University of the West of England
BRISTOL

CORPORATE AND ACADEMIC SERVICES

PROGRAMME SPECIFICATION

Part 1: Basic Data			
Awarding Institution	University of The West of England		
Teaching Institution	Bridgwater College		
Delivery Location	Bridgwater College		
Study abroad / Exchange / Credit recognition	Not applicable		
Faculty responsible for programme	Faculty of Environment and Technology		
Department responsible for programme	Engineering, Design and Mathematics		
Modular Scheme Title			
Professional Statutory or Regulatory Body Links	Application for IET Accreditation, and fulfilment of requirements of IEng to be sought.		
Highest Award Title	FdSc Mechatronics		
Default Award Title			
Fall-back Award Title			
Interim Award Titles	Certificate of Higher Education in Mechatronics		
UWE Progression Route	BEng(Hons)/MEng Electronic Engineering		
Mode(s) of Delivery	PT only		
Codes	**UCAS:**	**JACS:**	
	ISIS2: H730	**HESA:**	
Relevant QAA Subject Benchmark Statements	Subject benchmark statements: Engineering QAA(2015), Foundation Degree Qualification Benchmarks QAA (2010).		
First CAP Approval Date	4 June 2015	Valid from	September 2016
Revision CAP Approval Date		Revised with effect from	
Version	1		
Review Date	September 2021		

Part 2: Educational Aims of the Programme

Foundation Degree programmes are designed to enable learners to benefit from the interpretation of ideas and the experience of practice, within the wider context of employment and one in which knowledge, understanding and skills are clearly integrated. By focusing on learning within a work context, that is underpinned by both vocational and academic understanding Foundation Degrees should demonstrate learning outcomes that are explicitly relevant to both employers', and perhaps also professional, needs. Furthermore, consideration of sustainability in the application of the knowledge, understanding and skills achieved should enable successful progression both within employment and to honors level or to other qualifications.

The generic outcomes identified below are taken from the descriptor for the qualification that has been used to represent the level 5 within the FHEQ. By comparison, holders of Foundation Degrees should be able to demonstrate:

1. knowledge and critical understanding of the well-established principles in their field of study and the way in which those principles have developed
2. successful application in the workplace of the range of knowledge and skills learnt throughout the programme
3. ability to apply underlying concepts and principles outside the context in which they were first studied, and the application of those principles in a work context
4. knowledge of the main methods of enquiry in their subject(s), and ability to evaluate critically the appropriateness of different approaches to solving problems in their field of study and apply these in a work context
5. An understanding of the limits of their knowledge, and how this influences analyses and interpretations based on that knowledge in their field of study and in a work context.

Typically, holders of Foundation Degrees would be able to:

6. use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis in their field of study and in a work context
7. effectively communicate information, arguments, and analysis, in a variety of forms, to specialist and nonspecialist audiences, and deploy key techniques of the discipline effectively in their field of study and in a work context
8. undertake further training, develop existing skills, and acquire new competences that will enable them to assume responsibility within organisations
9. qualities and transferable skills necessary for employment and progression to other qualifications requiring the exercise of personal responsibility and decision-making • the ability to utilise opportunities for lifelong learning.

(QAA Foundation Degree Benchmark)
http://www.qaa.ac.uk/en/Publications/Documents/Foundation-Degree-qualification-benchmark-May-2010.pdf

The learning outcomes, professional practice and transferable skills that have been written into the Foundation Degree has taken these Benchmark statements into consideration addressing them in order to ensure the graduates are have the required level of skills, knowledge within a vocational workplace context.

Workbased Learning

This will require students to produce a workbased project. Students will need to get assistance from employers or placement to ensure they can demonstrate competence in the areas listed in the modu descriptor. The module leader will wish to contact students in the workplace to assist with meeting the criteria and to discuss with the employer suitable activities that will enable this.

There may be opportunities at work where a line manager could provide testimonial support as part of evidence gathering. He or she may be invited into college to form part of the audience for a presentation that students make. Students will follow the Bridgwater College workbased regulations.

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

Part 2: Educational Aims of the Programme

Designed in conjunction with key national and multi-national employers, the FdSc Mechatronics programme provides graduates with the mix of skills and capabilities required by UK business for the specification, design and delivery of mechatronic systems and solutions, including safety critical systems, as required by the aerospace, transport, medical, military and other services.

Delivered partly in the workplace, it develops technically competent individuals who think and communicate effectively and who can conduct inquiry, solve problems, undertake critical analysis and deliver effective mechatronic 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. It can also provide a stepping stone for advanced entry into a BEng Hons or MEng programme.

Workbased Learning

As above, this will require students to produce a workbased project and students will need to get assistance from employers or placement to ensure they can demonstrate competence in the areas listed in the module descriptor. Students will follow the Bridgwater College workbased regulations.

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 with an Education for Sustainable Development (ESD) context should be highlighted.

Learning Outcomes:	UFMFJ9-30-1	UFMF7C-30-1 (WBL)	UFMFH3-30-1	UFMFP8-15-1	UFMFVA-15-1	UFMF88-30-2	UFMFL9-15-2	UFMF8C-15-2 (WBL)	UFMFMA-15-2	UFMFV7-15-2	UFMFQ8-30-2	
A) Knowledge and understanding of:												
1. scientific principles and methodology necessary to underpin mechatronic 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			
2. mathematical principles necessary to underpin electrical and electronic engineering and mathematical methods, tools and notations used in the analysis of electrical, electronic and mechatronic engineering problems	x				x		x		x	x		
3. electronic components, transducers, sensors; actuators, motors and their control				x	x	x			x		x	
4. the properties, characteristics and selection of materials used in mechanical and electro-mechanical components and systems.		x	x			x					x	
5. the application of a systems approach to product realization that encompasses integration of mechanical, electrical and software engineering						x				x	x	
6. project management techniques which may be used to achieve engineering objectives in the workplace								x				
(B) Intellectual Skills												
1. the ability to use a broad spectrum of technologies/techniques to solve design problems		x	x	x	x	x			x			
2. demonstrate cognitive skills in thinking with respect to the design and development of solutions for real-world problems		x	x			x				x	x	
3. critically review available literature relevant to the subject discipline					x				x	x	x	
4. ability to investigate and define a problem and identify design constraints including environmental and sustainability limitations, health		x				x					x	

Part 3: Learning Outcomes of the Programme

	and safety and risk assessment issues.												
5.	**the skills of selecting and applying scientific principles in the modelling and analysis of mechatronic engineering problems**	x		x	x	x	x	x		x	x	x	
6.	**ability to understand the management processes for engineering**								x				
(C) Subject/Professional/Practical Skills													
1.	**select and apply appropriate quantitative methods and computer software tools for the evaluation, analysis and solution of engineering problems**	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	
3.	**undertake practical testing of design ideas through laboratory work or simulation with technical analysis and critical evaluation of results**		x			x	x				x	x	
4.	**use of relevant design, test and measurement equipment**		x	x	x	x	x				x	x	
5.	**knowledge and understanding of workshop/laboratory practice including safety and environmental considerations**		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			
2.	**to manage his or her own time; to meet deadlines**	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 development in the workplace**				x	x			x				
4.	**to express problems in appropriate notations**	x	x	x	x	x	x	x		x	x	x	
5.	**to gain experience of, and develop further skills in, learning independently of structured class work, including the use of on-line facilities to further self-study and workplace experience where appropriate**	x	x	x	x	x	x	x	x	x	x	x	
6.	**to read and use literature sources appropriate to the discipline to support learning activities.**	x	x	x	x	x	x	x	x	x	x	x	

Part 4: Student Learning and Student Support

At UWE, Bristol there is a policy for a minimum average requirement of 12 hours/week contact time over the course of the full undergraduate programme. This contact time encompasses a range of face:face activities as described below. In addition a range of other learning activities will be embedded within the programme which, together with the contact time, will enable learning outcomes to be achieved and

Part 4: Student Learning and Student Support

demonstrated. The FdSc will typically be in excess of this minimum due to the significant proportion of laboratory based study. PSRB recommendation for engineering programmes is 18 hours contact per week in the first year of study.

Supplemental instruction will also be provided informally in the workplace as well as formally for modules delivered as work based learning.

On the FdSc Mechatronics programme, teaching is a mix of scheduled, independent and work-based learning. For the programme:

Scheduled learning includes lectures, tutorials, project supervision, demonstration, practical classes and workshops; work based learning; supervised time in workshop.

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below.

Work-based Learning includes time spent exploring issues within their organisation, using the knowledge gained on the course to address a problem(s) related to systems engineering and/or management processes and practice within their own working environment. Work based modules will be supported in the workplace by a work-based supervisor/mentor from within their own organisation. This supervisor will be approved by the College and will engage with the College visiting tutor to ensure that the student gains maximum benefit from the work based learning opportunities.

Academic Support
Academic advice and support is the responsibility of the staff delivering the module in question. Staff are expected to be available outside normal timetabled hours, either by appointment or non teaching available hours, in order to offer advice and guidance on matters relating to the material being taught and on its assessment.

Mathematics Support
Additional support in mathematics outside of timetabled classes is available throughout the academic year.

Technology Enhanced Learning
All modules on the Mechanical Engineering programme are available on the Virtual Learning Environment “Blackboard”. Additionally, computer based e-assessment / online is implemented in a number of modules, so that students can take regular short tests with automated computer generated feedback.

Description of the teaching resources provided for students

Working Environment

Currently students studying at Bridgwater College have access to quiet study areas, HE study room, IT suits and any of the colleges Learning Resource centers (LRC). The college virtual LRC and online text books/journals are also available. In addition they also have access to UWE’s LRC and its project and study rooms. The Engineering Centre provides outstanding laboratory and workshops which make for an engaging leaning environment.

Progression to Independent Study Many modules require students to carry out independent study, such as research for projects and assignments, and a full range of facilities are available to help students with these. The philosophy is accordingly to offer students both guided support and opportunities for independent study. Guided support, mainly in the form of timetabled sessions, takes the form of lectures, tutorials, seminars and practical laboratory sessions. Students are expected to attend all sessions on their timetable, this is especially important because of the high content of practical lab work in the programme. The progression to independent study is also assisted by the nature of the support offered in individual modules. Typically, module leaders will provide a plan for the module indicating the activities to be carried out and the forms of learning to be undertaken during the delivery of the module, with a view to

Part 4: Student Learning and Student Support

encouraging students to plan ahead and to take responsibility for managing their time and resources.

Engineering Facilities

Physical Resources Students can take full advantage of the fully stocked and dedicated, machining, welding & fabrication workshops, and laboratories equipped with the latest Robotic, CAD/CAM, CNC, Materials, Pneumatic/Hydraulics, Programmable Logic Control, Electronics and Process Control Technology give them unrivalled access to the latest industry standard training and education.To further enhance our CAD/CAM provision we recently purchased a new CNC machining centre enabling the link between 3D modelling software, machining simulation and computerised manufacturing. In addition we have upgraded to the latest 3D prototyping technologies, industrial standard Robotics, PLC, Process Control and other Instrumentation and Control technologies and hardware. Foundation degree students will have full access to the above facilities as well as to general purpose teaching rooms and ILT equipped teaching spaces.

Engineering Electrical & Electronics specific resources delivered in well-appointed labs catering for 20 students at a time.
Feedback Flow & level Process Control Unit
Bytronic Industrial Trainer
Scorbot ER Robot Arm
Siemens PLC Modules (ethernet)
Hameg scope HM203
Hameg scope HM303
Black daul PSU
Jupiter 2000 Gen
Low Ten VR PSU
BYTRONIC PSU
Instek Function Gen
Levell Function Gen
XYTronic Solmax 456DLX Soldering Station

Engineering Software	
Licences	**Description**
Site	AUTODESK INVENTOR 2009
20	AUTOMATION STUDIO
20	REVIT ARCHITECTURE (To Be Purchased)
20	AUTODESK SHOWCASE (To Be Purchased)
Site	ELECTRONIC WORKBENCH
Site	ELECTRONICS, MECH, MATHS AND COMPUTING
20	LADSIM PLC SIMULATION
20	PRODESKTOP
40	SOLID WORKS 2009
20	BYTRONIC PCUSIM
Site	FEEDBACK PROCESS CONTROL SOFTWARE
Site	SIEMENS SIMIT SCE
Site	MICROSOFT ROBOTICS STUDIO
15	FAMIC SCORBOT ER4
1	PlasmaCAM
1	LJ Robotics Software
1	LJ PLC software
Site	LEGO Mindstorms
16	MATLAB

Part 4: Student Learning and Student Support

Library and IT Provision

The Bridgwater College main library site is located centrally within the College in the main block at the front of the College and at the heart of College provision. We subscribe to a wide range of electronic resources to support the whole curriculum including eBooks and databases. All our e-resources are available through the virtual learning environment, Blackboard and we are linking relevant curriculum resources directly to courses within Blackboard. We use shibboleth for access to our e-resources. As students of The University of the West of England students have the opportunity to:

- access a range of specialist laboratories and IT rooms at UWE in addition to the College facilities.
- access a range of university's library and online resources.

Bridgwater and UWE library services work closely together.

Key spaces for group projects, individual workspaces, networked PCs

Bridgwater College provides 144 networked PCs within our main Library space at Bridgwater with 29 networked PCs available in our Library at Cannington. At Bridgwater we have been able to provide a range of different working environments to suit the needs of our learners – we have a silent study room with computers, along with a silent study area for book readers, collaborative working spaces including a Gallery area, computer workshop room and a dedicated HE study room. We also have an eLearning support room where students and staff can work with us on eLearning projects.

Technology Enhanced Learning (TEL)

The main repository for on-programme learning materials at HE level in recent years has been the VLE (Blackboard). This is now extensively used by all engineering staff as well as students as the first port of call for unit specific materials. The vast majority of these materials have been developed and been made available by the teaching staff, and these include subject and lesson notes, presentations, schemes of work and assignments as well as links to other resources (e.g. hyperlinks). All networked and VLE resources, including networked software applications, are available via any internet connection for any enrolled student via the remote access link on the College website. For those specialist software applications that are not available over the network, CD ROMS with student licenses are issued.

The current software resources available include the standard Windows Office packages plus specialist software to service the current engineering curriculum needs. The current list of specialist engineering software is included. The new Energy Skills and Engineering Centre has built in ILT facilities as standard in each teaching room (data projector, Promethean board, PC's).

Pastoral Care

The Bridgwater College HE Tutoring policy document Guidance Pack and its associated resources are also available at the HE Student Resources course on Blackboard. Tutors may direct HE students to this site. Tutoring is a guidance process which focuses on individual students and assists them to achieve their chosen qualifications

Aims of the HE Tutorial Programme

- To encourage successful, active and independent learning
- To familiarise students with appropriate college and university facilities
- To optimise student use of college, course and personal resources to meet individual goals
- To support the Programme Manager to track and record students' progress on programme
- To ensure students have access to advice and guidance on all matters affecting their learning, progression and employability.
- To promote and facilitate students' full participation in College life

Student Representatives

It is important that students are able to communicate to the Programme Manager any issues they may

Part 4: Student Learning and Student Support

have concerning the programme and The University of the West of England requires each programme to have at least one student representative from each year of the programme. Student Representatives are elected by the student group and will attend the Programme Committee meetings at the College. He or she will be able to raise issues and concerns on behalf of fellow students with members of the Programme Team. The student representative can also relay student concerns to module leaders and staff at any time.

Employability

Bridgwater College have strategies to promote students' employability and their ability to articulate their knowledge, skills, attitudes and values. This is resourced, managed and monitored within the curriculum, Careers advisors, LRC and Tutorial system. Contributions are made as appropriate by careers and employability specialists, academic and professional services staff, employers, professional bodies, students and graduates, including former students. Extra-curricular activities, work based learning and volunteering provide opportunities for students to develop skills and experiences that are both valued by employers and relevant more broadly after they have completed their programme of study. The college offer and support careers guidance through many way including – applying to University, UCAS application, preparation for employment, CVs, application forms, job seeking skills, interview preparation delivered in collaboration with speakers and HE Careers Advisor. Bridgwater College offers information to help guide students through potential career pathways, for further information see the College's website:
http://www.bridgwater.ac.uk/college-information.php?category=4&page=50

Students also have access to the UWE Careers and Employability Guidance.

Description of any Distinctive Features

Bridgwater College have strong links with local and national employers who take an active role in the delivery of the curriculum. Talks and industry visits enhances to provision giving students expert advice and guidance on opportunities open to them and how to apply themselves.
The Bridgwater College HeadStart programme promotes the skills and knowledge required to enhance student opportunities and on course transferable skills.
The dedicated tutorial programme provides a compressive wrap around support offer which enables students to achieve reaching their full potential.

Part 5: Assessment

A: Approved to University Regulations and Procedures

Assessment Strategy
Assessment strategy to enable the learning outcomes to be achieved and demonstrated:

A broad range of assessment strategies are used ensuring that both theoretical and practical aspects of the learning outcomes are assessed. There will be a strong focus on learning through the work environment through work-based projects and learning in the workplace. Students will be expected to draw on their professional and work experience to conceptualise their learning.

Comprehension of and ability to apply intellectual skills are tested in all engineering modules through coursework, lab and computer exercises and examinations.

Assessment Map

The programme encompasses a range of **assessment methods** including: written examination, practical examination, written assignment, presentation, report and engineering logbook. These are detailed in the following assessment map:

Assessment Map for FdSc Mechatronics

Part 5: Assessment

		Type of Assessment											
		Unseen Written Exam	Open Book Written Exam	In-class Written Test	Practical Exam	Practical Skills Assessment	Computer/In Class based tests	Oral assessment and/or presentation	Written Assignment	Report / Project	Logbook	Dissertation	Portfolio
Compulsory Modules Level 1	**UFMFJ9-30-1**	A (75)					B (12.5)		B (12.5)				
	UFMF7C-30-1 (WBL)	A (25)					B1,B2 (30)			B3 (45)			
	UFMFH3-30-1	A1 (40) B1 (40)			A2 (10) B2 (10)								
	UFMFP8-15-1	A (50)								B2 (25)G	B1 (25)		
	UFMFVA-15-1	A (50)								B2 (25)G	B1 (25)		
Compulsory Modules Level 2	**UFMF88-30-2**	A (25)								B (75)			
	UFMFL9-15-2	A (75)					B (25)						
	UFMF8C-15-2 (WBL)									A (100)G			
	UFMFMA-15-2	A (50)								B (25)	B (25)		
	UFMFQ8-30-2	A1 (75)			A2 (25)								
	UFMFV7-15-2	A (50)				A (50)							

*Assessment should be shown in terms of either Written Exams, Practical exams, or Coursework as indicated by the colour coding above.

Part 6: Programme Structure
This 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, including compulsory and optional modules.

ENTRY

	Compulsory Modules	Optional Modules	Interim Awards
Year 1	UFMFJ9-30-1 Engineering Mathematics	NONE	
	UFMF7C-30-1 Design, Materials and Manufacturing (WBL)		
	UFMFP8-15-1 Electrical and Electronic Principles A		
	UFMFVA-15-1 Electrical and Electronic Principles B		

Year 2	UFMFH3-30-1 Stress and Dynamics	NONE	Cert HE Mechatronics
	UFMFQ8-30-2 Electrical Technology		
	UFMFL9-15-2 Maths for Signals and Control		

	Compulsory Modules	Optional Modules	Interim Awards
Year 3	UFMF8C-15-2 Project Management (WBL)	NONE	
	UFMFMA-15-2 Signal Processing and Circuits		
	UFMFV7-15-2 Control		
	UFMF88-30-2 Design and Electromechanical Systems		

GRADUATION

Part 7: Entry Requirements
The University's Standard Entry Requirements apply . The University accepts all nationally recognised advanced qualifications for entry to higher education, and gives equal consideration to academic and vocational qualifications for all programmes of study. The University may also take into consideration skills and expertise gained from work experience or vocational training. Candidates should normally have achieved UCAS Tariff points of 280. GCSE: Grade C or above in English Language and Mathematics, or equivalent. A-level subjects: GCE A2 level or equivalent in Science or Maths subject from Chemistry, Physics or MathsEDEXCEL (BTEC) Diploma: Engineering and Technology related subjects, including Mathematics Access: Achievement of the Access to HE Diploma; achievement of level 3 credits in Maths (to include

Part 7: Entry Requirements

algebra and calculus), achievement of level 2 credits in Maths and English Language. The Maths Unit at Level 3 must cover the core content for AS Maths.

Mature applicants with relevant experience who do not have the stated entry requirements are encouraged to apply.

Tariff points as appropriate for the year of entry - up to date requirements are available through the courses database

Part 8: Reference Points and Benchmarks

Description of ***how*** the following reference points and benchmarks have been used in the design of the programme:

The valuable experience gained from the Mechanical Engineering Fd validated by UWE has been used in development of the Mechatronics Foundation Degree. The experience has been invaluable in understanding the partnership operational requirements, working with our peers and in ensuring the curriculum meets all stakeholder expectations.

The engineering benchmarks for foundation degree qualifications and undergraduate degrees (QAA UK Quality Code for HE) provided the guidelines for the design of the programme in conjunction with SEMTA. In particular, the Engineering Subject Benchmark Statement (2015) regarding the characteristics of engineering graduates, and the Foundation Degree Qualification Benchmark (2010) defining the characteristics of foundation degrees have influenced the design of the programme.

In addition, 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 largely based on:

The IET Handbook of Learning Outcomes for BEng and MEng Programmes

The Engineering Council learning outcomes have been used to allow for a smooth transition to a BEng Hons or MEng programme and to prepare for accreditation of the FdSc to IEng.
The modules have been designed to ensure adequate and appropriate coverage of these outcomes across the levels of study.

University strategies and policies

The programme is clearly designed to address skills shortages in the STEM related sectors. It provides and alternative route into HE for apprentices thus addressing the aim of widening participation. It enhances collaborative opportunities with regional and multi-national employers.

The programme design strives to address UWE's 2020 strategy priorities "Ready and Able Graduates" and "Strategic Partnerships- Connections and Networks".

Bridgwater College's Teaching, Learning and Assessment Strategy and Workbased Learning policy has informed the development, structure and planned delivery of the FdSc Mechatronics.

Part 8: Reference Points and Benchmarks

Staff research projects

As the delivery team are based at Bridgwater College and are primarily engaged in teaching there is less opportunity for staff research. However, the material delivered is developed by staff at UWE and informed where possible by current research conducted in the Bristol Robotics Lab, the Institute for Bio-sensing Technologies and knowledge exchange programmes. Students are also exposed to research within the workplace and may be actively working on new technological developments.

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.

Bridgwater College has strong employer links which are used to inform the curriculum by identifying changing skill needs and gaps in provision. Feedback from employers has formed an important part of the development of this programme.

This 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.

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ACADEMIC SERVICES

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11. successful application in the workplace of the range of knowledge and skills learnt throughout the programme
12. ability to apply underlying concepts and principles outside the context in which they were first studied, and the application of those principles in a work context
13. knowledge of the main methods of enquiry in their subject(s), and ability to evaluate critically the appropriateness of different approaches to solving problems in their field of study and apply these in a work context
14. An understanding of the limits of their knowledge, and how this influences analyses and interpretations based on that knowledge in their field of study and in a work context.

Typically, holders of Foundation Degrees would be able to:

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16. effectively communicate information, arguments, and analysis, in a variety of forms, to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively in their field of study and in a work context
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A) Knowledge and understanding of:												
7. scientific principles and methodology necessary to underpin mechatronic and systems engineering, to enable appreciation of its scientific and engineering context in support of understanding of future developments and technologies. **(ESD)**		X	X	X	X	X	X		X			
8. mathematical principles necessary to underpin electrical and electronic engineering and mathematical methods, tools and notations used in the analysis of electrical, electronic and mechatronic engineering problems	X				X		X		X	X		
9. electronic components, transducers, sensors; actuators, motors and their control				X	X	X			X		X	
10. the properties, characteristics and selection of materials used in mechanical and electro-mechanical components and systems. (ESD)		X	X			X					X	
11. the application of a systems approach to product realization that encompasses integration of mechanical, electrical and software engineering.						X				X	X	
12. project management techniques which may be used to achieve engineering objectives in the workplace								X				
(B) Intellectual Skills												
7. the ability to use a broad spectrum of technologies/techniques to solve design problems. (ESD)		X	X	X	X	X			X			
8. demonstrate cognitive skills in thinking with respect to the design and development of solutions for real-world problems		X	X			X				X	X	
9. critically review available literature relevant to the subject discipline					X				X	X	X	
10. ability to investigate and define a problem and identify design constraints including environmental and sustainability limitations, health and safety and risk assessment issues. (ESD)		X				X					X	
11. the skills of selecting and applying scientific principles in the modelling and analysis of mechatronic engineering problems. (ESD)	X		X	X	X	X	X		X	X	X	
12. ability to understand the management processes for engineering								X				
(C) Subject/Professional/Practical Skills												
6. select and apply appropriate quantitative methods and computer software tools for the evaluation, analysis and solution of engineering problems	X			X	X		X		X	X	X	
7. apply experimental methods in the laboratory relating to engineering design, manufacture and test.		X	X	X	X	X			X	X	X	
8. undertake practical testing of design ideas through laboratory work or simulation with		X			X	X				X	X	

Part 3: Learning Outcomes of the Programme

	technical analysis and critical evaluation of results												
9.	use of relevant design, test and measurement equipment		X	X	X	X	X				X	X	
10.	knowledge and understanding of workshop/laboratory practice including safety and environmental considerations		X				X					X	
(D) Transferable skills and other attributes													
7.	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			
8.	to manage his or her own time; to meet deadlines	X	X	X	X	X	X	X	X	X	X	X	
9.	to work with others, being aware of the benefits and problems which teamwork can bring, having gained insights into the problems of team-based development in the workplace				X	X			X				
10.	to express problems in appropriate notations	X	X	X	X	X	X	X		X	X	X	
11.	to gain experience of, and develop further skills in, learning independently of structured class work, including the use of on-line facilities to further self-study and workplace experience where appropriate	X	X	X	X	X	X	X	X	X	X	X	
12.	to read and use literature sources appropriate to the discipline to support learning activities.	X	X	X	X	X	X	X	X	X	X	X	

Part 4: Student Learning and Student Support

At UWE, Bristol there is a policy for a minimum average requirement of 12 hours/week contact time over the course of the full undergraduate programme. This contact time encompasses a range of face-to-face activities as described below. In addition a range of other learning activities will be embedded within the programme which, together with the contact time, will enable learning outcomes to be achieved and demonstrated. The FdSc will typically be in excess of this minimum due to the significant proportion of laboratory based study. PSRB recommendation for engineering programmes is 18 hours contact per week in the first year of study.

Supplemental instruction will also be provided informally in the workplace as well as formally for modules delivered as work based learning.

Induction is undertaken at both Gloucestershire College and at UWE Frenchay as the students will be expected to use systems and resources at both sites. They are encouraged to see themselves as UWE students.

On the FdSc Mechatronics programme, teaching is a mix of scheduled, independent and work-based learning. For the programme:

Scheduled Learning includes lectures, tutorials, project supervision, demonstration, practical classes and workshops; work based learning; supervised time in workshop.

Independent Learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below.

Part 4: Student Learning and Student Support

Work-based Learning includes time spent exploring issues within their organisation, using the knowledge gained on the course to address a problem(s) related to systems engineering and/or management processes and practice within their own working environment. Work-based modules will be supported in the workplace by a work-based supervisor/mentor from within their own organisation. This supervisor will be approved by the College and will engage with the College visiting tutor to ensure that the student gains maximum benefit from the work- based learning opportunities.

Academic Support
Academic advice and support is the responsibility of the staff delivering the module in question. Staff are expected to be available outside normal timetabled hours, either by appointment or non-teaching available hours, in order to offer advice and guidance on matters relating to the material being taught and on its assessment.

Mathematics Support
Additional support in mathematics outside of timetabled classes is available throughout the academic year.

Technology Enhanced Learning
Learning materials for all modules on the Mechatronics programme are available on the College's Virtual Learning Environment. Additionally, computer based e-assessment / online is implemented in a number of modules, so that students can take regular short tests with automated computer generated feedback.

Description of the teaching resources provided for students

Working Environment
Description of any Distinctive Features

The programme is delivered by Gloucestershire College and to which the following statements apply:

1. **Staff**
   Academic staff who teach on this programme are academically well qualified up to MSc level, have relevant extensive industrial experience and have extensive teaching experience. They hold PGCE qualifications and are experienced in dealing with the needs of mature and part-time students.

2. **Teaching Facilities**
   Students on this programme will benefit from excellent teaching facilities including well-equipped workshops and laboratories in the new Docklands campus, well equipped Electronics and Mechatronic Lab and state-of-the-art classrooms with Interactive Whiteboards and Internet connections. The Labs are equipped with PCs and Laptops with specialist software. Virtual Learning Environment that the students can access 24/7.

The students also have access to the engineering and library facilities at UWE.

3. **Equipment**
   The educational experience of students on this programme will be enhanced by the use of equipment such as computer based test instrumentation, microprocessor and microcontroller development systems, PLC Trainers electro mechanical rigs and specialist

Part 4: Student Learning and Student Support

software, including electronic and mechanical Computer Aided Design.

4. **Student Support**
   The College is committed to widening participation in learning, including enhancing progression into HE provision. It has high quality learning support services which are used to address the barriers to learning faced by many learners in the area, including ESOL needs, child care barriers, physical disability barriers, financial and personal problems and cultural barriers. There are specific learner support arrangements for flexible learners in the workplace and extensive support mechanisms for managing mentoring programmes. 'Well organised additional learning support for students' was identified as a key strength in our last inspection report. All students receive tutorials for academic and pastoral support. Additional support will be provided through.

- The Learning Gateway (i.e. a library)
- IT suites used for tutorial sessions
- HE Student Support Pack
- A Work-Based Learning department to support work placements

5. **Industrial Support**
   The College has strong employer links which are used to inform the curriculum by identifying changing skill needs and gaps in provision. Employers also actively participate in aspects of course delivery

Students have access to student support services at UWE.

6. **Progression to Independent Study**
   Many modules require students to carry out independent study, such as research for projects and assignments, and a full range of facilities are available to help students with these. The philosophy is accordingly to offer students both guided support and opportunities for independent study.

Guided support, mainly in the form of timetabled sessions, takes the form of lectures, tutorials, seminars and practical laboratory sessions. Students are expected to attend all sessions on their timetable, this is especially important because of the high content of practical lab work in the programme.

The progression to independent study is also assisted by the nature of the support offered in individual modules. Typically, module leaders will provide a plan for the module indicating the activities to be carried out and the forms of learning to be undertaken during the delivery of the module, with a view to encouraging students to plan ahead and to take responsibility for managing their time and resources.

7. **Engineering Facilities**
   Students can take full advantage of the fully stocked and dedicated Labs, machining, welding & fabrication workshops, and laboratories equipped with the latest CAD/CAM, CNC, Materials, Pneumatic/Hydraulics, Programmable Logic Control, Electronics and Process Control Technology give them unrivalled access to the latest industry standard training and education. Dedicate PCs and Laptops with industry standard software are available to students. To further enhance our CAD/CAM provision we recently purchased a new CNC machining centre enabling the link between 3D modelling software, machining simulation and computerised manufacturing. In addition, we have 3D prototyping technologies, standard Robotics, PLC, Process Control and other Instrumentation and Control technologies and hardware. Foundation degree students will have full access to the above facilities as well as to general purpose teaching rooms and ILT equipped teaching

Part 4: Student Learning and Student Support

spaces. The students also have access to a well-stocked library with virtual learning facility and electronic resources.

8. Library and IT Provision

The Gloucestershire College main library site is located centrally within the College in the main block and at the heart of College provision. We subscribe to a wide range of electronic resources to support the whole curriculum including eBooks and databases. All our e-resources are available through the virtual learning environment, MOODLE and we are linking relevant curriculum resources directly to courses within MOODLE. We use GC Portal for access to our e-resources outside of College. As students of The University of the West of England students have the opportunity to:

- access a range of specialist laboratories and IT rooms at UWE in addition to the College facilities.
- access a range of university's library and online resources.

Gloucestershire and UWE library services work closely together.

9. Key spaces for group projects, individual workspaces, networked PCs

Library facilities, student learning spaces, IT facilities, pc-lab provision

10. Technology Enhanced Learning (TEL)

The main repository for on-line learning materials at HE level in recent years has been the VLE (Blackboard/Moodle). This is now extensively used by all engineering staff as well as students as the first port of call for unit specific materials. The vast majority of these materials have been developed and been made available by the teaching staff, and these include subject and lesson notes, presentations, schemes of work and assignments as well as links to other resources (e.g. hyperlinks). All networked and VLE resources, including networked software applications, are available via any internet connection for any enrolled student via the remote access link on the College website. For those specialist software applications that are not available over the network, CD ROMS with student licenses are issued.

The current software resources available include the standard Windows Office packages plus specialist software to service the current engineering curriculum needs.

11. Pastoral Care

Our **Learning Support** team offers a wide range of support for students with additional learning needs and disabilities, including:

- Dyslexia, dyspraxia and dyscalculia
- Autism and Asperger's syndrome
- Sensory impairment
- Physical disability
- British Sign Language signer
- In-class support
- Access arrangements for examinations
- Assistive technology
- Personal care
- Study support (including brailing, audio, note-taking)
- Transition support for students with SEN statements / LDA's (S139a) / EHCPs

12. Student Representatives

It is important that students are able to communicate to the Programme Manager any issues they may have concerning the programme and The University of the West of England requires each programme to have at least one student representative from each year of the programme. Student Representatives are elected by the student group and will attend the Programme Committee meetings at the College. He or she will be able to raise issues and concerns on behalf

Part 4: Student Learning and Student Support

of fellow students with members of the Programme Team. The student representative can also relay student concerns to module leaders and staff at any time.

13. Employability

All students on FdSc Mechatronics will be employed and the course will offer them career progression through academic and professional development. The college has a dedicated career advice and guidance team to support the students throughout the course.

Students also have access to the UWE Careers and Employability Guidance.

Description of any Distinctive Features

The College has strong employer links which are used to inform the curriculum by identifying changing skill needs and gaps in provision. Employers also actively participate in aspects of course delivery.

Part 5: Assessment

A: Approved to University Regulations and Procedures

Assessment Strategy

A broad range of assessment strategies are used ensuring that both theoretical and practical aspects of the learning outcomes are assessed. There will be a strong focus on learning through the work environment through work-based projects and learning in the workplace.

Testing of the knowledge base is through assessed coursework (individual and group), laboratory work, oral presentation, observed group meetings, through tasks undertaken under controlled conditions and through formal examinations.

Part 6: Programme Structure

This 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, including compulsory and optional modules.

ENTRY

	Compulsory Modules	Optional Modules	Interim Awards
Year 1	UFMFJ9-30-1 Engineering Mathematics	NONE	
	UFMF7C-30-1 Design, Materials and Manufacturing (WBL)		
	UFMFP8-15-1 Electrical and Electronic Principles A		
	UFMFVA-15-1 Electrical and Electronic Principles B		

a r			

	UFMFH3-30-1 Stress and Dynamics	NONE	Cert HE Mechatronics
	UFMFQ8-30-2 Electrical Technology		
	UFMFL9-15-2 Mathematics for Signals and Control		

	Compulsory Modules	Optional Modules	Interim Awards
Year 3	UFMF8C-15-2 Project Management (WBL)	NONE	
	UFMFMA-15-2 Signal Processing and Circuits		
	UFMFV7-15-2 Control		
	UFMF88-30-2 Design and Electromechanical Systems		

GRADUATION

Part 7: Entry Requirements

In addition to the University's Standard Entry Requirements

- **Tariff points:** 280
- **GCSE:** Mathematics and English Language at grade C or above required.
- **Specific subjects:** A level Mathematics grade C; IB Mathematics (Higher) grade 5; BTEC unit Further Mathematics for Technicians; or equivalent. Also one of the following: Chemistry, Computing/Computer Science, Design and Technology, Electronics, Engineering, Information and Communications Technology, Music Technology, Physics.
- **Relevant subjects:** Physics, Computing, ICT, Engineering, Science
- **EDEXCEL (BTEC) Diploma:** BTEC Nationals accepted: Aerospace Engineering; Communications Technology; Electrical/Electronic Engineering; Engineering; Manufacturing Engineering; Mechanical Engineering; Operations and Maintenance Engineering; Polymer Processing and Materials Technology; Telecommunications.
- Students with a BTEC National Diploma must have passed Further Mathematics, and those with the 14 – 19 Diploma must also offer the Additional Specialised Learning in Mathematics.
- **Access:** Achievement of the Access to HE Diploma; achievement of Level 3 credits in Maths to include algebra and calculus (please contact us for further information and advice); plus at least one other Science or Technology subject; achievement of Level 2 credits in Maths, English Language and Science.
- **Baccalaureate IB:** Accepted (see the UCAS website for the UCAS tariff points that you can gain from the IB to put towards our points requirements)
- **An interview may also be required**

For the University's general entry requirements please see
http://www.uwe.ac.uk/study/entryReqs.shtml

Mature applicants with relevant experience who do not have the stated entry requirements are encouraged to apply.

Part 7: Entry Requirements

Tariff points as appropriate for the year of entry - up to date requirements are available through the courses database

Part 8: Reference Points and Benchmarks

Description of ***how*** the following reference points and benchmarks have been used in the design of the programme:

The valuable experience gained from the FdSc Electronic and Computer Engineering validated by UWE has been used in development of the Mechatronics Foundation Degree. The course is closely aligned with FdSc Mechatronics (Bridgwater College) programme. The experience has been invaluable in understanding the partnership operational requirements, working with our peers and in ensuring the curriculum meets all stakeholder expectations.

The engineering benchmarks for foundation degree qualifications and undergraduate degrees (QAA UK Quality Code for HE) provided the guidelines for the design of the programme in conjunction with SEMTA. In particular, the Engineering Subject Benchmark Statement (2015) regarding the characteristics of engineering graduates, and the Foundation Degree Qualification Benchmark (2010) defining the characteristics of foundation degrees have influenced the design of the programme.

http://www.qaa.ac.uk/en/Publications/Documents/Foundation-Degree-qualification-benchmark-May-2010.pdf

The learning outcomes, professional practice and transferable skills that have been written into the Foundation Degree has taken these Benchmark statements into consideration addressing them in order to ensure the graduates have the required level of skills, knowledge within a vocational workplace context.

In addition, 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 largely based on:

The IET Handbook of Learning Outcomes for BEng and MEng Programmes

The Engineering Council learning outcomes have been used to allow for a smooth transition to a BEng Hons or MEng programme and to prepare for accreditation of the FdSc to IEng.
The modules have been designed to ensure adequate and appropriate coverage of these outcomes across the levels of study.

University strategies and policies

The programme is designed to address skills shortages in the STEM related sectors. It provides and alternative route into HE for apprentices thus addressing the aim of widening participation. It enhances collaborative opportunities with regional and multi-national employers.

The programme design strives to address UWE's 2020 strategy priorities "Ready and Able Graduates" and "Strategic Partnerships- Connections and Networks".

Gloucestershire College's Teaching, Learning and Assessment Strategy and Workbased Learning policy has informed the development, structure and planned delivery of the FdSc Mechatronics.

Part 8: Reference Points and Benchmarks

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.

Gloucestershire College has strong employer links which are used to inform the curriculum by identifying changing skill needs and gaps in provision. Feedback from employers has formed an important part of the development of this programme.

The programme has been designed in conjunction with industrial partners (including GE Aviation (Bishops Cleeve), GE Oil & Gas (Nailsea), Renishaw, Ultra Electronics, G-TEM, Spirax Sarco, Versarien, Poeton, GET – Gloucestershire Engineering Training and others) to provide a study route for higher engineering apprentices in the mechatronics and related industries. It has been developed via a number of stakeholder meetings held at GlosCol. This included current and past students.

This ensures that the programme meets the requirements of major employers regionally, nationally and globally in providing the blend of academic and vocational skills needed by modern engineers.

Modules within the programme are also delivered within UWE and in partner institutions. This Foundation degree has been developed in conjunction with academic and industrial partners with the intention of being a feed into the MEng/BEng (Hons) Electronic Engineering.

This programme is designed to provide the opportunity for advanced entry into any of the following undergraduate programmes subject to satisfactory completion of the foundation degree:

MEng/BEng (Hons) Electronic Engineering degrees

This 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.

University of the West of England
BRISTOL

ACADEMIC SERVICES

PROGRAMME SPECIFICATION

Part 1: Basic Data			
Awarding Institution	University of The West of England		
Teaching Institution	Weston College (University Centre Weston)		
Delivery Location	Weston College (University Centre Weston)		
Study abroad / Exchange / Credit recognition	Not applicable		
Faculty responsible for programme	Faculty of Environment and Technology		
Department responsible for programme	Engineering, Design and Mathematics		
Modular Scheme Title			
Professional Statutory or Regulatory Body Links			
Highest Award Title	FdSc Mechatronics		
Default Award Title			
Fall-back Award Title			
Interim Award Titles	Certificate of Higher Education in Mechatronics		
UWE Progression Route	BEng (Hons)/MEng Electronic Engineering		
Mode(s) of Delivery	PT only		
Codes	**UCAS:**	**JACS:**	
	ISIS2: H730	**HESA:**	
Relevant QAA Subject Benchmark Statements	Subject benchmark statements: Engineering QAA (2015), Foundation Degree Qualification Benchmarks QAA (2010).		
First CAP Approval Date	2 June 2016	Valid from	September 2016
Revision CAP Approval Date	8 August 2017	Revised with effect from	September 2017
Version	1		
Review Date	June 2022		

Part 2: Educational Aims of the Programme

Foundation Degree programmes are designed to enable learners to benefit from the interpretation of ideas and the experience of practice, within the wider context of employment and one in which knowledge, understanding and skills are clearly integrated. By focusing on learning within a work context, that is underpinned by both vocational and academic understanding Foundation Degrees should demonstrate learning outcomes that are explicitly relevant to both employers', and perhaps also professional, needs. Furthermore, consideration of sustainability in the application of the knowledge, understanding and skills achieved should enable successful progression both within employment and to honours level or to other qualifications.

The generic outcomes identified below are taken from the descriptor for the qualification that has been used to represent the level 5 within the Frameworks for Higher Education Qualifications. By comparison, holders of Foundation Degrees should be able to demonstrate:

19. knowledge and critical understanding of the well-established principles in their field of study and the way in which those principles have developed
20. successful application in the workplace of the range of knowledge and skills learnt throughout the programme
21. ability to apply underlying concepts and principles outside the context in which they were first studied, and the application of those principles in a work context
22. knowledge of the main methods of enquiry in their subject(s), and ability to evaluate critically the appropriateness of different approaches to solving problems in their field of study and apply these in a work context
23. An understanding of the limits of their knowledge, and how this influences analyses and interpretations based on that knowledge in their field of study and in a work context.

Typically, holders of Foundation Degrees would be able to:

24. use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis in their field of study and in a work context
25. effectively communicate information, arguments, and analysis, in a variety of forms, to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively in their field of study and in a work context
26. undertake further training, develop existing skills, and acquire new competences that will enable them to assume responsibility within organisations
27. qualities and transferable skills necessary for employment and progression to other qualifications requiring the exercise of personal responsibility and decision-making and the ability to utilise opportunities for lifelong learning.

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

Designed in conjunction with key national and multi-national employers, the FdSc Mechatronics programme provides graduates with the mix of skills and capabilities required by UK business for the specification, design and delivery of mechatronic systems and solutions, including safety critical systems, as required by the aerospace, transport, medical, military and other services.

Delivered partly in the workplace, the programme develops technically competent individuals who think and communicate effectively and who can conduct inquiry, solve problems, undertake critical analysis and deliver effective mechatronic 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. It also provides a stepping stone for advanced entry into a BEng Hons or MEng programme.

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	**UFMF7C-30-1 (WBL)**	UFMFH3-30-1	UFMFP8-15-1	UFMFVA-15-1	**UFMF88-30-2**	UFMFL9-15-2	**UFMF8C-15-2 (WBL)**	UFMFMA-15-2	UFMFV7-15-2	**UFMFQ8-30-2**	
A) Knowledge and understanding of:												
13. scientific principles and methodology necessary to underpin mechatronic and systems engineering, to enable appreciation of its scientific and engineering context in support of understanding of future developments and technologies. **(ESD)**		X	X	X	X	X	X		X			
14. mathematical principles necessary to underpin electrical and electronic engineering and mathematical methods, tools and notations used in the analysis of electrical, electronic and mechatronic engineering problems	X				X		X		X	X		
15. electronic components, transducers, sensors; actuators, motors and their control				X	X	X			X		X	
16. the properties, characteristics and selection of materials used in mechanical and electro-mechanical components and systems. (ESD)		X	X			X					X	
17. the application of a systems approach to product realization that encompasses integration of mechanical, electrical and software engineering.						X				X	X	
18. project management techniques which may be used to achieve engineering objectives in the workplace								X				
(B) Intellectual Skills												
13. the ability to use a broad spectrum of technologies/techniques to solve design problems. (ESD)		X	X	X	X	X			X			
14. demonstrate cognitive skills in thinking with respect to the design and development of solutions for real-world problems		X	X			X				X	X	
15. critically review available literature relevant to the subject discipline					X				X	X	X	
16. ability to investigate and define a problem and identify design constraints including environmental and sustainability limitations, health and safety and risk assessment issues. (ESD)		X				X					X	
17. the skills of selecting and applying scientific principles in the modelling and analysis of mechatronic engineering problems. (ESD)	X		X	X	X	X	X		X	X	X	
18. ability to understand the management processes for engineering								X				
(C) Subject/Professional/Practical Skills												
11. select and apply appropriate quantitative methods and computer software tools for the evaluation, analysis and solution of engineering problems	X			X	X		X		X	X	X	
12. apply experimental methods in the laboratory relating to engineering design, manufacture and test.		X	X	X	X	X			X	X	X	
13. undertake practical testing of design ideas		X			X	X				X	X	

Part 3: Learning Outcomes of the Programme

	through laboratory work or simulation with technical analysis and critical evaluation of results												
14.	use of relevant design, test and measurement equipment		X	X	X	X	X				X	X	
15.	knowledge and understanding of workshop/laboratory practice including safety and environmental considerations		X				X					X	
(D) Transferable skills and other attributes													
13.	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			
14.	to manage his or her own time; to meet deadlines	X	X	X	X	X	X	X	X	X	X	X	
15.	to work with others, being aware of the benefits and problems which teamwork can bring, having gained insights into the problems of team-based development in the workplace				X	X			X				
16.	to express problems in appropriate notations	X	X	X	X	X	X	X		X	X	X	
17.	to gain experience of, and develop further skills in, learning independently of structured class work, including the use of on-line facilities to further self-study and workplace experience where appropriate	X	X	X	X	X	X	X	X	X	X	X	
18.	to read and use literature sources appropriate to the discipline to support learning activities.	X	X	X	X	X	X	X	X	X	X	X	

Part 4: Student Learning and Student Support

Students undertake a minimum average requirement of 12 hours/week contact time over the course of the full undergraduate programme. This contact time encompasses a range of face-to-face activities as described below. In addition a range of other learning activities will be embedded within the programme which, together with the contact time, will enable learning outcomes to be achieved and demonstrated. The FdSc will typically be in excess of this minimum due to the significant proportion of laboratory based study. PSRB recommendation for engineering programmes is 18 hours contact per week in the first year of study.

Supplemental instruction will also be provided informally in the workplace as well as formally for modules delivered as work based learning.

Induction is undertaken at both University Centre Weston and at UWE Frenchay as the students will be expected to use systems and resources at both sites. They are encouraged to see themselves as UWE students.

On the FdSc Mechatronics programme, teaching is a mix of scheduled, independent and work-based learning. For the programme:

Scheduled Learning includes lectures, tutorials, project supervision, demonstration, practical classes and workshops; work based learning and supervised time in workshop.

Independent Learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below.

Part 4: Student Learning and Student Support

Work-based Learning includes time spent exploring issues within their organisation, using the knowledge gained on the course to address a problem(s) related to systems engineering and/or management processes and practice within their own working environment. Work-based modules will be supported in the workplace by a work-based supervisor/mentor from within their own organisation. This supervisor will be approved by the University Centre Weston and will engage with the College visiting tutor/assessor to ensure that the student gains maximum benefit from the work- based learning opportunities.

Academic Support
Academic advice and support is the responsibility of the staff delivering the module in question. Staff are expected to be available outside normal timetabled hours, either by appointment or through published staff availability, in order to offer advice and guidance on matters relating to the material being taught and on its assessment.

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Technology Enhanced Learning
Learning materials for all modules on the Mechatronics programme are available on the Virtual Learning Environment. Additionally, computer based e-assessment / online is implemented in a number of modules, so that students can take regular short tests with automated computer generated feedback.

Description of the teaching resources provided for students

Working Environment
Description of any Distinctive Features

The FdSc programme is delivered by University Centre Weston and to which the following statements apply:

14. **Staff**
    Academic staff who teach on this programme are academically well qualified up to PhDlevel, have relevant extensive industrial experience and have extensive teaching experience. They hold PGCE qualifications and are experienced in dealing with the needs ofa wide variety of students..

15. **Teaching Facilities**
    Students on this programme will benefit from excellent teaching facilities including well-equipped workshops and laboratories in the New South West Skills Campus, well equipped Electronics and Mechatronic Lab and state-of-the-art classrooms with interactive whiteboards and Internet connections. The Labs are equipped with PCs and Laptops with specialist software. Virtual Learning Environment that the students can access 24/7.

The students also have access to the engineering and library facilities at UWE.

16. **Equipment**
    The educational experience of students on this programme will be enhanced by the use of equipment such as computer based test instrumentation, microprocessor and microcontroller development systems, PLC Trainers electro mechanical rigs and specialist software, including electronic and mechanical Computer Aided Design.

Part 4: Student Learning and Student Support

17. **Student Support**
    University Centre Weston is committed to widening participation in learning, including enhancing progression into HE provision. The College has high quality learning support services which are used to address the barriers to learning faced by many students. There are specific learner support arrangements for flexible learners in the workplace and extensive support mechanisms for managing and mentoring programmes. All students receive tutorials for academic and pastoral support. Additional support will be provided through.

- The personal tutor assigned to the programme.
- Specialist support and welfare services.
- •An HE student support service provided by the The HE Academic Registry Team (HEART) team
- An apprenticeship team and assessors to support work placements.

18. **Industrial Support**
    University Centre Westonhas strong employer links which are used to inform the curriculum by identifying changing skill needs and gaps in provision. Employers also actively participate in aspects of course delivery

Students have access to student support services at UWE.

19. **Progression to Independent Study**
    Many modules require students to carry out independent study, such as research for projects and assignments, and a full range of facilities are available to help students with these. The philosophy is accordingly to offer students both guided support and opportunities for independent study.

Guided support, mainly in the form of timetabled sessions, takes the form of lectures, tutorials, seminars and practical laboratory sessions. Students are expected to attend all sessions on their timetable, this is especially important because of the high content of practical lab work in the programme.

The progression to independent study is also assisted by the nature of the support offered in individual modules. Typically, module leaders will provide a plan for the module indicating the activities to be carried out and the forms of learning to be undertaken during the delivery of the module, with a view to encouraging students to plan ahead and to take responsibility for managing their time and resources. The assessment processes and timetable for assessments adheres to the UWE requirements.

20. **Engineering Facilities**
    Students can take full advantage of the fully stocked and dedicated laboratories, machining, welding & fabrication workshops, laboratories equipped with the latest CAD/CAM, CNC, Materials, Pneumatic/Hydraulics, Programmable Logic Control, Electronics and Process Control Technology give them access to industry standard training and education. Dedicate PCs and Laptops with industry standard software are available to students. To further enhance our CAD/CAM provision we recently purchased new CNC machining centres enabling the link between 3D modelling software, machining simulation and computerised manufacturing. In addition, we have 3D prototyping technologies, standard Robotics, PLC, Process Control and other Instrumentation and Control technologies and hardware. Foundation degree students will have full access to the above facilities as well as to general purpose teaching rooms and ILT equipped teaching spaces. The students also have access to a well-stocked library with virtual learning facility and electronic resources.

Part 4: Student Learning and Student Support

. **8. Library and IT Provision**

The University Centre Weston (UCW) main library site is located centrally within the Winter Gardens We subscribe to a wide range of electronic resources to support the whole curriculum including eBooks and databases. All our e-resources are available through the virtual learning environment, MOODLE and we are linking relevant curriculum resources directly to courses within MOODLE. As students of The University of the West of England students have the opportunity to:

- access a range of specialist laboratories and IT rooms at UWE in addition to the College facilities.
- access a range of university's library and online resources.

UCW and UWE library services work closely together.

22. Key spaces for group projects, individual workspaces, networked PCs

Library facilities, student learning spaces, IT facilities, pc-lab provision

23. Technology Enhanced Learning (TEL)

The main repository for on-programme learning materials at HE will be the VLE (Blackboard/Moodle) as well as a move to Office 365. This is now extensively used by all engineering staff as well as students as the first port of call for unit specific materials. The vast majority of these materials have been developed and been made available by the teaching staff, of the University, but will be augmented and enhanced by University Centre Weston Staff these include: subject and lesson notes, presentations, schemes of work and assignments as well as links to other resources (e.g. hyperlinks). All networked, Office 365 and VLE resources, including networked software applications, are available via any internet connection for any enrolled student via the remote access link on the College website.

The current software resources available include the standard Windows Office packages plus specialist software to service the current engineering curriculum needs.

Pastoral Care

The HE Academic Registry Team (HEART**)** offer wide range of support for students with additional learning needs and disabilities. HEART also offers welfare support and has a Mental Health Specialist available to all students regardless of a diagnosis. Study Skills specialist support is arranged and provided by HEART and students are able to contact them directly to discuss any issues they may be having; personal or academic.

Students can disclose a learning need or disability at any point during the application and enrolment process.

Student Representatives

It is important that students are able to communicate to the Programme Manager any issues they may have concerning the programme and UWE requires each programme to have at least one student representative from each year of the programme. Student Representatives are elected by the student group and will attend the Programme Committee meetings and the Student and Staff Committee meetings at University Centre Weston. He or she will be able to raise issues and concerns on behalf of fellow students with members of the Programme Team. The student representative can also relay student concerns to module leaders or HEART any time.

Employability

The majority of students on FdSc Mechanical Engineering will be employed and the course

Part 4: Student Learning and Student Support

will offer them career progression through academic and professional development. The college has a dedicated career advice and guidance team to support the students throughout the course.

Students also have access to the University Centre Weston Careers Services; this service is provided by UWE but available to students at the UCW Winter Gardens campus..

Students also have access to the UWE Careers and Employability Guidance.

Description of any Distinctive Features

The College has strong employer links which are used to inform the curriculum by identifying changing skill needs and gaps in provision. Employers also actively participate in aspects of course delivery. Engineering provision has been developed to meet the needs of employers in the region and aligns with the University Centre Weston mission statement.

Part 5: Assessment

A: Approved to University Regulations and Procedures

Assessment Strategy

A broad range of assessment strategies are used ensuring that both theoretical and practical aspects of the learning outcomes are assessed. There will be a strong focus on learning through the work environment through work-based projects and learning in the workplace.

Testing of the knowledge base is through assessed coursework (individual and group), laboratory work, oral presentation, observed group meetings, through tasks undertaken under controlled conditions and through formal examinations.

Part 6: Programme Structure
This 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, including compulsory and optional modules.

ENTRY

	Compulsory Modules	Optional Modules	Interim Awards
Year 1	UFMFJ9-30-1 Engineering Mathematics UFMF7C-30-1 Design, Materials and Manufacturing (WBL) UFMFH3-30-1 Stress and Dynamics UFMFP8-15-1 Electrical and Electronic Principles A UFMFVA-15-1 Electrical and Electronic Principles B	NONE	Cert HE Mechatronics 120 credits at appropriate level

Year 2	UFMFL9-15-2 Mathematics for Signals and Control UFMF88-30-2 Design and Electromechanical Systems UFMF8C-15-2 Project Management (WBL)	NONE	As defined on completion of year 1

	Compulsory Modules	Optional Modules	Interim Awards
Year 3	UFMFMA-15-2 Signal Processing and Circuits UFMFV7-15-2 Control UFMFQ8-30-2 Electrical Technology	NONE	As defined on completion of year 1

GRADUATION

Achievement of FdSc allows progression to Level 3 of BEng (Hons) Electronic Engineering. If students achieve at least a 60% average across level 2 modules, then they will have achieved the criteria for progression to MEng

Part 7: Entry Requirements

In addition to the University's Standard Entry Requirements

- **GCSE:** Mathematics and English Language at grade C or above required.
- **Specific subjects:** A level Mathematics grade C; IB Mathematics (Higher) grade 5; BTEC unit Further Mathematics for Engineering Technicians; or equivalent. Also one of the following: Chemistry, Computing/Computer Science, Design and Technology, Electronics, Engineering, Information and Communications Technology, Music Technology, Physics.
- **Relevant subjects:** Physics, Computing, ICT, Engineering, Science
- **EDEXCEL (BTEC) Diploma:** BTEC Nationals accepted: Aerospace Engineering; Communications Technology; Electrical/Electronic Engineering; Engineering; Manufacturing Engineering; Mechanical Engineering; Operations and Maintenance Engineering; Polymer Processing and Materials Technology; Telecommunications.
- Students with a BTEC National Diploma must have passed Further Mathematics for Engineering Technicians, and those with the 14 – 19 Diploma must also offer the Additional Specialised Learning in Mathematics.
- **Access:** Achievement of the Access to HE Diploma; achievement of Level 3 credits in Mathematics to include algebra and calculus (please contact us for further information and advice); plus at least one other Science or Technology subject; achievement of Level 2 credits in Mathematics, English Language and Science.
- **Baccalaureate IB:** Accepted (see the UCAS website for the UCAS tariff points that you can gain from the IB to put towards our points requirements)
- **An interview may also be required**

For the University's general entry requirements please see http://www.uwe.ac.uk/study/entryReqs.shtml

Mature applicants with relevant experience who do not have the stated entry requirements are encouraged to apply.

Tariff points as appropriate for the year of entry - up to date requirements are available through the courses database

Part 8: Reference Points and Benchmarks

Description of ***how*** the following reference points and benchmarks have been used in the design of the programme:

The engineering benchmarks for foundation degree qualifications and undergraduate degrees (QAA UK Quality Code for HE) provided the guidelines for the design of the programme in conjunction with SEMTA. In particular, the Engineering Subject Benchmark Statement (2015) regarding the characteristics of engineering graduates, and the Foundation Degree Qualification Benchmark (2010) defining the characteristics of foundation degrees have influenced the design of the programme.

http://www.qaa.ac.uk/en/Publications/Documents/Foundation-Degree-qualification-benchmark-May-2010.pdf

The learning outcomes, professional practice and transferable skills that have been written into the Foundation Degree has taken these Benchmark statements into consideration addressing

Part 8: Reference Points and Benchmarks

them in order to ensure the graduates have the required level of skills, knowledge within a vocational workplace context.

In addition, 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 largely based on:

The IET Handbook of Learning Outcomes for BEng and MEng Programmes

The Engineering Council learning outcomes have been used to allow for a smooth transition to a BEng Hons or MEng programme and to prepare for accreditation of the FdSc to IEng.
The modules have been designed to ensure adequate and appropriate coverage of these outcomes across the levels of study.

University strategies and policies

The programme is designed to address skills shortages in the STEM related sectors. It provides and alternative route into HE for apprentices thus addressing the aim of widening participation. It enhances collaborative opportunities with regional and multi-national employers.

The programme design strives to address UWE's 2020 strategy priorities "Ready and Able Graduates" and "Strategic Partnerships- Connections and Networks".

University Centre Weston's Teaching, Learning and Assessment Strategy and Workbased Learning policy has informed the development, structure and planned delivery of the FdSc Mechatronics.

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.

University Centre Weston has strong employer links which are used to inform the curriculum by identifying changing skill needs and gaps in provision. Feedback from employers has formed an important part of the development of this programme.

The programme has been designed in conjunction with industrial partners to provide a study route for higher engineering apprentices in the mechanical engineering and related industries..

This ensures that the programme meets the requirements of major employers regionally, nationally and globally in providing the blend of academic and vocational skills needed by modern engineers.

Modules within the programme are also delivered within UWE and in partner institutions. This Foundation degree has been developed in conjunction with academic and industrial partners with the intention of being a feed into the MEng/BEng (Hons) Electronic Engineering.

This programme is designed to provide the opportunity for advanced entry into any of the following undergraduate programmes subject to satisfactory completion of the foundation degree:

MEng/BEng (Hons) Electronic Engineering degrees

This 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.