher Education Achievement Record (HEAR)

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.

### Regulations

Approved University Academic Regulations and Procedures.

It is the Award Board's responsibility to determine whether the student's attainment at level 0 is sufficient to progress to level 1.

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### Part 3: Learning Outcomes of the Programme

#### **A. Knowledge and Understanding of:**

1. Knowledge and understanding of scientific principles and methodology necessary to underpin their education in automation and robotic Engineering.
2. 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.
3. The requirement for engineering activities to promote sustainable development.

#### **B. Intellectual Skills**

1. Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of automation and robotic.
2. Understanding of engineering principles and the ability to apply them to analyse key engineering processes
3. Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modeling techniques
4. Understanding of and ability to apply a systems approach to hard automation and robotics problems
5. Creating and providing real-world solutions to engineering problems in uncertain environment to complete the design.
6. Gaining proficiency in operating an automation system or a robot manipulator or a mobile robot using supplied system software.
7. Being able to program (code) an automation system or a robot manipulator or a mobile robot using a high-level programming language and library.

#### **C. Subject/Professional/Practical Skills**

1. Ability to apply quantitative methods and computer software relevant to automation and robotics in order to solve problems
2. Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues
3. Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal
4. Knowledge of management techniques, which may be used to achieve engineering objectives.
5. Workshop and laboratory skills
6. Understanding of appropriate codes of practice and industry standards
7. Understand customer and user needs and the importance of considerations such as aesthetics
8. Identify and manage cost drivers
9. Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues

#### **D. Transferable Skills and other attributes**

1. Use creativity to establish innovative solutions
2. Knowledge and understanding of commercial and economic context of engineering processes
3. Understanding of the need for a high level of professional and ethical conduct in engineering
4. Understanding of contexts in which engineering knowledge can be applied (e.g. Operations and management, technology development, etc.)
5. Understanding use of technical literature and other information sources
6. Awareness of nature of intellectual property and contractual issues
7. Understanding of appropriate codes of practice and industry standards
8. Awareness of quality issues
9. Ability to work with technical uncertainty

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**Part 3: Learning Outcomes of the Programme**

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

The focus of the foundation year (level 0) is on the acquisition both of appropriate academic skills and relevant subject knowledge to allow students to develop and progress through levels 1, 2 and 3 in relation to knowledge and understanding, cognitive, subject specific and study skills.

<b>Learning Outcomes:</b>	UFMFJ9-30-1	UFMFN7-15-1	UFMFCA-15-1	UFCFE3-15-1	UFMFR8-15-1	UFMFJ3-30-1	UFMFL9-15-2	UFMFKA-30-2	UFMFJA-30-2	UFMFV7-15-2	UFMFHM-15-2	UFMFR9-15-2	UFMF8-30-3	UFCF95-15-3	UFMFC9-15-3	UFMFNF-15-3	UZRSSR-15-3	UFMFV8-15-3	UFMFH8-15-3	UFMF99-15-3	UFCFU3-15-3
<b>A1</b>					X	X			X	X	X		X		X			X			
<b>A2</b>	X				X	X	X	X	X	X	X		X		X	X			X		
<b>A3</b>	X						X					X	X	X			X	X			
<b>B1</b>	X			X			X	X	X	X	X	X		X		X	X			X	
<b>B2</b>		X	X		X	X	X		X	X	X		X		X			X	X		
<b>B3</b>	X	X	X		X				X	X	X	X			X	X		X	X		
<b>B4</b>	X	X			X			X	X				X		X			X	X		
<b>B5</b>							X				X		X					X			
<b>B6</b>																					X
<b>B7</b>																					X
<b>C1</b>	X				X	X	X		X	X			X	X	X	X		X	X	X	
<b>C2</b>						X			X				X	X	X	X		X		X	
<b>C3</b>			X								X			X				X			
<b>C4</b>						X		X		X				X				X			
<b>C5</b>		X	X		X	X			X	X	X	X	X			X					
<b>C6</b>		X			X				X	X	X	X						X	X		
<b>C7</b>			X					X	X			X						X			
<b>C8</b>			X			X		X	X		X		X		X	X			X		
<b>C9</b>		X			X								X	X	X			X			



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<b>Part 4: Programme Structure</b>			
This structure diagram demonstrates the student journey from Entry through to Graduation for a typical full time student, including: level and credit requirements;, interim award requirements;, module diet (including compulsory and optional modules)			
<b>ENTRY</b>	<b>Core Modules</b>	<b>Optional Modules</b>	<b>Awards</b>
<b>Year 0</b> 	<u>UFMF BG-30-0</u> Foundation Mathematics: Algebra and Calculus <u>UFCEXX-30-0</u> Program Design and Implementation <u>UFMFAG-30-0</u> Foundation Mechanics <u>UF CFGK-30-0</u> Professional and Academic Skills	None	120 credits at Level 0  Successful completion of all level 0 modules required to permit progression to level 1.
<b>Year 1</b> 	<u>UFMFJ9-30-1</u> Engineering Mathematics <u>UFMFN7-15-1</u> C-Programming <u>UFMFCA-15-1</u> Practical Electronics <u>UFMFJ3-30-1</u> Introduction to Robotics and Electronics <u>UFMFR8-15-1</u> Digital Principles for Robotics <u>UFCE3-15-1</u> Introduction to Artificial Intelligence	None	<b>Interim award:            CertHE Automation and            Robotics Engineering</b>  Credit Requirements: 240 credits  At least 100 credits at level 1 or above. 120 credits at level 0
<b>Year 2</b>	<u>UFMFL9-15-2</u> Mathematics for Signals and Control <u>UFMFKA-30-2</u> Microcontroller Applications Group Lab <u>UFMFV7-15-2</u> Control <u>UFMFJA-30-2</u> Robotic Systems <u>UFMFHM-15-2</u> Programmable Logic Controller Design <u>UFMFR9-15-2</u> Mechatronics	None	<b>Interim award:            DipHE Automation and            Robotics Engineering</b>  Credit requirements: 360 credits  At least 100 credits at level 2 or above. At least 120 credits at level 1 or above. 120 credits at level 0.
<b>Year 3</b>	<u>UFMFV8-15-3</u> Group Design Integration Project <u>UFMFC9-15-3</u> Machine Vision <u>UF CF95-15-3</u> Entrepreneurial Skills <u>UFMFNF-15-3</u>	<b>Optional Modules            Choose 15 credits from:</b>  <u>UFMFH8-15-3</u> Digital Signal Processing <u>UFMF99-15-3</u> Intelligent and Adaptive Systems	<b>Interim award:            BEng Automation and            Robotics Engineering</b>  Credit requirements: 420 credits  At least 60 credits at level 3

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	Probabilistic Robotics <u>UZRSSR-15-3</u> Ethics of Technology <u>UFMFX8-30-3</u> Individual Project BEng	<u>UFCFU3-15-3</u> Advanced Databases	or above. At least 100 credits at level 2 or above. At least 140 credits at level 1 or above. 120 credits at level 0.  <b>Highest award:</b> <b>BEng(Hons) Automation          and Robotics Engineering</b>  Credit requirements: 480 credits  At least 100 credits at level 3 or above. At least 100 credits at level 2 or above. At least 140 credits at level 1 or above. 120 credits at level 0.
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### Graduation

#### Part time:

The following structure diagram demonstrates the student journey from Entry through to Graduation for a typical **part-time student**.

<b>ENTRY</b>  	Part-time Level 0.1	<b>Compulsory Modules</b>  <u>UFMFBG-30-0</u> Foundation Mathematics: Algebra and Calculus <u>UFCFGK-30-0</u> Professional and Academic Skills	<b>Optional Modules</b>  None
	Part-time Level 0.2	<u>UFCEXX-30-0</u> Program Design and Implementation <u>UFMFAG-30-0</u> Foundation Mechanics	None
	Part – time Level 1.1	<u>UFMFJ9-30-1</u> Engineering Mathematics <u>UFMFJ3-30-1</u> Introduction to Robotics and Electronics	<b>Awards:</b>  <b>Interim Award:</b>
	Part – time Level 1.2	<u>UFMFN7-15-1</u> C-Programming <u>UFMR8-15-1</u> Digital Principles for Robotics <u>UFCFE3-15-1</u> Introduction to Artificial Intelligence <u>UFMFCA-15-1</u> Practical Electronics	<b>CertHE Automation and Robotics          Engineering</b>  Credit Requirements: 240 credits  At least 100 credits at level 1 or above. 120 credits at level 0

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Part – time Level 2.1	<u>UFMFL9-15-2</u> Mathematics for Signals and Control <u>UFMFKA-30-2</u> Microcontroller Applications Group Lab <u>UFMFV7-15-2</u> Control	
Part - time Level 2.2	<u>UFMFJA-30-2</u> Robotic Systems <u>UFMFHM-15-2</u> Programmable Logic Controller Design <u>UFMFR9-15-2</u> Mechatronics	<b>Interim award:</b> <b>DipHE Automation and Robotics Engineering</b>  Credit requirements: 360 credits  At least 100 credits at level 2 or above. At least 120 credits at level 1 or above. 120 credits at level 0
Part – time Level 3.1	<u>UFMFV8-15-3</u> Group Design Integration Project <u>UFMFC9-15-3</u> Machine Vision <u>UFCE95-15-3</u> Entrepreneurial Skills <u>UFMFNF-15-3</u> Probabilistic Robotics	<b>BEng Automation and Robotics Engineering</b>  Credit requirements: 420 credits  At least 60 credits at level 3 or above. At least 100 credits at level 2 or above. At least 140 credits at level 1 or above. 120 credits at level 0.
Part – time Level 3.2	<u>UFMFX8-30-3</u> Individual Project BEng <u>UZRSSR-15-3</u> Ethics of Technology <b>Students must take 15 credits from:</b> <u>UFMFH8-15-3</u> Digital Signal Processing <u>UFMF99-15-3</u> Intelligent and Adaptive Systems <u>UFCEU3-15-3</u> Advanced Databases	<b>Highest Award</b>  <b>BEng(Hons) Automation and Robotics Engineering</b>  Credit requirements: 480 credits  At least 100 credits at level 3 or above. At least 100 credits at level 2 or above. At least 140 credits at level 1 or above. 120 credits at level 0.

### Part 5: Entry Requirements

**Applicants holding the following qualifications are eligible to apply for entry to Level 0 of the programme:**

- Thanawiya amma (General Secondary School Certificate) or the one year certificate with an overall mark of 70%, or above
- Thanawiya amma (General Secondary School Certificate) with an overall mark of 65% or above PLUS a mark of over 60% in each stage of the GCET Foundation Studies Programme

#### **PLUS**

- A minimum overall score of IELTS 5.5, or equivalent  
 Further details of entry requirements for applicants holding the IB Diploma or A Levels can be found at:  
<http://www1.uwe.ac.uk/whatcanistudy/applyingtouw/undergraduateapplications/entryrequirements.aspx>

Applicants holding more advanced qualifications may be considered for entry to the programme with advanced standing on an individual basis.

## Part 6: 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

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### Part 6: Reference Points and Benchmarks

been identified as the top sector for development.

The above specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of individual modules can be found in module specifications, available on the [University's website](#)

### FOR OFFICE USE ONLY

First CAP Approval Date	17 May 2017			
Revision CAP Approval Date		Version	1	Link to <a href="#">APT</a> (ID 4220)
	6 Nov 2017		2	Link to <a href="#">RIA</a> (ID 4533)
	29 May 2018		3	Link to <a href="#">RIA</a> (ID 4794)
Next Periodic Curriculum Review due date	2023/24			
Date of last Periodic Curriculum Review				