University of the West of Scotland

Undergraduate Programme Specification

Session: 2023/24

Last modified:19/04/2023 22:28:31

Status: Proposal

Named Award Title:	**MEng (Hons) Aircraft Engineering Single**

Award Title for Each Award:	**MEng (Hons) Aircraft Engineering** **BEng (Hons) Aircraft Engineering** **BEng Aircraft Engineering** **BSc Aircraft Engineering** **Dip HE Engineering** **Cert HE Engineering Science**

Date of Validation:	March 2019
Details of Cohorts Applies to:	Cohorts entering from Sept ~~22~~23 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:	6 Years Full Time
Mode of Study:	Full Time Part Time
Campus:	Paisley

School:	School of Computing, Engineering and Physical Sciences
Programme Board	Engineering
Programme Leader:	Dr Bassam Rakhshani

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 5 (Grade B, or above) / Intermediate 2 (Grade B, or above) / Standard Grade (Credit) English

or GCE

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

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.

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

NA

General Overview

Graduates from the MEng (Hons) Aircraft Engineering Integrated Masters programme will have an ability to, and focus on developing solutions for aircraft engineering and broader engineering problems using new or existing technologies, through innovation, creativity and change. It extends beyond the outcomes of the BEng (Hons) Aircraft Engineering to provide a greater range and depth of specialist 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) Aircraft 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 specific and broader aircraft engineering and broader engineering problems. Much of the knowledge is at the forefront of aircraft engineering and informed by a critical awareness of new aircraft engineering developments and the wider context of engineering.

M2- Formulate and analyse complex engineering 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, being aware of and discussing the limitations of the techniques employed.

M4- Select and critically evaluate a broad spectrum of technical literature and other sources of information to solve complex engineering problems.

M5- Design solutions for complex aircraft engineering 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.

M6- Apply an integrated or systems approach to the solution of complex both aircraft engineering and general engineering 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. This is of paramount importance to the challenges faced by the aircraft industry and therefore has significant emphasis for the programme.

M8- Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.

M9- 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 aircraft engineering 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

Graduates from this programme are equipped to enter careers in a variety of aircraft engineering sectors or to progress to further study. Graduates from this programme should find employment in the local, national and international aerospace industry and wider engineering sectors.

The teaching and learning methods employed by staff in the delivery of the module portfolio covers a wide range of established and some novel approaches. Lectures and tutorials form the basis for much of the teaching within engineering but 'flipped' classroom and online content, video recording of sessions is now found in all modules. Extensive use is also made of laboratories, seminars, group work, independent learning and demonstrations. Synoptic learning is undertaken in a number of modules within the same level replicating how engineering problems are addressed within industry. 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 material to students including high quality notes, use of multimedia presentations and use of the internet/electronic technology.

The Engineering group has a policy of using small tutorial groups in key subject areas and either sub-divides cohorts into small groups or increase staff numbers in classes or laboratories. All modules are taught by subject experts with staff making use of materials and topics raised through their professional activities whether prior industrial experience, research KTP, and/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. At the Paisley Campus Engineering has its own extensive networks to support all of the area's activity. Students have access to 100+ high specification PC workstations in state of the art air- conditioned laboratories dedicated specifically for Engineering students. Indeed, all modules are now supported electronically, providing notes, copies of lectures, models, sample simulations etc. A VLE (Virtual Learning Environment) is used by all staff as both a repository for material and a social learning platform and is used for online formative and summative assessment, assessment submissions and discussion forums. A variety of assessment methods are used throughout programmes. These range from class tests, laboratory reports, design assignments, individual and group presentations and formal open-book examinations. 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 coursework submissions. Anonymous marking is undertaken, where possible. Mixtures of formative and summative methods are used in the assessment of student performance within the group. It is recognised that while most of the assessments are summative in nature formative assessment is also found in all modules, delivering timely and regular feedback.

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 by on-campus lectures, tutorials, laboratory and 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 safeguard the curriculum is and will continue 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 Aircraft Engineering programme provides opportunities throughout the levels to enable these skills to be developed and focussed appropriately.

Aircraft 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. Many of these are set in and constrained by consideration of aerospace regulatory body design specifications such as CS25.

Aerodynamic and structures 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 aircraft 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 4^{th} and 5^{th} years during 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 local aerospace market contains a number of international companies such as BAE Systems, Spirit AeroSystems United Technologies, British Airways, Woodward etc and the programme has been developed with feedback from those local companies. Such is the diversity of the work these companies undertake the skills the graduates gain from undertaking the programme are internationally transferrable.

The majority of the final year projects are offered in collaboration with these partner industries and this in tandem with short term placements at the end of third year with many of the local companies is providing graduate employment

opportunities at the end of the students' studies.

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.

Personal Development Planning

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

A number of local employers are offering short term unpaid placements at the end of year 3 and this is leading to further opportunities for paid internships at the end of year 4.

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 for students from all backgrounds and learning needs. Using the VLE, material will presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on inclusive learning and teaching practice. Specialist assistive equipment, support provision and adjustment to assessment practice in accordance with the University's policies and regulations. More information on the University's EDI 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 the attention 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 comprehensive knowledge and understanding of the key areas of aircraft engineering its underpinning natural science, mathematics, statistics and engineering principles with a critical awareness of new developments and the wider context of engineering.
A2	Demonstrate a knowledge and understanding of introductory principles and contexts with respect to multi-disciplinary aspects of aircraft engineering.
A3	Demonstrate a knowledge and understanding of the relevant materials, equipment and processes and technologies underpinning aircraft design.
A4	Demonstrate an understanding of the commercial context and sustainability of aircraft engineering activities.

Practice - Applied Knowledge and Understanding	
B1	Demonstrate the formulation and analysis of complex problems with substantiated conclusions related to aircraft and other engineering problems. This will include dealing with uncertain and incomplete data and being able to discuss the limitations of techniques employed.
B2	Use practical laboratory and workshop skills to investigate complex problems.
B3	Select and critically evaluate technical literature and other sources of information to solve complex problems.
B4	Select and apply appropriate computational techniques, being aware of and discussing the limitations.
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 aircraft 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	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.
E2	Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance.
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	ENGG07004	Technical Communications	20	✓			
7	ENGG07011	Aircraft Aerodynamics, Structures and Systems	20	✓			
7		Mathematics for Engineering *	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 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.

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 deeper knowledge of the engineering concepts of statics and dynamics
A2	Demonstrate an extended knowledge of the different types and characteristics of engineering materials and manufacturing processes.
A3	Discuss the role of quality management systems and continuous improvement in the context of complex problems.
A4	Demonstrate a comprehensive knowledge and understanding of the key areas of aircraft engineering its underpinning natural science, mathematics, statistics and engineering principles with a critical awareness of new developments and the wider context of engineering.
A5	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.
Practice - Applied Knowledge and Understanding	
B1	Discuss the role of quality management systems and continuous improvement in the context of complex problems.
B2	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.
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 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	Demonstrate the formulation and analysis of complex problems with substantiated conclusions related to aircraft and other 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	Demonstrate the ability to communicate engineering ideas and concepts through the use of presentation and application software
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, 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 aircraft 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 enhanced level of transferable skills that will be of value in working with others in more complex situations
E2	Recognise the role and contribution of team members when carrying out and evaluating tasks
E3	Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance
E4	Plan and record self-learning and development as the foundation for lifelong learning/CPD

Core Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
8	ENGG08028	Fluids and Aerodynamics	20	✓			
9		Computer Aided Design 1 *	20	✓			
8	MATH08001	Mathematics For Design	20	✓			
8	ENGG08001	Materials & Manufacture	20		✓		
8	ENGG08017	Design Analysis 1	20		✓		
8	ENGG08029	Thermodynamics and Aircraft Propulsion	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 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.

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 a comprehensive knowledge and understanding of the key areas of aircraft engineering its underpinning natural science, mathematics, statistics and engineering principles with a critical awareness of new developments and the wider context of engineering.
A2	Knowledge and understanding of mathematical principles and techniques necessary to underpin their education in aircraft engineering and to enable them to apply mathematical methods, tools and notation in the analysis and solution of aircraft engineering problems;
A3	Knowledge and understanding of the characteristics of engineering materials and components and the ability to apply them to the analysis of key engineering components;
A4	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;
A5	Understanding of manufacturing and operational practice relevant to engineering and design and the ability to apply them to analyse key engineering processes.
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 aircraft and other 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	Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.
C2	Use practical laboratory and workshop skills to investigate complex problems.
C3	Adopt a holistic and proportionate approach to the mitigation of security risks.
C4	Ability to apply a systems approach to engineering complex problems through know-how of the application of relevant technologies.
Generic Cognitive Skills - Problem Solving, Analysis, Evaluation	
D1	Demonstrate problem solving skills appropriate to a mechanical, aircraft or design engineer;
D2	Assess the requirements of International Standards and their impact on system design
D3	Develop the ability to work independently or as part of a team;
D4	Develop the ability for effective use of information technology;
D5	Develop effective technical based communication skills;
Autonomy, Accountability and Working With Others	
E1	Knowledge and understanding of project planning and time and resource management techniques.

E2	Recognise the need for professional and ethical conduct in engineering and awareness of environmental issues
E3	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
E4	Understanding of the requirement of Risk Assessments, and demonstrate the ability to compile a risk assessment
E5	Plan and record self-learning and development as the foundation for lifelong learning/CPD.

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	ENGG09027	Aircraft Design and Performance	20	✓			
9	ENGG09011	Analysis & Simulation 1	20		✓		
9		Computer Aided Design 2 *	20		✓		

* Indicates that module descriptor is not published.

Footnotes

Optional Modules

SCQF Level	Module Code	Module Name	Credit	Term			Footnotes
				1	2	3	
9	ENGG09001	Design Prototyping & Testing	20		✓		2
9	ENGG09018	Independent Study	20	✓	✓	✓	1
9	ENGG09019	Applied Intelligent Systems	20		✓		1,2

* Indicates that module descriptor is not published.

Footnotes
1. Applied Intelligent Systems ENGG09019 & Independent Study ENGG09018 are options for Part-time students.
2. Applied Intelligent Systems ENGG09019 & Design Prototyping and Testing ENGG09001 are options for Full- Time Students.

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 Aircraft 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 Aircraft Engineering, at the discretion of the SBE.

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 comprehensive knowledge and understanding of the key areas of aircraft engineering its underpinning natural science, mathematics, statistics and engineering principles with a critical awareness of new developments and the wider context of engineering.
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 aircraft engineering principles.
A4	Demonstrate a detailed knowledge and understanding of aerodynamics as applied to aircraft design,
A5	Demonstrate a clear understanding of the scope, application and limitations of Finite Element Analysis and Computational Fluid Dynamics.
Practice - Applied Knowledge and Understanding	
B1	Demonstrate the formulation and analysis of complex problems with substantiated conclusions related to aircraft and other 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 aircraft 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	Assess the requirements of international standards and how they impact on aircraft and component design
D4	Carry out individual and group projects in a professional, responsible and ethical manner
D5	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	Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance.

E3	Plan and record self-learning and development as the foundation for 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 component, system 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	ENGG10027	Advanced Aerodynamics	20		✓		
10	ENGG10038	Model Aircraft Design Group Project	20	✓	✓		
10	ENGG10021	Composite Structures	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) Aircraft Engineering Award.
The Classification of BEng (Hons) Aircraft Engineering will be determined by University Regulation 3.20-3.24.

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 aircraft 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 Aircraft 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 Aircraft Engineering Knowledge towards understanding each individual project undertaken.
A4	Demonstrate a detailed knowledge and understanding of aerodynamics and structural analysis and their interaction as applied to aircraft design,
A5	Extensive, detailed and critical knowledge and understanding of aircraft structural analysis of advanced materials and complex loading.
Practice - Applied Knowledge and Understanding	
B1	Demonstrate the formulation and analysis of complex problems with substantiated conclusions related to aircraft and other 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 Aircraft 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 effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.
C2	Communicate, using appropriate Aircraft 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	Select and critically evaluate technical literature and other sources of information to solve complex problems.
C5	Adopt a holistic and proportionate approach to the mitigation of security risks.
Generic Cognitive Skills - Problem Solving, Analysis, Evaluation	
D1	Identify, conceptualise and define specific problems and issues in Aircraft Engineering Design and Development.
D2	Develop original and creative responses to problems and issues within an Aircraft Engineering context.
D3	The application of critical analysis, evaluation and synthesis to current issues, or issues that are informed by current developments in Aircraft 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	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion
E2	Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance.
E3	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.
E4	Plan and record self-learning and development as the foundation for 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	ENGG11048	Aircraft Structural Analysis	20	✓			
11	ENGG11050	Group Project for MEng	40	✓	✓		
11	ENGG11049	Aeroelasticity	20		✓		

11	ENGG11022	Applied Finite Element Analysis	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 MEng (Hons) degree a candidate must hold 600 credits, including 360 at SCQF Levels 9, 10 and 11 from the above programme.
The Classification will take into account students' 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
Programme Leader Updated to Dr Bassam Rakhshani
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 in lieu of Aircraft Design Modelling and Analysis (T2)

Design Prototyping and Testing (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/terminology.

Text demonstrating how the programme aligns with UWS' Curriculum Framework added.

Work Based Learning/Placement Details
Module text withdrawn as module is now withdrawn.

Programme Structure/Learning Outcomes
Level 7-
Outcomes reworded to better reflect AHEP4 terminology. Aircraft Flight Studies (10 Credits) and Aircraft Simulation and Programming (10 Credits) replaced with Programming for Engineers (20 Credits)- Alignment with Curriculum Framework Principle of 20 Credit norm.
Missing Module delivery terms added.

Level 8-
Outcomes reworded to better reflect AHEP4 terminology.
ENGG08028 and ENGG08029 renamed to better reflect content.
Missing Module delivery terms added.

Level 9-
Outcomes reworded to better reflect AHEP4 terminology.
Progression with deficit statement added.
Level 10-
Outcomes reworded to better reflect AHEP4 terminology.
Missing Module delivery terms added.
Model Aircraft Design Group Project added to core in lieu of optional Design Analysis 3 removed from programme. Students have never selected it this will improve enrolment issues.

Level 11-
Outcomes reworded to better reflect AHEP4 terminology.

v1.02

Details of Cohorts Applies to updated to Sept 21.

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 (ENGG07004) - Curriculum Framework Development 2021.
Modules re-ordered.
Level 8 Modules
Computer Aided Design (ENGG08002) added to core (was optional) however there was no other optional modules therefore inherently core.
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.
Workplace Learning (Mech) (ENGG09030) deleted, this option has never been taken and is removed to reduce module numbers.
Footnotes updated to reflect the changes.

v1.01
Admission criteria removed from SQA National Qualifications as it appears in the heading above this section.
"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