University of the West of Scotland

Undergraduate Programme Specification

Session: 2023/24

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Named Award Title:	**BEng (Hons) Mechanical Engineering (Sandwich Available) Single**

Award Title for Each Award:	**BEng (Hons) Mechanical Engineering (Sandwich Available)** **BEng /BSc Mechanical Engineering** **Dip HE Engineering** **Cert HE Engineering Science**

Date of Validation:	March 2019
Details of Cohorts Applies to:	Cohorts from session 2023 onwards

Awarding Institution/Body:	University of the West of Scotland
Teaching Institution:	University of the West of Scotland
Language of Instruction & Examination:	English
Award Accredited By:	Institution of Mechanical Engineers
Maximum Period of Registration:	Full time: 6 years.
Mode of Study:	Full Time Part Time
Campus:	Paisley

School:	School of Computing, Engineering and Physical Sciences
Programme Board	Engineering
Programme Leader:	Dr Esther Smith

Admission Criteria

Candidates must be able to satisfy the general admission requirements of the University of the West of Scotland as specified in Chapter 2 of the University Regulatory Framework together with the following programme requirements:

SQA National Qualifications

Entry Requirements: ABBB (114 UCAS Tariff points) including Mathematics, plus SQA National 5 (Grade B, or above) / Intermediate 2 (Grade B, or above) / Standard Grade (Credit) Physics

or GCE

BBC (112 UCAS Tariff points) including Mathematics and Physics

or SQA National Qualifications/Edexcel Foundation

An appropriate HNC/HND award with the level of entry and/or credit awarded being subject to the content of the HN programme and marks for Graded Units. All advanced entry will be considered on an individual basis.

Other Required Qualifications/Experience

Applicants may also be considered with other academic, vocational or professional qualifications deemed to be equivalent. We welcome applications from international students with equivalency of qualifications. Scholarships may be available on application.

Further desirable skills pre-application

General Overview

Graduates from the BEng (Hons) Mechanical Engineering programme will have an ability to develope solutions for a wide range of engineering problems using new or existing technologies, through innovation, creativity and change.

Graduates will possess the following defining charateristics. A coherent body of knowledge including mathematics, natural science and engineering principles, and a proven ability to apply that knowledge to analyse and solve complex engineering problems. Some of the knowledge will be at the forefront mechanical engineering. Graduates will be able to select and apply quantitative and computational analysis techniques, recognising the limitations of the methods employed. They will have an appreciation of professional engineering practice and ethics, graduates will be commercially aware and be able to apply their knowledge and skills to design and deliver new products or services to meet defined needs using new or existing technologies.

The BEng (Hons) Mechanical Engineering Programme is contextually aligned with the Engineering Council AHEP4 Learning outcomes listed below:

C1. Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2. Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.

C3. Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed.

C4. Select and evaluate technical literature and other sources of information to address complex problems

C5. Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.

C6. Apply an integrated or systems approach to the solution of complex problems.

C7. Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts.

C8. Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.

C9. Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.

C10. Adopt a holistic and proportionate approach to the mitigation of security risks.

C11. Adopt an inclusive approach to engineering practice and re cognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.

C12. Use practical laboratory and workshop skills to investigate complex problems.

C13. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

C14. Discuss the role of quality management systems and continuous improvement in the context of complex problems.

C15. Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights.

C16. Function effectively as an individual, and as a member or leader of a team.

C17. Communicate effectively on complex engineering matters with technical and non-technical audiences.

C18. Plan and record self-learning and development as the foundation for lifelong learning/CPD.

General Overview of Programme

The teaching and learning methods employed by staff in the delivery of the module portfolio covers a wide range of established as well as some novel approaches. Much of this is left to the professionalism of the staff delivering the material with traditional lectures and tutorials still forming the basis for much of the teaching and learning within the School but also flipped classroom and online, video recording of sessions is now found in all modules . Extensive use is also made of laboratories, seminars, group work, independent learning and demonstrations. More use is now being made of problem-based learning materials in the teaching environment. One of the main objectives in this area is to keep teaching materials as interesting and as relevant as possible to ensure student enthusiasm for the subjects being presented. Staff make full use of all technologies when delivering materials to students including use of multi-media presentations and extensive use of the internet/electronic technology or other appropriate e-learning strategies. The School has a policy of using small tutorial groups in the key subject areas and either sub-divides cohorts into small groups or increases staff numbers in classroom or laboratory environments. All modules are taught by subject experts and for final year students staff make use of materials and topics raised through their professional activities whether research or consultancy based. Many case studies and examples of applications are taken from live industrial situations. The School has always taken a lead in the use of IT to either deliver material or to supplement and reinforce the traditional teaching and learning approaches. Students currently have access to high specification workstations in state of the art air conditioned laboratories. Students and staff have personal accounts for the School facilities and students are able to gain 24 hour access to the IT facilities seven days per week.

All modules are now supported electronically, providing notes, copies of lectures models, videos etc. Students can also contact staff via e-mail or vice-versa. Students are supplied with staff contact details (including e-mail addresses) in the Programme Handbooks. There are examples within the School where staff make use of the VLE to perform additional teaching and learning activities such as on-line tests and asessments. A variety of assessment methods are used throughout the programmes. These range from class tests, laboratory reports, design assessments, individual and group presentations and formal examinations. In first year, assessment is by class test, coursework and exams. This aims to build confidence in the student's ability to pass modules. Both group project work and individual project work are incorporated into the curriculum so that students develop their learning skills associated with group and independent working as well as giving presentations on their work. Formative feedback and constructive comments are given to the student on their work. Anonymous marking is undertaken, where possible. Honours projects and group projects are double marked. Mixtures of formative and summative methods are used in the assessment of student performance within the School. It is recognised that while most assessments are summative in nature, demands from students have indicated a desire for more assessment which delivers regular feedback. Where possible, this has been attempted but it is noted that this puts extreme demands on the available time that academics have for marking. There are a number of modules with PDP elements that are integrated within the module content (e.g. Project Management). However there are additional hours and a number of PDP activities that will be scheduled and presented out with the selected modules in accordance with School PDP guidelines. These will be presented, where possible, on the normal days of student attendance or during induction.

The programme and programme specification has been reviewed and updated taking cognisance of the University's Curriculum Framework principles as discussed below.

Student Centred

Reflection on learning is inherent and credit bearing in all years of the programme.

Advanced entry to the programme is available where RPL/CPD/informal learning is evidenced.

Access to student support (programme team, peers and wider University student services) is promoted at induction, through personal tutoring/year/programme leader, group activity in all levels of the programme, SCQF Level appropriate employability and careers sessions and within modules evident in entry level of the programme.

Engagement and progress is monitored by module coordinators, this takes the form of VLE analytics, assessment engagement, on-campus activity engagement and formative and summative assessment engagement. Monthly meetings with year leads and programme leads allows the programme teams to respond appropriately and quickly both from a student and programme learning, teaching and assessment perspective.

Co-creation of curriculum is challenging due to the need to demonstrate that Engineering Council learning outcomes are met by all students. However, within a number of modules students can determine the direction of their learning with boundaries set to ensure the assessment is fit for purpose[1].

Programme Delivery

Delivery of the programme is demonstrated by on-campus lectures, tutorial, laboratory or group work activity. The timetables are produced to ensure on-campus learning time is efficiently maximised.

Simple and Coherent

The programme has multiple exit award points as demonstrated in the programme specification and students are supported/counselled appropriately by the programme leader after examiners' panels.

Programme teams are aware of the programme learning outcomes through ongoing programme development meetings. The importance of the modular outcomes and assessment approaches on the overall programme outcomes and Engineering Council's learning outcomes, student feedback and sustainability are core to the discussions at these meetings. Students are made aware of the programme learning outcomes at induction, module introductions and programme development workshops. A capstone module is present at L10- Final Year Project.

Assessment, wherever possible, follows real-world activities examination is required as part of the accreditation requirements however this follows an open-book approach providing time-bound, individually assessed, unfamiliar problems- assessing content and developing a number of important meta-skills. All modules have inherent tutorial activity with formative assessment providing concurrent feedback allowing implementable feed-forward.

Academic accreditation is the mark of assurance that individual engineering programmes within higher education meet the required overall standards set by the **engineering profession** and defined by the Engineering Council (EngC). The programme prepares students for a career in engineering and the content is guided and evaluated by the Engineering Councils Standard for Professional Engineering Competence and Commitment.

Meta-skills are embedded in the programme as is required by the Engineering Council and these include digital skills, creativity, critical thinking, innovation, and entrepreneurship and social enterprise.

Students are assessed in a variety of ways and settings including, practical, written, oral, time-bound, group, real-world environment, creative, critical thinking and this broad approach to assessment provides a number of transferrable skills to be developed whilst assessing.

Inclusivity

The programme team have reviewed the content of the AdvanceHE Anti-Racist Curriculum Project[2] and are aware that in this regard 'curricular reform is a continual process rather than a final destination'. With this in mind further institutional guidance is welcomed to ensure that every effort has been made to ensure the curriculum is and continues to be anti-racist and inclusive for all.

Sustainability

Wherever possible modules are shared with other engineering programmes to maximise efficiency with specific programme contextualised components of learning, teaching and assessment. All modules have been reviewed to ensure they meet the norms around contact hours.

[1] https://www.uws.ac.uk/media/8142/assessment-handbook-2021-22.pdf

[2] https://www.advance-he.ac.uk/anti-racist-curriculum-project

Graduate Attributes, Employability & Personal Development Planning

Graduate Attributes

UWS' Graduate Attributes focus on academic, personal and professional skills and throughout the programmes that these skills develop graduates who are universally prepared, work-ready and successful. The Mechanical Engineering programme provides opportunities throughout the levels to enable these skills to be developed and focussed appropriately.

Mechanical Engineering knowledge is assembled throughout the programme and wherever possible digital literacy skills and ability to provide effective solutions is enhanced utilising industry standard appropriate technologies such as MATLAB, MATHCAD, CAD, FEA and CFD software.

Particularly, but not exclusively, in later years of the programme, critical analytical and inquiry skills are developed and used to solve industry related problems in modules such as Design, Prototyping and Testing and Design and Applications.

Structural and Fluids design and analysis exercises are utilised where incisive and innovative solutions are required to be effectively presented as part of collaborative groups or as individual autonomous learning activities.

The programme promotes cultural awareness and emotional intelligence with a variety of group exercises developing resilient, ambitious and enterprising leadership qualities whilst ensuring that group members are emotionally and culturally aware and respectful communication and behaviours are the norm.

Commercial awareness is linked to mechanical design activities during the programme ensuring that costs associated with staff, materials, manufacture, in-service and decommissioning are considered when developing transformational/innovative solutions with commercial potential.

Ethical awareness and social responsibility is developed throughout and is formalised in final year project studies where School/University ethical approval is sought if required.

Links to current University and programme research are promoted through the programme with opportunities for students to become involved in aspects of the research from the earliest opportunity either discretely or as part of an assessment.

PDP and Employablility

The University's Mechanical Engineering graduates gain employment throughout the UK and overseas in engineering and manufacturing companies, consulting engineers, engineering contractors and also research activities. The programe is also organised to allow part time entry allowing those in employment to undetake degree award on a day release manner and thereby supporting employers to increase qualification levels of their employees manageably.

Across the programme of study, the Personal Development Planning (PDP) process gives the opportunity for engagement of students with a set of core activities, which include
• reflection on prior experience, personal attributes and goals;
• audits of skills and feedback on their development;
• opportunities and guidance on the recording of achievements;
• the identification/development of learning goals;
• opportunities to reflect on this material and to gain feedback;
• opportunities (and guidance) on presentation of evidence for different audiences and planning of future
• learning and career development (such as CVs);
• maintaining an effective PDP record.

Work Based Learning/Placement Details

The programme includes either thin or thick based approaches to Workplace learning which involves either a year placement between third and fourth year or a number of shorter placements. If a student completes at least 36 weeks of work placed learning the student is eligible for the 'sandwich award' title.

The programme offers a 40 credit, Workplace Learning module which must be agreed and documented according to the module descriptor before the module can be undertaken.

Engagement

In line with the Academic Engagement Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on the relevant learning platform, and complete assessments and submit these on time.

Where a programme has Professional, Statutory or Regulatory Body requirements these will be listed here:

Students are expected to attend all timetabled sessions and to engage with all formative and summative assessment elements of all the modules that are included in the programme specification as core modules as well as any optional module when applicable.

Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality and Diversity Policy

Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity forstudents from all backgrounds and learning needs. Using the VLE, material will presented electronically in formats thatallow flexible access and manipulation of content. This module complies with University regulations and guidance oninclusive learning and teaching practice. Specialist assistive equipment, support provision and adjustment toassessment practice in accordance with the University's policies and regulations. More information on the University'sEDI policies can be accessed at: https://www.uws.ac.uk/about-uws/uws-commitments/equality-diversity-inclusion/
(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to theattention of the School).

Programme structures and requirements, SCQF level, term, module name and code, credits and awards (Chapter 1, Regulatory Framework)

A. Learning Outcomes (Maximum of 5 per heading)

Outcomes should incorporate those applicable in the relevant QAA Benchmark statements

Knowledge and Understanding	
A1	Demonstrate a knowledge and understanding of the key areas of mechanical and design engineering, and its underpinning science and mathematics. Some of the knowledge will be at the forefront of the particular subject area.
A2	Demonstrate a basic knowledge and understanding of introductory principles and contexts with respect to multi-disciplinary aspects of engineering.
A3	Knowledge and understanding of the relevant materials, equipment and processes and technologies underpinning product design.
A4	Demonstrate an understanding of the commercial context and sustainability of engineering activities.
A5	Apply knowledge of engineering management principles, commercial context, project and change management and relevant legal matters including intellectual property rights
Practice - Applied Knowledge and Understanding	
B1	Be able to apply appropriate quantitative science and engineering tools to the analysis of complex problems to reach substantiated conclusions, recognising the limitations of the techniques employed.
B2	Apply acquired knowledge and understanding and practical engineering skills in appropriate laboratories, workshops and individual and group projects to investigate complex problems.
B3	Use and apply technical literature and other information sources to address complex problems
B4	Demonstrate and apply an awareness of quality issues and their application to continuous improvement.
B5	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts
Communication, ICT and Numeracy Skills	
C1	Develop an appropriate range of transferable skills in communication, the use of IT facilities and information retrieval.
C2	Use computer software relevant to mechanical and design engineering.
C3	Adopt a holistic and proportionate approach to the mitigation of security risks
C4	Communicate effectively on complex engineering matters with technical and non-technical audiences
Generic Cognitive Skills - Problem Solving, Analysis, Evaluation	
D1	Apply appropriate quantitative science and engineering tools to basic problems.
D2	Develop an appropriate range of transferable skills and apply these in problem solving.

D3	Apply an integrated or systems approach to the solution of complex problems.
Autonomy, Accountability and Working With Others	
E1	Adopt an inclusive approach to engineering practise the responsibilities, benefits and importance of supporting equality, diversity and inclusion
E2	Develop transferable skills that will be of value in working with others.
E3	Develop skills in planning self-learning and improving performance, as the foundation for PDP, lifelong learning and CPD.
E4	Demonstrate an understanding of the need for a high level of professional and ethical conduct in engineering.
E5	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct

Core Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
7	ENGG07002	Applied Engineering Science	20	✓	✓		
7		Mathematics for Engineering 1 *	20	✓	✓		
7	ENGG07003	Engineering Industry	20	✓			
7	ENGG07004	Technical Communications	20	✓			
7	ENGG07001	Engineering Mechanics	20		✓		
7	ENGG07016	Programming for Engineers	20		✓		

* Indicates that module descriptor is not published.

Footnotes

Optional Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	

* Indicates that module descriptor is not published.

Footnotes

Criteria for Progression and Award

To progress from SCQF 7 to SCQF 8 in this programme, students are normally required to obtain 120 credits from the above programme.

Refer to Regulation 3.13 regarding progression with credit deficit, note, the decision to permit a proceed with carry is not automatic but is subject to detailed discussion at the programme award board.

Students obtaining 120 credits at SCQF 7 or above, with 100 from the programme are eligible for the exit award of the Certificate of Higher Education in Engineering Science.

All pre-requisite modules must be passed before progression is allowed.

B. Learning Outcomes (Maximum of 5 per heading)

Outcomes should incorporate those applicable in the relevant QAA Benchmark statements

Knowledge and Understanding	
A1	Demonstrate and apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.
A2	Demonstrate an extended knowledge of the different types and characteristics of engineering materials and manufacturing processes
A3	Demonstrate a the role of quality management systems and continuous improvement in the context of complex problems
A4	Demonstrate a knowledge and understanding of basic management theory and relevant issues
A5	Demonstrate an understanding of the environmental and societal impact of solutions to complex problems and minimise adverse impacts
Practice - Applied Knowledge and Understanding	
B1	Demonstrate the analysis of complex engineering problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed Select appropriate materials and manufacturing methods for a range of consumer products
B2	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts. Select and evaluate technical literature and other sources of information to address complex problems.
B3	Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. this will include the consideration of applicable H&S, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practices and industry standards
B4	Apply an integrated or systems approach to the solution of complex problems. Undertake appropriate design calculations for different aspects of engineering artefacts
B5	Demonstrate skills in the application and use of computer aided design software and use practical laboratory and workshop skills to investigate complex problems.
Communication, ICT and Numeracy Skills	
C1	Communicate design ideas through the use of 3D modelling software
C2	Demonstrate the ability to communicate engineering ideas and concepts through the use of presentation software to various audiences
C3	Adopt a holistic and proportionate approach to the mitigation of security risks
C4	Demonstrate the use of web technology to communicate product information to a selected audience
C5	Demonstrate an understanding of the computer techniques available to enhance the communication of engineering ideas and concepts
Generic Cognitive Skills - Problem Solving, Analysis, Evaluation	
D1	Use appropriate quantitative science and engineering tools to the analysis of basic engineering problems.
D2	Demonstrate the ability to monitor, interpret and apply the results of analysis and modelling.
D3	Demonstrate the ability to apply basic quantitative methods relevant to mechanical engineering design problems.
D4	Demonstrate the ability to define a problem and identify constraints.
D5	Demonstrate the ability to use appropriate codes of practice and industry standards.
Autonomy, Accountability and Working With Others	
E1	Develop an awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues.

E2	Develop an enhanced level of transferable skills that will be of value in working with others in more complex situations
E3	Recognise the role and contribution of team members when carrying out and evaluating tasks. Function effectively as an individual, and as a member or leader of a team.
E4	Understand the need for the consideration of Sustainability at the initial stage of product design
E5	Plan and record self learning and development as the foundation of lifelong learning/ CPD

Core Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
8	MATH08001	Mathematics For Design	20	✓			
8	ENGG08030	Introductory Management for Engineers	20	✓			
9		Computer Aided Design 1 *	20	✓			
8	ENGG08017	Design Analysis 1	20		✓		
8	ENGG08021	Introduction to Thermo-Fluids	20		✓		
8	ENGG08001	Materials & Manufacture	20		✓		

* Indicates that module descriptor is not published.

Footnotes

Optional Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
9	ENGG00001	Sandwich Placement: Engineering	40	✓	✓	✓	

* Indicates that module descriptor is not published.

Footnotes

Criteria for Progression and Award

To progress from SCQF 8 to SCQF 9 in this programme, students are normally required to obtain 240 credits from the above programme.

Refer to Regulation 3.13 regarding progression with credit deficit, note, the decision to permit a proceed with carry is not automatic but is subject to detailed discussion at the programme award board.

Students obtaining 240 credits of which 100 are at SCQF 8 or above from the programme are eligible for the exit award of the Diploma of Higher Education in Engineering.
All pre-requisite modules must be passed before progression is allowed.

C. Learning Outcomes (Maximum of 5 per heading)

Outcomes should incorporate those applicable in the relevant QAA Benchmark statements

Knowledge and Understanding	
A1	Demonstrate and apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.
A2	Demonstrate an understanding of the concepts and limitation of the Finite Element Analysis technique when applied as a design tool
A3	Demonstrate an integrated knowledge and understanding of computer aided engineering tools in reverse and conventional modes in engineering product design

A4	Demonstrate a comprehensive knowledge of advanced testing techniques and their application
A5	Demonstrate an integrated knowledge and understanding of project organisation, management and execution
Practice - Applied Knowledge and Understanding	
B1	Demonstrate the analysis of complex engineering problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations
B2	Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed. Apply an integrated or systems approach to the solution of complex problems.
B3	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts. Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity
B4	Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health & safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.
B5	Select and evaluate technical literature and other sources of information to address complex problems. Use practical laboratory and workshop skills to investigate complex problems. Discuss the role of quality management systems and continuous improvement in the context of complex problems. Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights.
Communication, ICT and Numeracy Skills	
C1	Apply appropriate mathematical and analytical techniques in the solution of engineering and design problems
C2	Demonstrate the ability to use relevant test, modelling, and measurement equipment in the laboratory
C3	Adopt a holistic and proportionate approach to the mitigation of risks
C4	Ability to apply a systems approach to engineering problems through know-how of the application of relevant technologies;
C5	Communicate effectively on complex engineering matters with technical and non-technical audiences.
Generic Cognitive Skills - Problem Solving, Analysis, Evaluation	
D1	Undertake a critical analyses of mechanical engineering designs and propose alterations to improve performance
D2	Analyse design data as the basis of optimising product or component geometry
D3	Undertake a comparison between traditional and reverse engineering approaches to component or product design
Autonomy, Accountability and Working With Others	
E1	Further develop the ability to work independently or as part of a team. Communicate effectively on complex engineering matters with technical and non technical audiences
E2	Prepare, under supervision a risk assessment in line with current industry practice
E3	Recognise the need for professional and ethical conduct in engineering and awareness of environmental issues
E4	Plan and record self learning and development as the foundation of lifelong learning/CPD

E5	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.

Core Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
9	ENGG09004	Project Management	20	✓			
9	ENGG09020	Design Analysis 2	20	✓			
9	ENGG09021	Design & Applications	20	✓			
9	ENGG09001	Design Prototyping & Testing	20		✓		
9	ENGG09011	Analysis & Simulation 1	20		✓		

* Indicates that module descriptor is not published.

Footnotes

Optional Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
9	ENGG00001	Sandwich Placement: Engineering	40	✓	✓	✓	
9	ENGG09018	Independent Study	20		✓		2
9	ENGG09019	Applied Intelligent Systems	20		✓		1
9		Computer Aided Design 2 *	20		✓		

* Indicates that module descriptor is not published.

Footnotes

1. Applied Intelligent Systems ENGG09019 optional for Part-Time students only.
2. and Independent study optional for Part-time students only.
3. Applied Intelligent Systems ENGG09019 & Computer Aided Design 2 are options for Paisley Full-Time students

Criteria for Progression and Award

Students obtaining 360 credits from the above programme (with a minimum of 100 at SCQF L9) are eligible for the exit award of BEng Mechanical Engineering.

Any student who has completed 360 credit points, 300 being in Engineering, and not as laid out above, may be entitled to exit with BSc Mechanical Engineering, at the discretion of the SBE.

The award of distinction can be made to a student obtaining a pass degree as stated in the University Regulations.

To progress from SCQF 9 to SCQF 10 in this programme, students are normally required to obtain 360 credits from the above programme. Refer to Regulation 3.14 regarding progression with credit deficit.

All pre-requisite modules must be passed before progression is allowed.

D. Learning Outcomes (Maximum of 5 per heading)

Outcomes should incorporate those applicable in the relevant QAA Benchmark statements

Knowledge and Understanding	
A1	Demonstrate and apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

A2	Demonstrate a detailed knowledge and understanding of design principles and apply them to the development of an engineering design
A3	Demonstrate a detailed knowledge and understanding of advanced engineering principles including creep, plasticity, fracture mechanic, vibrations and the key elements of sustainability and renewable energy systems
A4	Demonstrate a detailed knowledge and understanding of the design, manufacture and testing of composite materials,
A5	Demonstrate a clear understanding of the scope, application and limitations of computational fluid dynamics and FEA
Practice - Applied Knowledge and Understanding	
B1	Demonstrate the analysis of complex mechanical engineering problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.
B2	Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed. Apply an integrated or systems approach to the solution of complex problems. Select and evaluate technical literature and other sources of information to address complex problems
B3	Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health & safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards
B4	Apply an integrated or systems approach to the solution of complex problems. Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts. Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity. Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights
B5	Undertake research into a number of mechanical engineering related areas Undertake static and dynamic assessments of a range of engineering components or equipment Use practical laboratory and workshop skills to investigate complex problems Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations Discuss the role of quality management systems and continuous improvement in the context of complex problems.
Communication, ICT and Numeracy Skills	
C1	Use computer simulation to communicate design solutions
C2	Analyse and evaluate engineering data as a means of optimising a component or system
C3	Use computer software to present project results to a variety of audiences which could include peers, academics and industrialists
C4	Apply project management techniques and tools to an engineering problem
C5	Adopt a holistic and proportionate approach to the mitigation of security risks
Generic Cognitive Skills - Problem Solving, Analysis, Evaluation	
D1	Demonstrate creative skills in preparing engineering design solutions
D2	Demonstrate the ability to investigate and solve engineering problems through the use of computer simulation
D3	Assess the requirements of international standards and how they impact mechanical engineering design
D4	Carry out individual and group projects in a professional manner

D5	Develop effective technical based communication skills

Autonomy, Accountability and Working With Others

E1	Communicate effectively on complex engineering matters with technical and non-technical audiences
E2	Working with peers demonstrate a high level of ability to function effectively as a team member, demonstrating leadership when required
E3	Plan and record self learning and development as the foundation for lifelong learning and CPD
E4	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion
E5	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct

Core Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
10	ENGG10001	Final Year Project	40	✓	✓		
10	ENGG10019	Analysis & Simulation 2	20	✓			
10	ENGG10020	Design Analysis 3	20	✓			
10	ENGG10021	Composite Structures	20		✓		
10	ENGG10084	Energy Systems Analysis and Design	20		✓		

* Indicates that module descriptor is not published.

Footnotes

Optional Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	

* Indicates that module descriptor is not published.

Footnotes

Criteria for Award

To be eligible for the award of BEng Honours degree a candidate must hold 480 credits, including 120 at SCQF 10 from the above programme.

Students who have satisfied the requirements for a Sandwich Award (as stated in section 29) will graduate in that rather than in the full time mode.

The Classification of Honours will be determined by University Regulation 3.20-3.24. Students must have obtained a pass in all modules listed as pre-requisites.

Regulations of Assessment

Candidates will be bound by the general assessment regulations of the University as specified in the University Regulatory Framework.

An overview of the assessment details is provided in the Student Handbook and the assessment criteria for each module is provided in the module descriptor which forms part of the module pack issued to students. For further details on assessment please refer to Chapter 3 of the Regulatory Framework.

To qualify for an award of the University, students must complete all the programme requirements and must meet the credit minima detailed in Chapter 1 of the Regulatory Framework.

Combined Studies

There may be instances where a student has been unsuccessful in meeting the award criteria for the named award and for other more generic named awards existing within the School. Provided that they have met the credit requirements in line with the SCQF credit minima (please see Regulation 1.21), they will be eligible for an exit award of CertHE / DipHE or BA / BSc in Combined Studies.

For students studying BA, BAcc, or BD awards the award will be BA Combined Studies.

For students studying BEng or BSc awards, the award will be BSc Combined Studies.

Changes

Changes made to the programme since it was last published:

v.1.14
General Overview updated to reflect full return to campus delivery.
Admissions criteria updated to reflect current requirements.
Engagement text updated to reflect current institutional position.
EDI text updated to reflect current institutional position.
Level 7
Mathematics for Engineering 1 (T1 & T2) added in lieu of Engineering Mathematics 1 (T1) & 2 (T2).
Level 8
Computer Aided Design 1 (T1) added in lieu of Computer Aided Design (T1)
Level 9
Computer Aided Design 2 (T2) added as optional for Full-Time students, footnotes added to provide explanation

v1.13
Details of cohorts applies to Sept 22 onwards
General Overview
Text updated to reflect the new AHEP4 learning outcomes terminology, note the programme learning content has not been changed merely the wording terminology
Text demonstrating how the programme aligns with UWS' CF principles added
Programme Structure / Learning outcomes
Level 7:Outcomes reworded to better reflect AHEP4 terminology
Level 8:Outcomes reworded to better reflect AHEP4 terminology ENGG08030 is core
Level 9:Outcomes reworded to better reflect AHEP4 terminology
Level 10:Outcomes reworded to better reflect AHEP4 terminology (ENGG11038 & ENGG10045) 10 credit module replaced by ESAD to align CF Module correct terms added.
v1.12
Details of cohorts applies to updated to September 21
Programme Leader changed to Esther smith
Level 7 Modules
Engineering Mathematics MATH07006 added to core (was optional) however there was no other optional modules therefore inherently core.
Applied Engineering Science (ENGG07002) added as core to replace Applied Engineering Science 1 & 2 (ENGG07015/ENGG07013) - Curriculum Framework Development 2021.
Technical Communications in Engineering (ENGG07012) and Introduction to Intelligent Systems (ENGG07014) replaced by Technical Communications (20 Credits) (ENGG07004) - Curriculum Framework Development 2021.

Level 9 Modules
Engineering Project Management (ENGG09046) and Manufacturing Systems Management (ENGG09047) deleted from core. These modules were replaced in 2020/21, retained in 2020/21 Programme Specification for resit students only but are now deleted. Independent Study (ENGG09018) added as an optional for part time students only. Footnotes added to reflect the changes. Modules reordered
Level 10 modules
Modules reordered

v1.11
Programme Leader changed to Tony Leslie from Tugrul Comlekci
"We welcome applications from international students with equivalency of qualifications. Scholarships may be

available on application" added to Other Required Qualifications/Experience section.

Level 9
ENGG09004 Added to core.
ENGG09046 Engineering Project Management moved to optional from core with Footnote 1 to explain.
ENGG09047 Manufacturing Systems Management moved to optional from core with Footnote 1 to explain.
ENGG09019 Applied Intelligent Systems added to optional for Part-Time and RBS students, this will however effectively remain core for Full-Time students with Footnote 2 to explain.
ENGG09018 Independent study as added optional for Part-time students with Footnote 3 to explain.
Footnotes 1, 2 and 3 added.

Level 10
ENGG10019 Analysis and Simulation 2 changed to T1 only was T1 and T2

v1.10 (29.04.2019)
Date of validation and details of cohorts applied to are updated.
Campus updated to Paisley only.
General description text updated.
PDP and employability text updated.
Level 7:
Regulation reference updated.
Level 8:
Regulation reference updated.
Level 9:
Austrian campus references removed.
ENGG09018 Independent Study removed (core to Austrian students only)
ENGG09004 Project Management removed and replaced with the two modules:
ENGG09046 Engineering Project Management (added)
ENGG09XXX Manufacturing Systems Management (added)
ENGG00001 Sandwich Placement: Engineering (added)
Level 10:
ENGG10009 Renewable Energy and Sustainability removed and replaced with:
ENGG10045 Thermal Systems Analysis and Design (added)
ENGG11038 Renewable Energy and Energy Storage Systems (added)
Regulation reference updated.

/**********/
v8
Admissions Criteria-
Entry qualifications updated for SQA Highers and A Levels to reflect current prospectus.

Study/Progression-
Graduate Attributes added in line with 2018 Graduate Attributes.

Level 7 Modules-
ENGG07002 - Applied Engineering Science - Delete
MATH07003 - Mathematics of Space and Change - Delete
ENGG07004 - Technical Communications - Delete
ENGG07008 - Intelligent Systems Concepts - Delete

ENGG07013 - Applied Engineering Science 2 - Added to Core (T2)
ENGG07012 - Technical Communications in Engineering - Added to Core (T1)
ENGG07015 - Applied Engineering Science 1 - Added to Optional (T1)
MATH07006 - Engineering Mathematics 1 - Added to Optional (T1)
MATH07007 - Engineering Mathematics 2 - Added to Core (T2)
ENGG07016 - Programming for Engineers - Added to Core (T2)

Level 8 Modules-
ENGG08025 - IT for Engineering - Delete
ENGG08026 - Engineering Management - Delete
ENGG08030 - Introductory Management for Engineers - Added to Optional (T1)
ENGG08001 - Materials and Manufacture - Moved from T1 to T2

Level 9 Modules-
ENGG09019 - Applied Intelligent Systems - Moved T1 to T2
ENGG09021 - Design and Applications - Moved T2 to T1
Criteria for Progression and Award-

Change to BSc Mechanical Engineering from BSc Engineering to match general details section.

Level 10 Modules-
ENGG10019- Analysis and Simulation 2- Changed from T1 only to T1 & T2.

V7

Entry requirements updated

Module trimester changes
L7: MATH07003 Mathematics of Space & Change moves to Trimester 1
ENGG07001 Engineering Mechanics moves to Trimester 2

L8: ENGG08021 Introduction to Thermofluids moves to Trimester 2
MATH08001 Mathematics for Design moves to Trimester 1

ENGG08018 Engineering Management and IT is replaced by two separate modules
ENGG08026 Engineering Management
ENGG08025 IT for Engineers

L10: ENGG10019 Analysis & Simulation 2 moves to Trimester 1
ENGG10020 Design Analysis 3 moves to Trimester 2
Various:
Updated various dates in the General Details Section.
Changed progression from Level 7 to 8 to allow for two carries.
Changed progression from Level 8 to 9 to allow for two carries.
Clarified the requirements for BSc Mechanical Engineering.

Need to change the L10 module title Renewable Energy and Pollution to Renewable Energy and Sustainability.

V5 corrected A-Level admission to BC

2014
General -all dates updated.
Progression statements for 7-8, 8-9, 9-10 and award statement now include reference to the requirements to have passed all modules listed as pre-requisites.
Admission- grades changed to BBBC with Maths and Physics.

Version Number: 1.15