University of the West of Scotland

Undergraduate Programme Specification

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Named Award Title:	**MEng (Hons) Mechanical Engineering(Sandwich Avail) Single**

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

Date of Validation:	March 2019
Details of Cohorts Applies to:	Cohorts entering from September ~~2022~~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:	~~Seeking accreditation from~~ Institution of Mechanical Engineers
Maximum Period of Registration:	Full time 7 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

Standard Entry Requirements: AABB (120 UCAS Tariff points) including Mathematics and Physics, plus SQA National ~~Qualifications~~
~~SQA Highers- A,~~5 (Grade B, or above) / Intermediate 2 (Grade B, ~~B including Maths and Physics~~or above) / Standard Grade (Credit)English

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or GCE

~~A Levels- B, B, B including Maths~~BBB (120 UCAS Tariff points)including Mathematics and Physics plus GCSEs in English Language or English Literature (Grade B / Grade 5 or 6)

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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

General Overview

Graduates from the MEng (Hons) Mechanical Engineering Integrated Masters programme will have an ability to develope solutions for complex engineering problems using new or existing technologies, through innovation, creativity and change. It extends beyond the outcomes of the BEng (Hons) Mechanical Engineering to provide a greater range and depth of specialist comprehensive knowledge, within an authentic environment, as well as a broader and more general academic base. The programme provides a foundation for leadership and innovative engineering practice roles.

Graduates will possess the following defining charateristics. A broad and 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. Much of the knowledge will be at the forefront of the particular subject of study. Graduates will be able to select and apply quantitative and computational analysis techniques in the absence of complete data, discussing the limitations of the methods employed. With an appreciation of professional engineering practice and ethics, graduates will be commercially aware and able to apply their knowledge and skills to design, deliver and evaluate innovative new products or services to meet defined needs using new or existing technologies.

The MEng (Hons) Mechancial Engineering programme is contextually aligned with the Engineering Council's AHEP4 Learning Outcomes as oulined below:

M1. Apply a comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Much of the knowledge will beat the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering.

M2. Formulate and analyse complex problems to reach substantiated conclusions. This will involve evaluating available data using first principles of mathematics, statistics, natural science and engineering principles, and using engineering judgment to work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed.

M3. Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.M4.

M4. Select and critically evaluate technical literature and other sources of information to solve complex problems.

M5. Design solutions for complex problems that evidence some originality and 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.

M6. Apply an integrated or system s approach to the solution of complex problems.

M7. Evaluate the environmental and societal impact of solutions to complex problems (to include the entire life cycle of a product or process) and minimise adverse impacts.

M8. Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conM9. Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.

M10. Adopt a holistic and proportionate approach to the mitigation of security risks.

M11. Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.

M12. Use practical laboratory and workshop skills to investigate complex problems.

M13. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

M14. Discuss the role of quality management systems and continuous improvement in the context of complex problems.

M15. Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights.

M16. Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance.

M17. Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.

M18. Plan and record self-learning and development as the foundation for lifelong learning/CPD.

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 flipped classroom and online content, video recordings of sessions are 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 of Computing, Engineering and Physical Sciences 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. The School has its own extensive IT Networks to support all of the activities within the cognate area. These systems are dedicated for the School alone. Students currently have access to 100+ high specification workstations in state of the art laboratories, some of which are air conditioned. 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. 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 assessments. 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 mainly by class test and coursework. This aims to build confidence in the student’s ability to pass modules. Examinations are then increased from year two onwards. Both group project work and individual project work are incorporated into the curriculum so that students develop the 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].

~~Flexible and Hybrid~~Programme Delivery

~~Hybrid delivery~~Delivery of the programme is ~~demonstrated through the recording of accessible lecture content and on-campus~~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 L11- MEng Group 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.

Employability

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 programme is also organised to allow part time entry allowing those in employment to undertake degree award on a day release manner and thereby supporting employers to increase qualification levels of their employees manageably.

PDP

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.

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 broad knowledge and understanding of the key areas of mechanical and design engineering, and its underpinning science and mathematics, statistics and engineering principles with a critical awareness of new developments and the wider context of engineering.
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	Demonstrate the formulation and analysis of complex problems with substantiated conclusions related to complex engineering problems. This will include dealing with uncertain and incomplete data and being able to discuss the limitations of 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 critically apply technical literature and other information sources to solve 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 (to include the entire life-cycle of a product or process) 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	Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed
C5	Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.
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	Develop an inclusive approach to engineering practice and recognise 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~~	~~MATH07006~~	~~Engineering Mathematics 1~~	~~10~~	✓			
7	ENGG07001	Engineering Mechanics	20		✓		
7	ENGG07016	Programming for Engineers	20	-	✓	-	
~~7~~	~~MATH07007~~	~~Engineering Mathematics 2~~	~~10~~		✓		

* 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 Level 7 to SCQF Level 8 in this programme, students are normally required to obtain 120 credits from the above programme and achieve an average of all modules of >=60%.

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

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 SBE.

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

B. Learning Outcomes (Maximum of 5 per heading)

Outcomes should incorporate those applicable in the relevant QAA Benchmark statements

Knowledge and Understanding	
A1	Demonstrate a the role of quality management systems and continuous improvement in the context of complex problems
A2	Demonstrate an extended knowledge of the different types and characteristics of engineering materials and manufacturing processes
A3	Demonstrate an understanding of the environmental and societal impact of solutions to complex problems (to include the entire life cycle of a product or process) and minimise adverse impacts
A4	Demonstrate a knowledge and understanding of basic management theory and quality management systems and continuous improvement in the context of complex problems
A5	Demonstrate a comprehensive knowledge and understanding of the key areas of mechanical engineering its underpinning natural science, mathematics, statistics and engineering principles with a critical awareness of new developments and the wider context of engineering
Practice - Applied Knowledge and Understanding	
B1	Select appropriate materials and manufacturing methods for a range of consumer products. Discuss the role of quality management systems and continuous improvement in the context of complex problems.
B2	Evaluate the environmental and societal impact of engineering solutions (to include the entire life cycle of product/process) and to minimise adverse impacts
B3	Apply an integrated or systems approach to the solution of complex problems. Use practical laboratory and workshop skills to investigate complex problems. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.
B4	Design solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs. This will involve the consideration of H&S, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards
B5	Demonstrate the formulation and analysis of complex problems with substantiated conclusions related to mechanical engineering problems. This will include dealing with uncertain and incomplete data and being able to discuss the limitations of techniques employed.
Communication, ICT and Numeracy Skills	
C1	Select and critically evaluate technical literature and other sources of information to solve complex problems.
C2	Adopt a holistic and proportionate approach to the mitigation of security risks
C3	Demonstrate the ability to communicate engineering ideas and concepts through the use of presentation and application software
C4	Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.
C5	Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.
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
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 life long learning/ CPD

Core Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
8	~~ENGG08002~~	~~Computer Aided Design CAD~~	~~20~~	✓	-	-	
~~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 Level 8 to SCQF Level 9 in this programme, students are required to obtain 240 credits from the above programme and achieve an average of all modules in the year of >=60%.

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

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 SBE.

Students obtaining 240 credits of which 100 are at SCQF Level 8 or above from the programme are eligible for the exit award of the Diploma of Higher Education in Engineering.

C. Learning Outcomes (Maximum of 5 per heading)

Outcomes should incorporate those applicable in the relevant QAA Benchmark statements

Knowledge and Understanding	
A1	Demonstrate an integrated knowledge and understanding of project organisation, management and execution
A2	Demonstrate a comprehensive knowledge and understanding of the key areas of mechanical engineering its underpinning natural science, mathematics, statistics and engineering principles with a critical awareness of new developments and the wider context of engineering.
A3	Knowledge and understanding of the principles of IT and specialist software relevant to engineering and design, particularly CAE and the ability to use such software to the analysis and design of components and systems;
A4	Knowledge and understanding of mathematical principles and techniques necessary to underpin their education in mechanical engineering and to enable them to apply mathematical methods, tools and notation in the analysis and solution of mechanical engineering problems.
A5	Knowledge and understanding of the characteristics of engineering materials and components and the ability to apply them to the analysis of key engineering components;
Practice - Applied Knowledge and Understanding	
B1	Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed. Select and critically evaluate technical literature and other sources of information to solve complex problems. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.
B2	Demonstrate the formulation and analysis of complex problems with substantiated conclusions related to complex engineering problems. This will include dealing with uncertain and incomplete data and being able to discuss the limitations of techniques employed.
B3	Apply an integrated or systems approach to the solution of complex problems. Evaluate the environmental and societal impact of solutions to complex problems (to include the entire life-cycle of a product or process) and minimise adverse impacts.
B4	Ability to monitor, interpret and apply the results of analysis to develop, maintain processes or products in order to bring about continuous improvement; 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	Design solutions for complex problems that evidence some originality and 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. Apply engineering, project, risk and quality management techniques and tools to an engineering problem;
Communication, ICT and Numeracy Skills	
C1	Adopt a holistic and proportionate approach to the mitigation of security risks
C2	Use practical laboratory and workshop skills to investigate complex problem
C3	Use project management software as a planning tool to improve the probability of completing a project on time and within budget.
C4	Ability to apply a systems approach to engineering complex problems through know-how of the application of relevant technologies.
C5	Apply engineering, project, risk and quality management techniques and tools to an engineering problem
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
D4	Develop the effective use of information technology
D5	Demonstrate problem solving skills appropriate to a mechanical/design engineer
Autonomy, Accountability and Working With Others	
E1	Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used
E2	Prepare, under supervision a risk assessment in line with current industry practice
E3	Knowledge and understanding of project planning and time and resource management techniques
E4	Plan and record self learning and development as the foundation of lifelong learning/CPD
E5	Recognise the need for professional and ethical conduct in engineering and awareness of environmental issues

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		Computer Aided Design 2 *	20		✓		
9	ENGG00001	Sandwich Placement: Engineering	40	✓	✓	✓	
9	ENGG09018	Independent Study	20		✓		~~2~~1
9	ENGG09019	Applied Intelligent Systems	20		✓		~~1~~2

* Indicates that module descriptor is not published.

Footnotes
1. Applied Intelligent Systems ENGG09019 and Independent Study ENGG09018 optional for Part-Time students only~~; this will remain core~~.
2. Applied Intelligent Systems ENGG09019 and Computer Aided Design 2 are options for Full-Time students~~. 2. Independent study optional for Part-time students only~~.

Criteria for Progression and Award

To progress from SCQF Level 9 to SCQF Level 10 in this programme, students are required to obtain 360 credits of which 100 credits are at SCQF Level 9 from the above programme to achieve an average of all modules of >=60% in 2 of the first 3 years of study inclusive of SCQF Level 9.
Refer to Regulation 3.14 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.
All pre-requisite modules must be passed before progression is allowed and no student will be allowed to progress to

Level 10 with credit deficit.

Students obtaining 360 credits of which 100 are at SCQF Level 9 or above from the programme are eligible for the exit award of the BEng in Mechanical Engineering.
The award of distinction can be made to a student obtaining a pass degree as stated in the University Regulations.

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 PAB.

D. Learning Outcomes (Maximum of 5 per heading)

Outcomes should incorporate those applicable in the relevant QAA Benchmark statements

Knowledge and Understanding	
A1	Demonstrate a detailed and innovative knowledge and understanding in the integration of a range of mechanical engineering techniques through project activity
A2	Demonstrate a detailed knowledge and understanding of design principles and apply them to the development of an engineering design (including sustainability and renewable energy systems)
A3	Demonstrate a detailed knowledge and understanding of advanced engineering principles including creep, plasticity, fracture mechanics, acoustics and machine condition monitoring.
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 formulation and analysis of complex problems with substantiated conclusions related to mechanical engineering problems. This will include dealing with uncertain and incomplete data and being able to discuss the limitations of techniques employed.
B2	Select and critically evaluate technical literature and other sources of information to solve complex problems. Use practical laboratory and workshop skills to investigate complex problems
B3	Design solutions for complex problems that evidence some originality and 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 engineering problems. Evaluate the environmental and societal impact of solutions to complex problems (to include the entire life-cycle of a product or process) and minimise adverse impacts.
B5	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. 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	Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.
C2	Analyse and evaluate engineering data as a means of optimising a component or system.
C3	Adopt a holistic and proportionate approach to the mitigation of security risks
C4	Ability to apply a systems approach to engineering problems through know-how of the application of relevant technologies;
C5	Apply project management techniques and tools to an engineering problem; Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty)

	associated with a particular project or activity
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	Carry out individual and group projects in a professional, responsible and ethical manner
D4	Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.
Autonomy, Accountability and Working With Others	
E1	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.
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 of lifelong learning/CPD
E4	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.
E5	Analyse the risk involved in the design and operation of a product or process

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 Progression and Award

To progress from SCQF Level 10 to SCQF Level 11 in this programme, students are normally required to obtain 480 credits from the above programme and achieve an average of all modules of >=60% at SCQF Level 10.
Students obtaining 480 credits of which 240 are at SCQF Level 9 and SCQF Level 10 from the above programme including all core module but do not satisfy the requirements for progression to Level 11 are eligible for the BEng (Hons) Mechanical Engineering Award.
The Classification of BEng (Hons) Mechanical Engineering will be determined by University Regulation 3.20-3.24.
Students who have satisfied the requirements for a Sandwich Award will graduate in that rather than in the full time mode.

E. Learning Outcomes (Maximum of 5 per heading)

Outcomes should incorporate those applicable in the relevant QAA Benchmark statements

Knowledge and Understanding	
A1	Demonstrate a comprehensive knowledge and understanding of the key areas of mechanical engineering its underpinning natural science, mathematics, statistics and engineering principles with a critical awareness of new developments and the wider context of engineering.
A2	A critical understanding and embedment of the main theories, concepts and principles within Mechanical Engineering towards the practice of the profession.
A3	Comprehension, appreciation and critical understanding of a range of specialised theories applied to the dynamic nature of Mechanical Engineering knowledge towards understanding each individual project undertaken.
A4	Demonstrate a detailed knowledge and understanding of mechanical design and analysis.
A5	Extensive, detailed and critical knowledge and understanding of mechanical analysis with advanced materials and complex loading.
Practice - Applied Knowledge and Understanding	
B1	Demonstrate the formulation and analysis of complex problems with substantiated conclusions related to mechanical engineering problems. This will include dealing with uncertain and incomplete data and being able to discuss the limitations of techniques employed.
B2	Design solutions for complex problems that evidence some originality and 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.
B3	Apply an integrated or systems approach to the solution of complex problems. Evaluate the environmental and societal impact of solutions to complex problems (to include the entire life-cycle of a product or process) and minimise adverse impacts.
B4	Planning and executing a significant group project of Mechanical Engineering investigation or development. Use practical laboratory and workshop skills to investigate complex problems. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.
B5	Discuss the role of quality management systems and continuous improvement in the context of complex problems. 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
Communication, ICT and Numeracy Skills	
C1	Communicate, using appropriate methods, to a range of audiences with different levels of knowledge/expertise.
C2	Communicate, using appropriate Mechanical Engineering methods, to a range of audiences with different levels of knowledge/expertise
C3	Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed
C4	Adopt a holistic and proportionate approach to the mitigation of security risks.
C5	Select and critically evaluate technical literature and other sources of information to solve complex problems
Generic Cognitive Skills - Problem Solving, Analysis, Evaluation	
D1	Identify, conceptualise and define specific problems and issues in Mechanical Engineering Design and Development.
D2	Develop original and creative responses to problems and issues within an Mechanical Engineering context.
D3	The application of critical analysis, evaluation and synthesis to current issues, or issues that are informed by current developments in Mechanical Engineering.

D4	Handle complex issues and make informed judgements in situations in the absence of complete or consistent data/information
Autonomy, Accountability and Working With Others	
E1	Take responsibility for own work and also take significant responsibility for the work of others within a team environment Evaluate effectiveness of own and team performance.
E2	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion
E3	Manage complex ethical and professional issues and make informed judgements on issues not addressed by current professional and/or ethical codes or practices
E4	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	
11	ENGG11033	Advanced Fluid Mechanics and CFD	20	✓			
11	ENGG11032	Advanced Heat Transfer ~~and Energy Recovery~~	20	✓			
11	ENGG11050	Group Project for MEng	40	✓	✓		
11	ENGG11022	Applied Finite Element Analysis	20		✓		
11	ENGG11041	Structural Integrity	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

credits, including 360 at SCQF Levels 9, 10 and 11 from the above programme.

Students who have satisfied the requirements for a Sandwich Award will graduate in that rather than in the full time mode.

The Classification will take into account student's performance at Level 9, Level 10 and Level 11.
The composite mark is given by:
20% from Level 9
30% from Level 10
50% from Level 11
The classification will be determined as follows:-
First Class >=70% Average
Upper Second Class (2.1) >=60% Average
Lower Second Class (2.2) >=50% Average

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:

v1.04
Details of Cohorts Applies to: Changes applies to Sept 23 onwards
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

v1.03
Details of Cohorts applies to: changes applies to Sept 22 onwards
General Overview: Text updated to reflect new AHEP4 specific learning outcome terminology, note the learning content has not changed merely the wording and terminology.
Text demonstrating how the programme aligns with UWS' Curriculum Framework added
Programme Structure/ Learning Outcomes
Level 7- Outcomes reworded to better reflect AHEP4 terminology
Level 8- Outcomes reworded to better reflect AHEP4 terminology ENGG08030 moved to core
Level 9- Outcomes reworded to better reflect AHEP4 terminology
Level 10-Outcomes reworded to better reflect AHEP4 terminology Correction of term delivery. Two 10 credit modules (ENGG10045 & ENNGG11038) replaced by new 20 credit ESAD module to align with CF
Level 11-Outcomes reworded to better reflect AHEP4 terminology

v1.02
Details of Cohorts Applies to updated to Sept 21.
Programme Leader changed to Esther Smith

Level 7 Modules
Engineering Mathematics 1 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 (ENGG07004) - Curriculum Framework Development 2021.
Modules re-ordered
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 optional for part-time students only.
Footnotes updated to reflect the changes.

Modules reordered.
Level 10 modules
Modules reordered

v1.01
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 Project Management 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 students, this will however effectively remain core for Full-Time students with Footnote 2 to explain.
Footnotes 1 and 2 added.

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

v1.0 Original version as validated

Version Number: 1.04.05