

School of Physics, Engineering and Computer Science

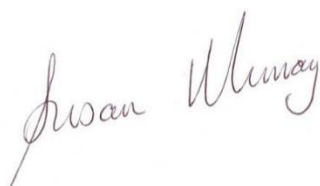
Title of Programme: Engineering Degree Apprenticeship (Aerospace)

Programme Code: ENDAAE

Programme Specification

This programme specification is relevant to students entering:
21 September 2020

Associate Dean of School (Academic Quality Assurance):
Susan Murray



Signature

A programme specification is a collection of key information about a programme of study (or course). It identifies the aims and learning outcomes of the programme, lists the modules that make up each stage (or year) of the programme, and the teaching, learning and assessment methods used by teaching staff. It also describes the structure of the programme, its progression requirements and any programme-specific regulations. This information is therefore useful to potential students to help them choose the right programme of study, to current students on the programme, and to staff teaching and administering the programme.

Summary of amendments to the programme:

Section	Amendment

If you have any queries regarding the changes please email AQO@herts.ac.uk

Programme Specification

Engineering Degree Apprenticeship (Aerospace)

This programme specification (PS) is designed for prospective students, enrolled students, academic staff and potential employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the teaching, learning and assessment methods, learning outcomes and content for each module can be found in Definitive Module Documents (DMDs) and Module Guides.

Section 1

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	University of Hertfordshire
University/partner campuses	College Lane
Programme accredited by	Royal Aeronautical Society.
Final Qualification	BEng Honours
All Final Award titles (Qualification and Subject)	Aerospace Engineering
FHEQ level of award	6
UCAS code(s)	N/A
Language of Delivery	English

A. Programme Rationale

A degree apprenticeship enables an apprentice to gain a degree alongside gaining valuable work experience. Throughout the apprenticeship apprentices will be in full employment with their academic fees paid by the employer usually using apprenticeship levy funding. Being able to apply their studies in an industrial environment not only enhances the learning experience for the apprentices but helps employers further their employees' careers.

This particular programme will enable apprentices to study the BEng Honours in Aerospace Engineering at the University of Hertfordshire alongside developing their professional behavioural skills and knowledge to satisfy the requirements for the Product Design and Development Engineer Degree Apprenticeship Standard. This will be achieved through a combination of industrial experience opportunities provided by the employer and academic studies led by UH staff with a wealth of industrial and research experience.

Throughout the apprenticeship, apprentices will be employed by a company who will provide an Individual Learning Plan that includes both time to study as well as work experiences to enable them to apply the skills and knowledge gained through the degree course within the work place.

The Apprenticeship is normally spread over 4 years with apprentices studying three taught modules per semester during Semesters A and B. Two of the modules will be delivered on a one day per week basis attending classes at UH. A third module will be delivered to apprentices through two whole weeks (4 days) using blended learning methods (i.e. a combination of face-to-face and on-line learning). These module intensive weeks will typically be delivered a number of weeks apart to allow apprentices to complete assignments and independent study. There may also be some on-

line preparation work to be completed before the first intensive week and a final assignment/assessment after the second intensive week. During Semester C and when the apprentice is not at UH they are expected to be based in industry either completing work set by UH or working for their employer.

In addition to the academic modules studied at UH, apprentices will complete a Professional Practice module each year. This involves recording their work experience and developing a portfolio of evidence as part of their Individual Learning Plan (ILP). The ILP is an essential tool to help the apprentice prepare for the end point assessment by identifying which tasks contribute to meeting each of the Knowledge, Skills and Behavioural requirements listed in the apprenticeship standard. Professional Practice modules are zero credit modules that are used to monitor progress of the portfolio and preparation for the EPA and are not used as a pass/fail element to progress to the next level.

B. Educational Aims of the Programme

The programme has been devised in accordance with the University's graduate attributes of programmes of study as set out in [UPR TL03](#).

Additionally this programme aims to:

- provide a high quality education in engineering;
- provide an education for the individual which enhances his/her prospects of professional employment in engineering and business both in national and international industries;
- provide studies which are accredited by the Royal Aeronautical Society;
- provide studies which develop an awareness of, and underpinning knowledge and understanding of a broad range of Aerospace Engineering areas of expertise;
- provide studies which enable the student to attain a high level of expertise in a range of topics specific to Aerospace Engineering with a particular emphasis on aerodynamics and aircraft structural design

C. Intended Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are defined by the Engineering Council and recommended in the QAA benchmark statements for Engineering (2019) and the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2019). The outcomes relate to the typical student. In addition, the SEEC Credit Level Descriptors for Higher Education (2016) have been used to provide guidance for curriculum design at each level of the programme to reflect student development. The curriculum design has also taken into account UH Graduate Attributes.

	A. Knowledge & Understanding	Teaching/learning methods & strategies	Assessment strategy
A1	SM1b- Knowledge and understanding of the scientific principles and methodology underpinning aerospace engineering, and an understanding, to enable appreciation of the scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies.	Acquisition of knowledge and understanding is through the following approaches: Acquisition of A1 and A2 is through a combination of lectures, small group tutorials, coursework and laboratory work at levels 4 and 5 of the programme.	Knowledge and understanding are assessed through combination of unseen examinations and in-course assessments in the form of laboratory reports, essays and phase tests. Some aspects of knowledge and understanding are assessed by design exercises and project reports and
A2		Additional support is provided through the Study Success Hubs which includes the	

<p>A3</p>	<p>SM2b- Knowledge and understanding of mathematical and statistical methods underpinning aerospace, and to enable the application of a range of mathematical and statistical methods, tools and notations proficiently in the analysis and solution of engineering problems.</p> <p>SM3b- Ability to apply and integrate knowledge and understanding of other engineering disciplines to support a study of mechanical engineering.</p>	<p>Maths Support Service. Specialist aspects of A2 are further developed at level 6.</p> <p>In particular, Work Based Learning (WBL) is deployed within many of the modules, typically as work-based projects or other-directed assignments.</p> <p>Acquisition of A3 is through a combination of lectures, projects and coursework throughout the programme.</p> <p>Staff deploy a range of teaching and learning strategies in the most appropriate way for each individual module. This will vary depending on the subject nature of a particular module and the level of study. A more didactic approach will tend to be adopted at lower levels, in particular for A1 and A2. An increasingly self-directed and interactive approach will be adopted at higher levels, particularly for A3.</p> <p>Throughout, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.</p>	<p>presentations. At level 6 some aspects of A3 are assessed by case study reports.</p> <p>Assessments will also include work-based projects or other assignments, drawing on knowledge of and experience in the workplace as appropriate.</p>
	<p>B. Intellectual Skills for Analysis</p>	<p>Teaching/learning methods & strategies</p>	<p>Assessment strategy</p>
<p>B1</p>	<p>EA1b- Understanding of engineering principles and the ability to apply them to analyse of key engineering processes.</p>	<p>Engineering analysis skills are developed throughout the programme by the methods and strategies outlined for section A of the intended learning outcomes above,</p>	<p>Engineering analysis skills B1, B2 and B4 are assessed through unseen examination papers, laboratory reports and coursework related to in-course exercises.</p>
<p>B2</p>	<p>EA2- Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.</p>	<p>again moving from a more didactic approach to an increasingly self-directed and interactive approach at higher levels, particularly for B2, B3 and B4.</p>	<p>Engineering analysis skills B3 are assessed through project reports and presentations drawing on knowledge and experience in the</p>
<p>B3</p>	<p>EA3b- Ability to apply quantitative and computational methods in order to solve engineering</p>	<p>Analysis, problem solving and modelling skills are further</p>	<p>drawn on knowledge and experience in the</p>

B4	problems and implement appropriate action. EA4b- Understanding of, and the ability to apply, an integrated or systems approach to solving engineering problems.	developed through tutorial work, laboratory work, in-course exercises and project work.	workplace where appropriate.
	C. Intellectual Skills for Design	Teaching/learning methods & strategies	Assessment strategy
C1	D1- Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics.	Intellectual skills for design are developed throughout the programme by the methods and strategies outlined above, again moving from a more didactic approach to an increasingly self-directed and interactive approach at higher levels, particularly for C3 and C4. Feedback is given to all students on all coursework produced. Throughout, the learner is encouraged to develop intellectual skills further by independent study. Project work offering the opportunity to practise the skills in a supportive environment. In some cases, particular at levels 5 and 6, practical work may be undertaken in the workplace.	C1, C2, C5 and C6 are assessed through unseen examination, coursework, project reports, technical reports and oral presentations. C3, C4 is assessed by review of group project work.
C2	D2- Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical health, safety, security and risk issues; intellectual property; codes of practice and standards.		
C3	D3b- Work with information that may be incomplete or uncertain, and quantify the effect of this on the design.		
C4	D4- Apply advanced problem solving skills, technical knowledge and understanding, to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including production, operation, maintenance and disposal.		
C5	D5- Plan and manage the design process, including cost drivers, and evaluate outcomes.		
C6	D6- Communicate their work to technical and non-technical audiences.		
	D. Economic, Legal, Social, Ethical & Environmental Context	Teaching/learning methods & strategies	Assessment strategy
D1	EL1b- Understanding of the need for a high level of professional and ethical production in engineering and a knowledge of professional codes of conduct.	The economic, legal, social, ethical and environmental context of the role of engineers is developed in a series of project-based exercises through the programme, and reinforced by	D1 to D6 are assessed by coursework, project reports, technical reports and presentations.

D2	EL2- Knowledge and understanding of the commercial, economic and social context of engineering processes.	a taught module at the start of the programme.	
D3	EL3b- Knowledge and understanding of management techniques, including project management that may be used to achieve engineering objectives.	Further drawing on knowledge and experience in the workplace.	
D4	EL4- Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate.		
D5	EL5b- Awareness of the relevant legal requirements governing engineering activities, including personnel, health and safety, contracts, intellectual property rights, product safety and liability issues.		
D6	EL6b- Knowledge and understanding of risk issues, including health and safety, environmental and commercial risk, risk assessment and risk management techniques.		
	E. Engineering Practice	Teaching/learning methods & strategies	Assessment strategy
E1	P1- Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc.)	Staff deploy a range of teaching and learning strategies in the most appropriate way for each individual module. This will vary depending on the subject nature of a particular module and the level of study. A more didactic approach will tend to be adopted at lower levels, in particular for E1, E2, E3, E4 and E11.	Engineering practice is assessed through combination of unseen examinations and in-course assessments.
E2	P2b- Knowledge of characteristics of particular materials, equipment, processes or products.		Assessments take many forms as appropriate, and include laboratory reports, demonstrations, essays and phase tests.
E3	P3- Ability to apply relevant practical and laboratory skills.		
E4	P4- Understanding use of technical literature and other information sources.	Acquisition of skills for E5, E6 and E7 are through a combination of formal lectures and tutorials, as well as project based work. In some cases, particularly at levels 5 and 6, practical work may be undertaken in the workplace.	
E5	P5- Knowledge of relevant legal and contractual issues.		
E6			

E7	P6- Understanding of appropriate codes of practice and industry standards.	An increasingly self-directed and interactive approach will be adopted at higher levels, particularly for E6, E7 and E8.	
E8	P7- Awareness of quality issues and their application to continuous improvement.		
E11	P8- Ability to work with technical uncertainty.		
	P11b- Understanding of, and the ability to work in, different roles within an engineering team.		
	F. Transferable Skills	Teaching/learning methods & strategies	Assessment strategy
F1	G1- Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities.	Additional general skills are developed throughout the programme by the methods and strategies outlined in above.	Additional general skills are assessed through the following approaches:
F2	G2- Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.	F1 is developed through feedback on coursework reports, oral presentations and project reports.	F1, and F2 are assessed through coursework, individual project and technical reports and oral presentations.
F3	G3b- Plan and carry out a personal programmes of work, adjusting where appropriate.	F2 is developed in a dedicated module that emphasises the role of such practice.	F3 and F4 are assessed by review of an individual's progress during individual project work.
F4	G4- Exercise initiative and personal responsibility, which may be as a team member or leader. NB Typically, the principles of transferable skills are taught indirectly during academic study at the University with students developing proficiency through experience at work.	F3 is developed through project work planning and throughout the programme. F4 is developed through group project and assignment work. Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.	

Appendix 1 shows how these programme learning outcomes map to the professional behavioural skills and knowledge requirements listed in the Product Design and Development Engineer Degree Apprenticeship Standard and which modules contribute to meeting the Product Design and Development Engineer Degree Apprenticeship Standard requirements.

D. Programme Structures, Features, Levels, Modules, and Credits

The programme is offered in part time mode and leads to the award of a BEng Degree with Honours in Aerospace Engineering.

Entry is normally in Semester A at level 4 (with A-Level, or equivalent qualifications) but is possible at level 5 with suitable qualifications (e.g. an Edexcel HND in Engineering with appropriate subjects studied).

Professional and Statutory Regulatory Bodies

The degree is accredited as meeting the academic requirement, in part, for Chartered Engineering registration for the cohorts up to, and including, 2020 by the Royal Aeronautical Society.

Work-Based Learning

As part of a degree apprenticeship apprentices are expected to apply the skills and knowledge they have learnt in the work place. To aid this each apprentice will be allocated an Industrial Mentor by the Company and an Employer Liaison Tutor (ELT) by the School. The Industrial Mentor will be responsible for developing a Schedule of Work in consultation with the Employer Liaison Tutor (ELT) that provides the opportunity to develop the knowledge, skills and behaviours required by the apprenticeship standard. The Industrial Mentor and Employer Liaison Tutor will monitor progress through the Individual Learning Plan developed by the apprentice through the Professional Practice module at each level. In addition the apprentice shall maintain an e-portfolio of documentary evidence of achievement that is required for the end point assessment. The Industrial Mentor, Apprentice and Employer Liaison Tutor shall meet on a quarterly basis to review progress and make adjustments to the Schedule of Work as appropriate. Records from these meetings shall be included in the e-portfolio.

Apprentices are encouraged to use their experience and their reports as a basis for a presentation to the local Professional Institution Branch, Region or Division possibly through student papers or poster competitions.

End Point Assessment

After the completion of the BEng Honours in Automotive Engineering apprentices are required to take the end point assessment to complete their apprenticeship. (See the Product Design and Development Engineer Degree Apprenticeship Assessment Plan for details).

Erasmus Exchange programme

N/A

Programme Structure

The programme structure and progression information below (Table 1a and 1b) is provided for the Honours award. Any interim awards are identified in Table 1b. The Programme Learning Outcomes detailed above are developed and assessed through the constituent modules. Table 2 identifies where each learning outcome is assessed.

Table 1a Outline Programme Structure

Mode of Study

Part-time

Entry point Semester A

Year 1

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Practice (Year 1)	4ECS2025	0	English	-	-	-	ABC
Engineering Mathematics for Aerospace	4ENT1168	15	English	60	40	-	A
Aerospace Technology & Industry	4AAD0016	15	English	-	100	-	A
Introduction to Projects & Design*	4ENT1170	15	English	-	60	40	A
Electrical Science for Aircraft Engineering	4ENT1171	15	English	50	50	-	B
Aerospace Engineering Professionalism	4ENT1173	15	English	-	100	-	B
Introductory Robotics & Microcontrollers*	4ENT1174	15	English	-	60	40	B

* these modules will be delivered using two intensive weeks of delivery for these modules.

- NB unless the number of apprentices justifies otherwise, where appropriate modules will be delivered in common with the Mechanical Engineering equivalent module (i.e. 4ENT1168 with 4ENT1160, 4ENT1170 with 4ENT1163, 4ENT1171 with 4ENT1164, 4ENT1173 with 4ENT1166 and 4ENT1174 with 4ENT1167.)
- Progression to Year 2 requires a minimum of 60 credits.

Year 2

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Practice (Year 2)	5ECS2000	0	English	-	-	-	ABC
Mechanical Science for Aircraft Engineering*	4ENT1169	15	English	60	40	-	A
Fluids & Aerodynamics	5ENT1128	15	English	60	40	-	A
Practical Aerodynamics	5ENT1131	15	English	-	60	40	A
Programming for Aircraft Engineers	4ENT1172	15	English	-	100	-	B
Aircraft Structural Mechanics*	5ENT1134	15	English	70	30	-	B
Aircraft Dynamics & Vibration	5ENT1133	15	English	60	40	-	B

* these modules will be delivered using two intensive weeks of delivery for these modules.

- NB unless the number of apprentices justifies otherwise, where appropriate modules will be delivered in common with the Mechanical Engineering equivalent module (i.e. 4ENT1169 with 4ENT1161, 4ENT1172 with 4ENT1165, 5ENT1128 with 5ENT1116, 5ENT1134 with 5ENT1122, and 5ENT1133 with 5ENT1121.)
- Progression to Year 3 requires a minimum of 150 credits.

Year 3

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Practice (Year 3)	6ECS2000	0	English	-	-	-	ABC
Materials for Aerospace*	5ENT1130	15	English	-	100	-	A
Thermodynamics for Aerospace	5ENT1129	15	English	-	100	-	A
Aircraft Performance & Propulsion	6ENT1132	15	English	60	40	-	A
Control & Autopilot Systems	5ENT1132	15	English	-	100	-	B
Structural Design & CAE	5ENT1136	15	English	-	60	40	B
Advanced Aerodynamics*	6ENT1171	15	English	60	40	-	B

* these modules will be delivered using two intensive weeks of delivery for these modules.

- NB unless the number of apprentices justifies otherwise, where appropriate modules will be delivered in common with the Mechanical Engineering equivalent module (i.e. 5ENT1130 with 5ENT1118 and 5ENT1129 with 5ENT1117).
- Progression to Year 3 requires a minimum of 240 credits.

Year 4

Module Title	Module Code	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Professional Practice (Year 4)	6ECS2001	0	English	-	-	-	ABC
BEng Individual Project (Aerospace) *	6ENT1079	30	English	-	100	-	AB
Flight Testing	6ENT1166	15	English	60	40	-	A
Integrated Systems	6ENT1170	15	English	-	100	-	A
Aerospace Structures & FEA	6ENT1167	15	English	60	40	-	B
Aerospace Vehicle Design	6ENT1133	15	English	-	100	-	B

* the Individual Project will be employer based.

- The award of an Honours degree requires 360 credit points passed with a minimum of at least 120 at level 6 including the BEng Individual Project (Aerospace).

Honours classification

The University has approved structure and assessment regulations common to all programmes. Full details are provided in [UPR AS14](#), Section D.

Table 1b Final and interim awards available

The programme provides the following final and interim awards:

Final Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
BEng (Hons)	Aerospace Engineering	360 credit points including 240 at level 6/5 of which 120 must be at level 6	6	All programme learning outcomes (see Table 2)
Interim Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
University Certificate		45 credit points at level 4	4	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Certificate of Higher Education		120 credit points at level 4	4, 5	<i>For untitled awards:</i> See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Diploma of Higher Education		240 credit points including at least 120 at level 5	5, 6	<i>For untitled awards:</i> See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
BEng	Aerospace Engineering	300 credit points including 180 at level 6/5 of which 60 must be at level 6 excluding	6	A1, A2, A3, B1, B2, B3, B4, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, E1, E2, E3, E4, E5, E6, E7, F1, F2, F3

NB where interim awards are made this will result in non-completion of the apprenticeship.

Programme-specific assessment regulations

The programme complies with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12/UPR AS13](#) and [UPR AS14](#)) with the exception of those listed below, which have been approved by the University:

For non-honours awards, the standard University regulations on progression and compensation shall apply, and the Programme Board of Examiners shall have discretion to transfer a student onto a non-honours award where it is to the advantage of the student to do so (for example, where the criteria for progression on an accredited award have not been met).

As specified by the accrediting bodies, a compensated pass cannot be awarded for the Individual Project, which must be included in the calculation of degree classification. Students who do not succeed in the Individual Project may be eligible to repeat, and will be allocated an entirely different project.

Professional Statutory Regulatory Bodies thresholds will apply for accredited awards as per the Engineering Council Compensation and Condonement notice November 2018.

“To comply with professional body regulations students must achieve in all 15 credit point modules, after all available attempts, under the University regulations, a minimum of 30% (in any allowable attempt) at levels 4, 5 and 6 before the board of examiners will be able to consider compensation for an accredited honours degree. A maximum of 30 credit points can be compensated across the programme, in line with University regulations. Compensation is not permitted for individual modules worth 30 or more credit points at level 4, 5 and 6.”

Course Code	Course Instance	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
ENDAA	A4DA4P-1	BEng (Honours) Aerospace Engineering/ BEng Aerospace Engineering	6ENT1079-0906 BEng Individual Project (Aerospace)	Yes

E. Management of Programme & Support for student learning.

Management

The programme is managed and administered through:

- Dean of School;
- Associate Dean of School (AQA) who has overall responsibility for Quality Assurance and professional body accreditation;
- Associate Dean of School (L&T) who has overall responsibility for Learning & Teaching and Student Experience
- Academic Manager for Degree Apprenticeships
- Employer Liaison Tutor and Industrial Liaison Manager
- the Programme Leader who is responsible for the day to day management of the programme, chairing the programme committee and advising students on the programme;
- an Admissions Tutor, with specific responsibility for selection;
- a programme committee that includes the above plus student representation;

- module leaders who are responsible for individual modules.

Support

Students are supported by:

- An induction week at the beginning of each new academic session;
- An extensive Learning Resources Centre, incorporating a library and computer centre;
- Guided student-centred learning through the use of StudyNet;
- A student handbook that is specific to the programme;
- A Programme Leader who can advise on programme issues;
- A Employer Liaison Tutor who will also act as a Personal Tutor
- An Industrial Mentor
- Module teaching teams who provide academic support;
- Computer and technical laboratories facilities and technical support staff;
- A project supervisor;
- Student representatives on the programme committee;
- The Mathematics Drop-in Centre;
- A substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters;
- The Medical Centre;
- Printing, photocopying, laminating and document binding facilities;
- Nightline – a confidential student listening and information service in the evening when other services are not available;
- A confidential counselling service;
- University Disability Advisors;
- The Students' Union.

F. Other sources of information

In addition to this Programme Specification, the University publishes guidance to registered students on the programme and its constituent modules:

- A Engineering Apprenticeship Handbook;
- A Definitive Module Document (DMD) for each constituent module;
- A Module Guide for each constituent module.

The [Ask Herts](#) website provides information on a wide range of resources and services available at the University of Hertfordshire including academic support, accommodation, fees, funding, visas, wellbeing services and student societies.

As a condition of registration, all students of the University of Hertfordshire are required to comply with the University's rules, regulations and procedures. These are published in a series of documents called 'University Policies and Regulations' (UPRs). The University requires that all students consult these documents which are available on-line, on the UPR web site, at: <http://www.herts.ac.uk/secreg/upr/>. In particular, [UPR SA07](#) 'Regulations and Advice for Students' Particular Attention - Index' provides information on the UPRs that contain the academic regulations of particular relevance for undergraduate and taught postgraduate students.

In accordance with section 4(5) of the Higher Education and Research Act 2017 (HERA), the UK Office for Students (OfS) has registered the University of Hertfordshire in the register of English higher education providers. The Register can be viewed at: <https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/>. Furthermore, the OfS has judged that the University of Hertfordshire delivers consistently outstanding teaching, learning and outcomes for its students. It is of the highest quality found in the UK. Consequently, the University received a Gold award in the 2018 Teaching Excellence and Student Outcomes (TEF) exercise. This award was made in June 2018 and

is valid for up to 3 years. The TEF panel's report and conclusions can be accessed at: <https://www.officeforstudents.org.uk/advice-and-guidance/teaching/tef-outcomes/#/provider/10007147>

G. Entry requirements

Applicants must be working in the engineering sector in a role which provides sufficient work-based learning scope to acquire the knowledge, skills and behaviour expected by the Apprenticeship Standard. They must be supported by their employer to engage in the expected off the job learning, through to End-Point Assessment and satisfy the [EFSA eligibility criteria](#) - "Who can be funded" (starts on page 18 at P77).

The normal entry requirements for the programme are at level 4:

- GCSE Maths at grade 4, English Language at grade 4 and Science at grade 4 or above or the equivalent;
- 104 UCAS points
- BCC or equivalent. Minimum of 2 A levels.
- A levels to include Maths and either Physics or Technology or engineering based subjects excluding General Studies and Critical Thinking.

Applications are also welcomed from those holding other equivalent qualifications including, but not limited to:

- Engineering BTEC Extended Diploma with a Distinction in the Further Maths unit or equivalent, with Distinction, Merit, Merit overall.
- Engineering Advanced Diploma to include A level Maths as ASL component.
- Access to Engineering Diploma with 45 Level 3 credits at Merit to include Maths and Science or Principles units. Any additional L3 credits must be at Merit.
- Those holding equivalent qualifications will be required to discuss their individual circumstances with the appropriate Admissions Tutor.

Applicants who do not meet these normal entry requirements may be eligible for entry to an appropriate HND or Foundation Degree elsewhere, and then subsequent admission to this programme in year 2 (see below).

Direct Entry at year 2

It is possible for apprentices to enter the programme at year 2 if they have prior certified learning. In all instances, applicants will be required to discuss their individual circumstances with the appropriate Admissions Tutor. ESFA funding rules do not allow any repeated learning and all applicants will undergo an initial needs assessment to ensure that the planned programme only includes new learning.

Apprentices applying for direct entry into year 2 are required to have an HND or Foundation Degree, or equivalent, in an appropriate discipline with merits and distinctions in appropriate subjects which must include Mathematics plus technical or physical sciences.

English Language Requirements

Addition to the requirements stated above, students entering the programme and whose first language is not English will be required to demonstrate a proficiency in English to TOEFL 550/IELTS 6.0 or an equivalent recognised qualification

The programme is subject to the University's Principles, Policies and Regulations for the Admission of Students to Undergraduate and Taught Postgraduate Programmes (in [UPR SA03](#)), along with associated procedures. These will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

If you would like this information in an alternative format please contact:
Academic Manager for Engineering Degree Apprenticeships
(d.a.germany@herts.ac.uk)

If you wish to receive a copy of the latest Programme Annual Monitoring and Evaluation Report (AMER) and/or the External Examiner's Report for the programme, please email a request to aqo@herts.ac.uk

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

The following maps identify where the programme learning outcomes are assessed in the constituent modules. They provide;

- i) an aid to academic staff in understanding how individual modules contribute to the programme aims,
- ii) a checklist for quality control purposes and
- iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

The key to the learning outcomes are as listed in Section 1.C. The modules include;

BEng (Honours) Aerospace Engineering

	Learning outcomes	Knowledge & Understanding			Intellectual Skills for Analysis				Intellectual Skills for Design						Economic, Legal, Social, Ethical & Environmental Context						Engineering Practice						Transferable Skills								
		A1	A2	A3	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5	D6	E1	E2	E3	E4	E5	E6	E7	E8	E11	F1	F2	F3	F4		
	AHEP codes	SM1p	SM2p	SM3p	EA1p	EA2p	EA3p	EA4p	D1p	D2p	D3p	D4p	D5p	D6p	EL1b	EL2p	EL3p	EL4p	EL5p	EL6p	P1p	P2p	P3p	P4p	P5p	P6p	P7p	P8p	P11p	AGS1	AGS2	AGS3	AGS4		
Module Title	Module Code																																		
Level 4	Engineering Mathematics for Aerospace	4ENT1168		x			x																												
	Mechanical Science for Aircraft Engineering	4ENT1169	x			x	x	x															x												
	Aerospace Technology & Industry	4AAD0016	x												x							x													
	Introduction to Projects & Design	4ENT1170							x										x			x								x	x				
	Electrical Science for Aircraft Engineering	4ENT1171	x		x	x	x											x				x	x							x					
	Programming for Aircraft Engineers	4ENT1172						x															x												
	Aerospace Engineering Professionalism	4ENT1173												x	x	x	x	x	x							x	x	x		x	x				
	Introductory Robotics & Microcontrollers	4ENT1174			x	x		x	x	x	x	x	x	x		x	x				x	x	x	x				x	x						
Level 5	Fluids & Aerodynamics	5ENT1128	x			x	x																												
	Thermodynamics for Aerospace	5ENT1129	x			x	x																												
	Materials for Aerospace	5ENT1130				x																x													
	Practical Aerodynamics	5ENT1131																																	
	Control & Autopilot Systems	5ENT1132		x		x	x	x																											
	Aircraft Structural Mechanics	5ENT1134				x	x	x																											
	Aircraft Dynamics & Vibration	5ENT1133	x			x	x																x												
	Structural Design & CAE	5ENT1136			x	x			x	x	x	x	x	x		x	x	x		x	x	x	x	x	x	x	x	x	x	x		x			
Level 6	Aircraft Performance & Propulsion	6ENT1132	x			x	x															x													
	Flight Testing	6ENT1166	x	x		x	x	x				x																							
	Aerospace Structures & FEA	6ENT1167		x		x	x	x																											
	Aerospace Vehicle Design	6ENT1133			x				x	x	x		x					x	x									x	x					x	
	Integrated Systems	6ENT1170		x	x	x	x	x		x	x	x			x				x	x				x	x	x	x								
	Advanced Aerodynamics	6ENT1171	x	x			x	x																											
	BEng Individual Project (Aerospace)	6ENT1079	x						x	x				x	x	x	x	x	x	x				x	x		x	x		x		x	x		

Appendix 1 - Learning Outcomes Mapping of Degree Apprenticeship Standards to the BEng in Aerospace Engineering

Degree Apprenticeship Standard Requirements	UH Programme LOs	Modules that contribute to the assessment of the requirement
K1 Mathematics and science for engineers	A1, A2, A3	4ENT1168 Engineering Mathematics for Aerospace 4ENT1171 Electrical Science for Aircraft Engineering 4ENT1169 Mechanical Science for Aircraft Engineering 4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1128 Fluids and Aerodynamics 5ENT1129 Thermodynamics for Aerospace 5ENT1133 Aircraft Dynamics and Vibration 5ENT1134 Aircraft Structural Mechanics 5ENT1132 Control and Autopilot Systems 6ENT1132 Aircraft Performance & Propulsion 6ENT1166 Flight Testing 6ENT1167 Aerospace Structures & FEA 6ENT1170 Integrated Systems 6ENT1171 Advanced Aerodynamics
K2 Materials and manufacture	E2, E3	4ENT1174 Introduction to Robotics and Microcontrollers 4ENT1170 Introduction to Projects and Design 5ENT1130 Materials for Aerospace 5ENT1136 Structural Design and CAE
K3 Mechanical, electrical and electronic principles and applications	A1, A3, E1	4ENT1171 Electrical Science for Aircraft Engineering 4ENT1169 Mechanical Science for Aircraft Engineering 5ENT1128 Fluids and Aerodynamics 5ENT1129 Thermodynamics for Aerospace 5ENT1133 Aircraft Dynamics and Vibration 5ENT1134 Aircraft Structural Mechanics 5ENT1136 Structural Design and CAE 6ENT1170 Integrated Systems 6ENT1167 Aerospace Structures & FEA
K4 Statics and dynamics	A1, E1	4ENT1169 Mechanical Science for Aircraft Engineering 5ENT1133 Aircraft Dynamics and Vibration 5ENT1012 Structural Mechanics 5ENT1136 Structural Design and CAE
K5 How to undertake and apply business-led projects	C1, C2, C5, D1, D2, D3, D4, D5, D6	4ENT1173 Aerospace Engineering Professionalism 4ENT1174 Introduction to Robotics and Microcontrollers

		5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design 6ENT1079 BEng Individual Project (Aerospace)
K6 Engineering operations and business management	C1, C2, C5, D1, D2, D3, D4, D5, D6, E1, E5, E6, E7	4ENT1173 Aerospace Engineering Professionalism 4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE
K7 Applying advanced technology techniques	B2, B3, B4, C4, E1, E3	4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1133 Aircraft Dynamics and Vibration 5ENT1134 Aircraft Structural Mechanics 6ENT1166 Flight Testing 6ENT1167 Aerospace Structures & FEA 6ENT1170 Integrated Systems 6ENT1171 Advanced Aerodynamics
S1 Comply with statutory and organisational safety requirements and demonstrate a responsible and disciplined approach to risk mitigation, avoidance and management	C2, D5, D6, E5, E6	4ENT1173 Aerospace Engineering Professionalism 4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1170 Integrated Systems 6ENT1133 Aerospace Vehicle Design 6ENT1079 BEng Individual Project (Aerospace)
S2 Effectively use, interpret and evaluate a range of engineering data sources and documentation	B2, B3, C2, C3, C5, E4	4ENT1168 Engineering Mathematics for Aerospace 4ENT1174 Introduction to Robotics and Microcontrollers 4ENT1171 Electrical Science for Aircraft Engineering 4ENT1172 Programming for Aircraft Engineers 4ENT1169 Mechanical Science for Aircraft Engineering 5ENT1128 Fluids and Aerodynamics 5ENT1129 Thermodynamics for Aerospace 5ENT1133 Aircraft Dynamics and Vibration 5ENT1134 Aircraft Structural Mechanics 5ENT1136 Structural Design and CAE 5ENT1132 Control and Autopilot Systems 6ENT1132 Aircraft Performance & Propulsion 6ENT1166 Flight Testing 6ENT1133 Aerospace Vehicle Design 6ENT1167 Aerospace Structures & FEA 6ENT1170 Integrated Systems 6ENT1171 Advanced Aerodynamics 6ENT1079 BEng Individual Project (Aerospace)

S3 Organise work efficiently and effectively by managing engineering resources when completing tasks	C5, D3, E11, F1, F3, F4	4ENT1173 Aerospace Engineering Professionalism 4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design 6ENT1079 BEng Individual Project (Aerospace)
S4 Use computer software packages to assist with engineering activities	B3	4ENT1172 Programming for Aircraft Engineers 4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 5ENT1132 Control and Autopilot Systems 6ENT1166 Flight Testing 6ENT1133 Aerospace Vehicle Design 6ENT1167 Aerospace Structures & FEA 6ENT1170 Integrated Systems 6ENT1171 Advanced Aerodynamics
S5 Carry out Project Management activities	C5, E7, E11, F2, F3,F4	4ENT1173 Aerospace Engineering Professionalism 4ENT1174 Introduction to Robotics and Microcontrollers 4ENT1170 Introduction to Projects and Design 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design 6ENT1079 BEng Individual Project (Aerospace)
S6 Establish design briefs, presenting and discussing technical proposals	C1, C2, C5, C6, D2, D4, D5, D6	4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design 6ENT1170 Integrated Systems 6ENT1079 BEng Individual Project (Aerospace)
S7 Manage and control product design changes	C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6, E7	4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design 6ENT1170 Integrated Systems 6ENT1079 BEng Individual Project (Aerospace)
S8 Support team feasibility design reviews	C6, E11, F1	4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design
S9 Demonstrate technical and commercial management by planning and managing tasks & resources	C1, C2, C3, C5, C6, D1, D2, D3, D4, D5, D6, E1, E6, E7, E8, E11	4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design 6ENT1079 BEng Individual Project (Aerospace)
B1 Safety mindset. The importance of complying with statutory and organisational health, safety and	C2, D1, D5, D6, E5, E6 Graduate Attributes	4ENT1173 Aerospace Engineering Professionalism 4ENT1174 Introduction to Robotics and Microcontrollers

risk management requirements and the implications if these are not adhered to	(see Appendix 2)	5ENT1136 Structural Design and CAE 6ENT1170 Integrated Systems 6ENT1133 Aerospace Vehicle Design 6ENT1079 BEng Individual Project (Aerospace) Professional Practice modules
B2 Strong work ethic: Has a positive attitude, motivated by engineering; dependable, ethical, responsible and reliable	D1, E11 Graduate Attributes (See Appendix 2)	4ENT1173 Aerospace Engineering Professionalism 4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design Professional Practice modules
B3 Logical approach: Able to structure a plan and develop activities following a logical thought process, but also able to quickly “think on feet” when working through them	C2, C5, F3 Graduate Attributes (See Appendix 2)	4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design 6ENT1170 Integrated Systems 6ENT1079 BEng Individual Project (Aerospace) Professional Practice modules
B4 Problem solving orientation: Identifies issues quickly, enjoys solving complex problems and applies appropriate solutions. Has a strong desire to push to ensure the true root cause of any problem is found and a solution identified which prevents further recurrence.	B3, B4, D2, D4, F1 Graduate Attributes (See Appendix 2)	4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design 6ENT1170 Integrated Systems 6ENT1079 BEng Individual Project (Aerospace) Professional Practice modules
B5 Quality focus: Follows rules, procedures and principles in ensuring work completed is fit for purpose and pays attention to detail / error checks throughout activities.	D1, E3, E4, E5, E6, E7, Graduate Attributes (See Appendix 2)	6ENT1079 BEng Individual Project (Aerospace) 6ENT1170 Integrated Systems 6ENT1133 Aerospace Vehicle Design Professional Practice modules
B6 Personal responsibility and resilience: Motivated to succeed accountable and persistent to complete task.	E11, F2, F4 Graduate Attributes (See Appendix 2)	6ENT1079 BEng Individual Project (Aerospace) 6ENT1133 Aerospace Vehicle Design Professional Practice modules
B7 Clear communicator: Uses a variety of appropriate communication methods to give/receive information accurately, and in a timely and positive manner.	C6, F1 Graduate Attributes (See Appendix 2)	6ENT1079 BEng Individual Project (Aerospace) 6ENT1133 Aerospace Vehicle Design Professional Practice modules
B8 Team player: Not only plays own part but able to work and communicate clearly and effectively within a team and interacts/ helps others when required. In doing so applies these skills in a respectful professional manner.	E11, F4, Graduate Attributes (See Appendix 2)	4ENT1174 Introduction to Robotics and Microcontrollers 5ENT1136 Structural Design and CAE 6ENT1133 Aerospace Vehicle Design Professional Practice modules

B9 Applies Lean Manufacturing Principles: Demonstrates continuous improvement in driving effectiveness and efficiency	E1, E2, E7	6ENT1170 Integrated Systems Professional Practice modules
B10 Adaptability: Able to adjust to different conditions, technologies, situations and environments.	F2, F3, F4 Graduate Attributes (See Appendix 2)	6ENT1079 BEng Individual Project (Aerospace) Professional Practice modules
B11 Self-Motivation: A 'self-starter', who always wants to give their best, sets themselves challenging targets, can make their own decisions.	F2, F3, F4 Graduate Attributes (See Appendix 2)	6ENT1079 BEng Individual Project (Aerospace) Professional Practice modules
B12 Willingness to learn: Wants to drive their continuous professional development	F2, F3, F4 Graduate Attributes (See Appendix 2)	6ENT1079 BEng Individual Project (Aerospace) Professional Practice modules
B13 Commitment: Able to commit to the beliefs, goals and standards of their own employer and to the wider industry and its professional standards.	F2, F3, F4 Graduate Attributes (See Appendix 2)	Professional Practice modules

Appendix 2 - UH Graduate Attributes

The Aerospace Programmes embody the University of Hertfordshire graduate attributes extensively – indeed these attributes align very well with the requirements of UK-SPEC which these programmes fulfill in order to be accredited. The following paragraphs indicate how this is achieved.

Professionalism, employability and enterprise

Being a vocational programme apprentices will have many opportunities to develop communication skills, work independently and in teams both in industry and at UH, building confidence at problem solving and developing creativity and self-management skills in the context of the Aerospace industry. Team work is fostered through design based modules at each level and particularly through a group design task at level 6 on 6ENT1133 Aerospace Vehicle Design where they are required to design an aircraft from scratch. Students and apprentices have contact with practicing engineers throughout their degree course through guest lectures, however apprentices will additionally benefit from being fully immersed in a professional environment whenever they are working at their companies. Although there is no specific mention of it in Aerospace Degree Apprenticeship standard like all our engineering students, apprentices will be encouraged to gain an EngTech or ICTTech, through registration with the IET or IMechE.

Learning and research skills

The apprenticeship programme provides opportunities to develop effective learning skills. As part of the induction process apprentices will be introduced to the learning and research resources available within the University and on line through UH's Virtual Learning Environment, Studynet. In subsequent years, these skills are enhanced and supported by Helen Singer, the Schools Information Manager. These skills are assessed through a number of modules and particularly in 6ENT1079 BEng Individual Project (Aerospace).

Intellectual depth, breadth and adaptability

The University encourages engagement in curricular, co-curricular and extra-curricular activities that deepen and broaden knowledge and develop powers of analysis, application, synthesis, evaluation and criticality. This occurs throughout the curriculum as the students/apprentices are exposed to Engineering Mathematics and Science, including technically deepening specialist topics appropriate to their discipline, providing a theoretical underpinning, practical work in laboratories and the workshop which are then brought together in Design modules and various forms of project work – again including Individual and Group Project work. Apprentices will be encouraged to adapt the technical skills they have learnt at UH in the work place. This will be assessed as part of the Gateway 1 and 2 review and assessments at the end of level 4 and level 6 respectively.

Respect for others

The School of Physics, Engineering and Computer Science attract students from diverse backgrounds both geographically and culturally and strive to promote self-awareness, empathy, cultural awareness and mutual respect, all key ingredients for successful team working. Apprentices will be studying, and at times working, alongside these students in group activities in a number of modules and particularly through a Group Design task at level 6 on 6ENT1133 Aerospace Vehicle Design. In addition they will gain further experience of working in multidisciplinary teams within their companies. This will be reviewed as part of the Professional Practice modules and at the end point assessment.

Social responsibility

The School, primarily through the use of project work, steers their graduates towards an understanding that the actions they take really can make a positive contribution to society. As Engineers and Technologists, students and apprentices are taught the importance of environmental, economical, ethical, regulatory and consumer requirements when designing new products. This is formally covered in 4ENT1173 Aerospace Engineering Professionalism but expected to be applied during several modules and particularly during the group design project as part of 6ENT1133 Aerospace Vehicle Design.

Global Awareness

Many employers of apprentices are international organisations and even those that are not will be importing materials/services and/or exporting products or services. As such apprentices will naturally gain a global awareness through the industrial experience with their employer.

Section 2

Programme management

Relevant QAA subject benchmarking statements	Engineering
Type of programme	Undergraduate – Apprenticeship Degree
Date of validation/last periodic review	July 20
Date of production/ last revision of PS	July 2020
Relevant to level/cohort	Level 4 entering September 2020
Administrative School	School of Physics, Engineering and Computer Science

Table 3 Course structure

Course details		
Course code	Course description	HECOS
ENDAA	BEng (Hons) Aerospace Engineering (Degree Apprenticeship)	100115