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PROGRAMME SPECIFICATION

Part 1: Information	
Awarding Institution	University of the West of England
Teaching Institution	Global College of Engineering and Technology (GCET), Muscat, Sultanate of Oman (GCET).
Delivery Location	GCET, Muscat, Sultanate of Oman
Study abroad / Exchange / Credit recognition	N/A
Faculty responsible for programme	Faculty of the Environment & Technology (FET)
Department responsible for programme	Engineering Design & Mathematics
Professional Statutory or Regulatory Body Links	NA
Highest Award Title	BEng (Hons) Instrumentation and Control Engineering
Default Award Title	BEng (Hons) Instrumentation and Control Engineering
Interim Award Titles	BEng Instrumentation and Control Engineering Diploma of Higher Education Instrumentation and Control Engineering Certificate of Higher Education Instrumentation and Control Engineering
UWE Progression Route	NA
Mode of Delivery	Full-time/Part-time
ISIS code/s	H66113
For implementation from	September 2018

Part 2: Description

Broad aims

- The programme is designed to provide the balance of theoretical and practical understanding needed to meet the demands of the instrumentation and control engineering in the industry for engineering practitioners, and in particular to meet the requirements for professional accreditation in partial fulfilment of CEng.
- To produce graduates with a broad understanding of the discipline in conjunction with a detailed understanding of their chosen specialism of electronic systems and instrumentation.
- The programme produces graduates with a wide range of expertise relevant to the instrumentation and control engineering industry. The programme covers a broad range of disciplines such as digital and analogue circuit design, power electronics, control, instrumentations, sensors and transducers, signal processing and project management. A number of developments have occurred in electronic engineering in recent times, although signals are analogue in nature, many electrical or electronic designs involve conversion to digital format as soon as possible and processing 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 and simulation and modeling 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.

Specific aims to elaborate upon might be:

- Gain a sound knowledge and understanding of the fundamental principles governing the behaviour of instrumentation and control engineering and of the related mathematics;
- Be capable of analysis of the behaviour of complex electronic, digital electronic or electrical systems;
- Demonstrate a capacity for innovative and creative design and be able to draw on knowledge of fundamental principles and proven systems to further develop existing systems and to generate new systems which meet required specifications;
- Have a broad knowledge and understanding of engineering theory, practices and applications and be able to use advanced techniques of analysis, synthesis and simulation, and implementation in the field of electronic engineering or electrical engineering,
- Have developed the ability, interest and motivation to conduct independent study and keep abreast of future changes in technology and engineering practices.
- Be able to work in a largely unsupervised way to undertake an individual research project and present the findings in a professional manner,
- Be able to communicate clearly, concisely and persuasively with individuals and groups, using a professional standard of English, both orally and in writing.

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 UK business for the specification, design and delivery of measurements, instrumentation and control engineering and solutions, including safety systems, as required by the automation, oil and gas and electric power generation and distribution, aerospace, transport, medical, military and other industries.

Delivered in a way that develops technically competent individuals who think and communicate effectively and who can conduct inquiry, solve problems, undertake critical analysis and deliver effective electronic and embedded software systems solutions in a constantly changing business context.

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

Regulations

A: Approved to University 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.

Part 3: Learning Outcomes of the Programme

The award route provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas:

Learning Outcomes:	UFMFJ9-30-1	UFMFCA-15-1	UFMFF8-30-1	UFMFN7-15-1	UFMFP8-15-1	UFMFVA-15-1	UFMFHA-15-2	UFMFKA-30-2	UFMFL9-15-2	UFMFMA-15-2	UFMFPK-15-2	UFMFNP-15-2	UFMFX8-30-3	UFMFW7-15-3	UFMFPP-15-3	UFMFH8-15-3	UFMF99-15-3	UFCF95-15-3	UFMFV8-15-3	UFMFE7-15-3	UFMFS7-15-3:	UFMFDE-15-3	
A) Knowledge and understanding of:																							
1. Scientific principles and methodology necessary to underpin electronic, instrumentation, control and systems engineering, to enable appreciation of its scientific and engineering context in support of understanding of future developments and technologies.			X		X	X			X	X	X	X		X	X	X					X	X	
2. Mathematical principles necessary to underpin electrical and electronic, instrumentation, control engineering and mathematical methods, tools and notations used in the analysis and solution of electrical and electronic engineering problems, number systems and their applications.	X				X	X		X	X	X		X		X	X	X				X	X	X	
3. The range of applicability of abstract models of electronic and control engineering components and their fundamental limitations in linear and non-linear circuit applications					X						X	X		X	X				X	X	X	X	
4. Electronic components, digital circuits and logic families and an ability to characterise them; ability to use combinatorial and sequential logic circuits; basic computer structure (microcomputer and DSP) their use in real-time applications. Ability to use HDL systems and techniques.		X	X	X				X		X		X				X	X		X	X			
5. System-on chip design methodologies and their application to the top-down design of electronic systems				X				X								X			X	X			

Part 3: Learning Outcomes of the Programme																							
6. The commercial, ethical, economic and legal context of engineering processes, including sustainable development, risk management, health and safety and environmental legislation.		X			X		X	X			X							X	X	X	X	X
(B) Intellectual Skills																							
1. Demonstrate an understanding of the need for a high level of professional and ethical conduct in engineering.				X	X		X	X			X		X				X	X	X		X		
2. The ability to investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues.		X		X	X		X	X			X		X	X		X		X	X	X	X	X	
3. Critically review available literature relevant to the subject discipline		X	X	X	X			X			X		X	X	X	X	X		X		X	X	
4. Demonstrate independent thinking in the design and development of solutions to real-world problems				X	X			X			X		X	X	X	X			X		X	X	
5. The ability to select and apply appropriate computer-based methods for modelling and analysing problems in the fields relating to the design, manufacture and control of electrical and electronic components and systems.				X	X			X			X		X	X	X	X		X	X		X	X	
6. The ability to understand issues relating to the marketing of products and the management processes associated with their design and manufacture.							X						X					X		X			
(C) Subject/Professional/Practical Skills																							
1. Select and apply appropriate quantitative methods and computer software tools for the evaluation, analysis and solution of electronic and systems engineering problems and situations.	X				X	X		X	X	X	X				X			X	X		X	X	
2. Apply experimental methods in the laboratory relating to engineering design, manufacture and test		X	X		X	X		X	X	X	X			X		X		X	X		X	X	
3. Use relevant design, test and measurement		X	X		X	X		X		X	X	X				X	X		X		X	X	

Part 3: Learning Outcomes of the Programme

	equipment																						
4.	Execute and manage multi-disciplinary projects.											X	X		X		X		X				X	
5.	Undertake practical testing of design ideas through laboratory work or simulation with technical analysis and critical evaluation of results.	X	X	X	X	X	X		X			X			X	X			X	X	X	X	X	
6.	Apply engineering techniques taking account of environmental, industrial and commercial constraints								X			X			X	X			X			X	X	
(D) Transferable skills and other attributes																								
1.	To communicate using professional standards of English, both orally and in writing, including, for instance, the results of technical investigations, to peers and/or to "problem owners".		X	X	X	X			X		X	X				X	X	X	X			X	X	
2.	To manage his or her own time; to meet deadlines;	X	X	X	X	X	X		X	X	X	X			X	X	X		X	X	X	X	X	
3.	To work with others, being aware of the benefits and problems which teamwork can bring, having gained insights into the problems of team-based systems development.		X		X	X	X		X			X				X			X			X	X	
4.	To use software in the context of problem-solving investigations, and to interpret findings	X		X	X	X	X		X		X	X			X	X	X			X	X	X	X	
5.	To express problems in appropriate notations.	X		X			X		X	X	X	X			X	X	X	X		X	X	X		
6.	To gain experience of, and to develop skills in, learning independently of structured class work, including the use of on-line facilities to further self-study.	X	X	X	X	X	X		X	X	X	X	X		X	X	X					X	X	
7.	To read and to use literature sources appropriate to the discipline to support learning activities**.**	X	X	X	X	X	X		X	X	X	X	X		X	X	X		X	X	X	X	X	

Part 4: Programme Structure

This structure diagram demonstrates the student journey from Entry through to Graduation for a typical **full time undergraduate student** including: level and credit requirements, interim award requirements, module diet, including compulsory and optional modules

		Compulsory Modules	Optional Modules	Awards
ENTRY	Level 0	Foundation Mathematics: Algebra & Calculus UFMFBG-30-0 Engineering Experimentation UFMFEG-30-0 Professional and Academic Skills UFCFGK-30-0 Program Design and Implementation UFCEXX-30-0	None	120 credits at Level 0 Successful completion of all level 0 modules required to permit progression to level 1.
	Level 1	Compulsory Modules Engineering Mathematics UFMFJ9-30-1 Practical Electronics UFMFCA-15-1 C Programming UFMFN7-15-1 Digital Principles UFMFF8-30-1 Electrical & Electronic Principles A UFMFP8-15-1 Electrical & Electronic Principles B UFMFVA-15-1	Optional Modules None	Interim Awards **Cert HE Instrumentation and Control Engineering** Credit Requirements: 240 credits At least 100 credits at level 1 or above. 120 credits at level 0
	Level 2	Compulsory Modules Microcontrollers Applications Group Laboratory UFMFKA-30-2 Maths for Signals & Control UFMFL9-15-2 Signal Processing & Circuits UFMFMA-15-2	Optional Modules None	Interim Awards **Dip HE Instrumentation and Control Engineering** 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. and 220 credits at level 1 or above)

		Project Management UFMFHA-15-2		
		Control UFMFV7-15-2		
		Measurements and Instrumentations UFMFNP-15-2		
		Sensors, Transducers and Actuators UFMFPK-15-2		

	Compulsory Modules	Optional Modules	Interim Awards
Level 3	Individual Project UFMFX8-30-3	**15 Credits from:** Digital Signal Processing UFMFH8-15-3 Analogue Electronics UFMFE7-15-3 Communications UFMFS7-15-3 Power Electronics UFMFDE-15-3	**BEng Instrumentation and Control Engineering** 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. **Highest award:** **BEng(Hons) Instrumentation and Control Engineering** 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
	Control System Design UFMFW7-15-3		
	Remote Sensing UFMFPP-15-3		
	Group Design and Integration Project UFMFV8-15-3		
	Intelligent and Adaptive Systems UFMF99-15-3		
	Entrepreneurial Skills UFCF95-15-3		

GRADUATION

Part time:
The following structure diagram demonstrates the student journey from Entry through to Graduation for a typical **part time student,** including: level and credit requirements; interim award requirements; module diet (i.e., compulsory and optional modules)

ENTRY		Compulsory Modules	Optional Modules	Awards
	Level 0.1	Foundation Mathematics: Algebra & Calculus UFMFBG-30-0		None
		Engineering Experimentation UFMFEG-30-0		

Level 0.2	Compulsory Modules	Optional Modules	Awards
	Professional and Academic Skills UFCFGK-30-0		120 credits at Level 0 Successful completion of all level 0 modules required to permit progression to level 1
	Program Design and Implementation UFCEXX-30-0		
Level 1.1	Compulsory Modules	Optional Modules	Interim Awards
	Engineering Mathematics UFMFJ9-30-1		
	Practical Electronics UFMFCA-15-1		
	Electrical & Electronic Principles A UFMFP8-15-1		
Level 1.2	Compulsory Modules	Optional Modules	Interim Awards
	C Programming UFMFN7-15-1		**Interim award: Cert HE Instrumentation and Control Engineering** Credit Requirements: 240 credits At least 100 credits at level 1 or above. 120 credits at level 0
	Digital Principles UFMFF8-30-1		
	Electrical & Electronic Principles B UFMFVA-15-1		
Level 2.1	Compulsory Modules	Optional Modules	Interim Awards
	Microcontrollers Applications Group Laboratory UFMFKA-30-2		
	Maths for Signals & Control UFMFL9-15-2		
	Signal Processing & Circuits UFMFMA-15-2		
Level 2.2	Compulsory Modules	Optional Modules	Interim Awards
	Project Management UFMFHA-15-2		**Dip HE Instrumentation and Control Engineering** 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.
	Control UFMFV7-15-2		
	Measurements and Instrumentations UFMFNP-15-2		
	Sensors, Transducers and Actuators UFMFPK-15-2		

	Compulsory Modules	Optional Modules	Interim Awards
Level 3.1	Remote Sensing UFMFPP-15-3		
	Intelligent and Adaptive Systems UFMF99-15-3		
	Control System Design UFMFW7-15-3		
	Entrepreneurial Skills UFCF95-15-3		
	Compulsory Modules	**Optional Modules**	**Interim Awards**
Level 3.2	Individual Project UFMFX8-30-3	**15 Credits from:** Digital Signal Processing UFMFH8-15-3 Analogue Electronics UFMFE7-15-3 Communications UFMFS7-15-3 Power Electronics UFMFDE-15-3	**BEng Electronic Systems and Instrumentation** 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. **Highest award:** **BEng (Hons) Electronic Systems and Instrumentation** 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.
	Group Design and Integration Project UFMFV8 -15-3		

GRADUATION

Part 5: Entry Requirements

The University's Standard Entry Requirements apply with the following additions/exceptions*:

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

1. Thanawiya amma (General Secondary School Certificate) or the one year certificate with an overall mark of 70%, or above
2. 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:

Part 5: Entry Requirements

http://www1.uwe.ac.uk/whatcanistudy/applyingtouwe/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 http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code
- ✓ Framework for higher education qualifications (FHEQ): http://www.qaa.ac.uk/publications/information-and-guidance/publication?PubID=2718#.Wm3lrkxuLIU
- ✓ National Qualifications Framework
- ✓ Engineering subject benchmark statements http://www.qaa.ac.uk/en/Publications/Documents/SBS-engineering-15.pdf.
- ✓ 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. SEEC level descriptors http://www.seec.org.uk/wp-content/uploads/2016/07/SEEC-descriptors-2016.pdf
- ✓ IET Handbook of Learning Outcomes for BEng and MEng programmes: https://www.scribd.com/document/343619594/IET-Learning-Outcomes . The specific outcomes are derived from the requirements for electronic and digital engineering described in The IET Handbook of Learning Outcomes for BEng and MEng programmes.

Strategies

UWE Strategy 2020
The programme addresses the following UWE Strategic Priorities:

- ✓ Priority 1 Outstanding learning
- ✓ Priority 2 Ready and able graduates
- ✓ Priority 4 Strategic partnerships, connections and networks

GCET
This programme addresses GCET 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 GECT 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 UFMFHA-15-2, UFMFKA-30-2, UFMFE7-15-3, and UFMFX8-30-3.

Employer interaction and feedback:
GCET 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.

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First SVP Approval Date	20 February 2018			
Revision Approval Date		Version	1	Link to APT (ID 4642)
Next Periodic Curriculum Review due date	2024			
Date of last Periodic Curriculum Review				