# Template C4



# Programme Specification

# Title of Course: BEng Aviation Engineering

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| --- | --- |
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| Date of implementation of current version | September 2023 |
| Version number | 1 |
| Faculty | Faculty of Engineering, Computing, and the Environment |
| School | Engineering and Environment |
| Department | Department of Aerospace and Aircraft Engineering |
| Delivery Institution | Kingston University London |

This Programme Specification is designed for prospective students, current students, academic staff and 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 they take full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes and content of each module can be found in the course VLE site and in individual Module Descriptors.

## SECTION 1: GENERAL INFORMATION

## SECTION 2: THE COURSE

### Aims of the Course

The general aims of the course are:

* To equip graduates with the engineering, design, management, business and general skills required to become aerospace professionals, as well as enable them to follow careers in related professional disciplines.
* To align with the current edition of the UK Standard for Professional Engineering Competence (UK-SPEC) and to meet the academic requirements for Incorporated Engineering (IEng) Membership of the Royal Aeronautical Society (RAes) by ensuring that the course is accredited by that body.

More specific aims of the course are:

* Produce aerospace graduates who are equipped with the technical knowledge, understanding and skills; and behaviours required to be competent in the job roles within the aerospace sector.
* To prepare graduates with an ability to solve design problems and the technical skills needed to realise these solutions in the fields of aircraft operation and maintenance.
* To equip students with a broader set of professional skills and attitudes that will enable them to manage their continuous professional development when they leave the university; and to encourage them to be lifelong learners.
* Provide students with the requisite skills and knowledge to progress to higher level study and work towards becoming aerospace managers of the future.
* To furnish graduates with a firm grasp of sustainability, ethics, risks, legal obligations and economics.

### Intended Learning Outcomes

The course outcomes are referenced to the relevant QAA subject benchmarks and the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014) And relate to the typical student. The course provides opportunities for students to develop and demonstrate knowledge and understanding specific to the subject, key skills and graduate attributes in the following areas:

### Programme Learning Outcomes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Knowledge and Understanding**  On completion of the course students will be able to: |  | **Intellectual Skills**  On completion of the course students will be able to |  | **Subject Practical Skills**  On completion of the course students will be able to |
| A1 | Apply their knowledge and understanding of essential facts, concepts, theories and principles associated with aerospace engineering and the underpinning mathematics and science. | B1 | Recognise, evaluate and analyse problems; identify and investigate possible solutions and make sound decisions regarding the solution to adopt and/or the course of action to be taken. | C1 | Apply aircraft engineering principles to design and implement operational procedures and solve logistical problems through the use of engineering analysis |
| A2 | Demonstrate a knowledge and understanding of aircraft maintenance operations and project planning. | B2 | Locate, collect, collate, interpret and critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), and use it to make judgements, and to frame appropriate questions to help achieve a solution. | C2 | Use workshop and laboratory equipment safely for manufacture and experimental investigation |
| A3 | Demonstrate a clear understanding of the legal obligations pertaining to aircraft engineers, the rules and regulations under which they must work and the need to always consider aviation safety. | B3 | Communicate clearly and succinctly orally, graphically and in writing having due regard for the receiving audience and intellectual property rights. | C3 | Apply numerical and statistical methods to operational and commercial data to improve safety, procedures and gain a commercial advantage in the aviation industry and the wider transport sector. |
| A4 | Demonstrate understanding of the economical, ethical and sustainability challenges facing aviation and recognise the wider benefit of aviation to developing economies. | B4 | Manage their own personal and professional development by identifying gaps and/or shortfalls in their knowledge, understanding and skills and taking the necessary action to rectify it. | C4 | Use a range of office, engineering and aircraft industry related IT equipment and software confidently and effectively. |
| A5 | Apply business methods to assess the economic and financial aspects of air transport and/or engineering projects. |  |  |  | Work independently or as part of a team to initiate, investigate, plan, manage and drive projects to a successful conclusion and produce the associated documentation (proposals, plans, reports, presentations). |

Engineering Design and Manufacture

30 Credits, EG4018

Applying Business Management

15 Credits

EG6XXX

Engineering Mechanics and Materials

30 Credits - EG4019

Aircraft Maintenance Group Project

30 Credits

AE6101

Air Transport Economics

15 Credits

AE6XXX

Aviation Operations

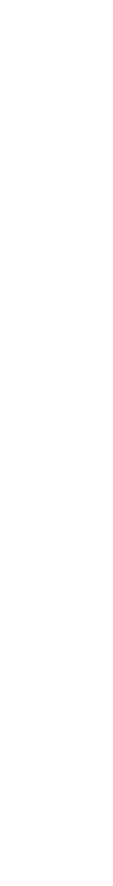
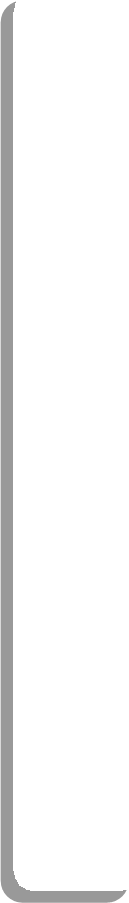
15 Credits

EG5XXX

Aerospace Engineering and Design

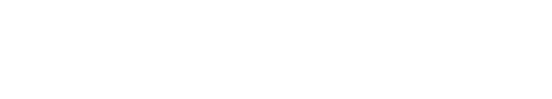
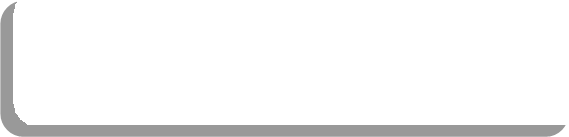
30 credits, AE5XXX

**BSc (Hons) in Aerospace Engineering**



**Industrial Placement**

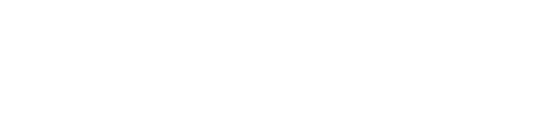
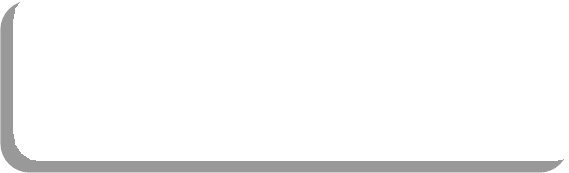
**LEVEL 4**



Introduction to the Aviation Industry

15 Credits,

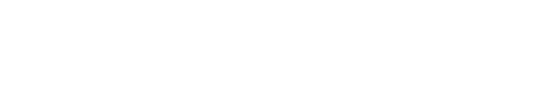
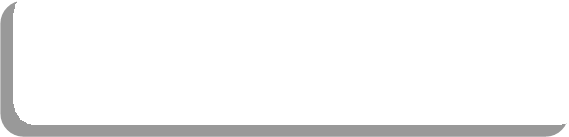
AE4009



Engineering Mathematics

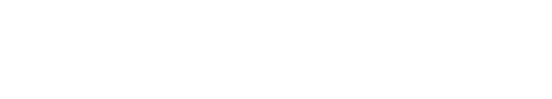
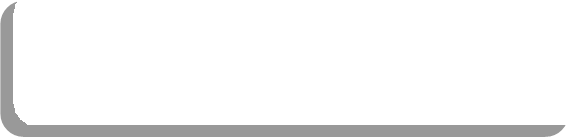
15 Credits

EG4017



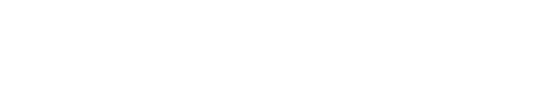
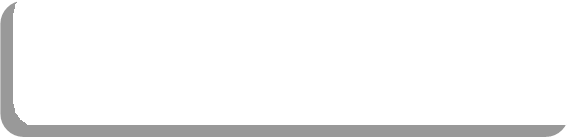
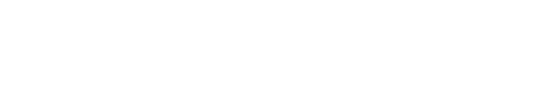
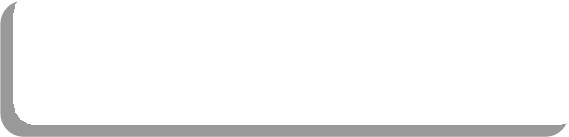
Thermodynamics and Fluid Mechanics

15 Credits, EG4024

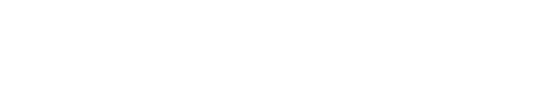
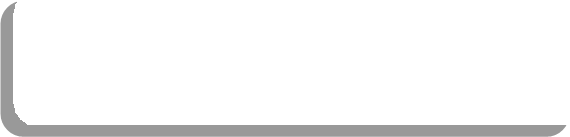


Navigate for the Professional Engineer -15 Credits

AE4021



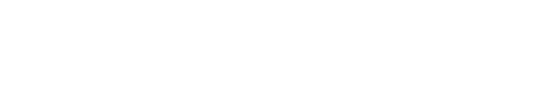
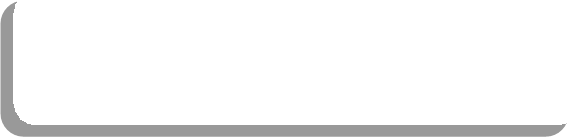
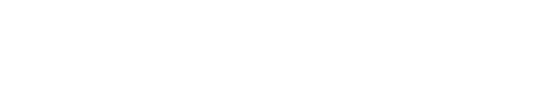
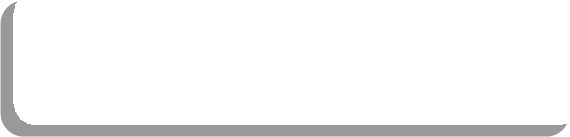
**LEVEL 5**



Aircraft Dynamics and controls

15 Credits

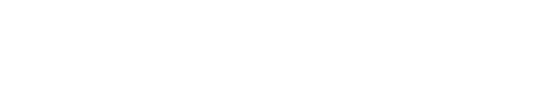
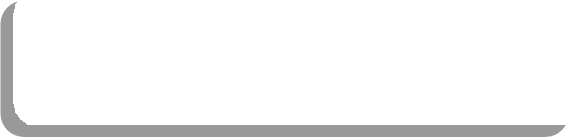
AE5XXX



Aviation Safety

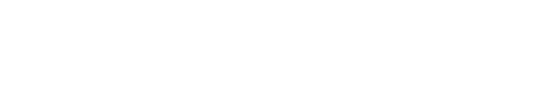
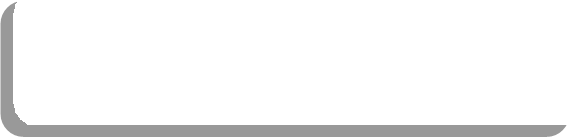
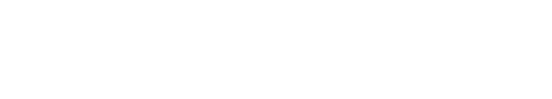
15 Credits

AE5XXX



Exploring Engineering Project Management - 15 Credits

EG5XXX

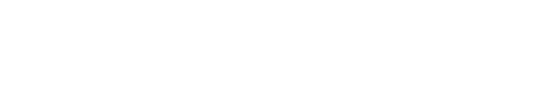


Aircraft Systems

30 credits

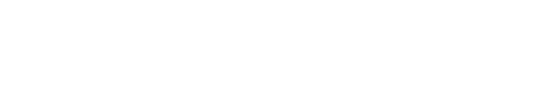
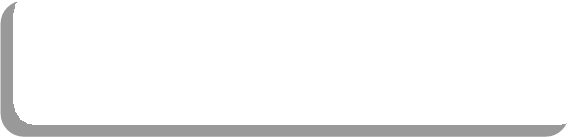
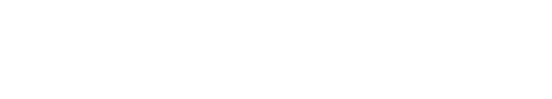
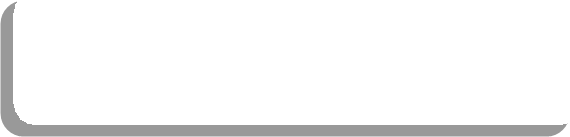
AE5101

**LEVEL 6**



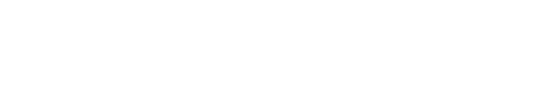
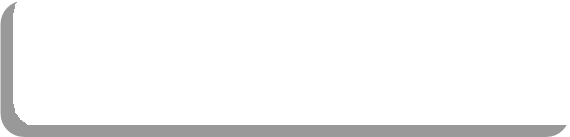
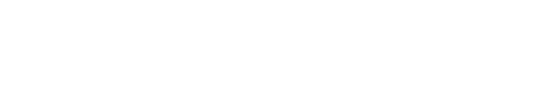
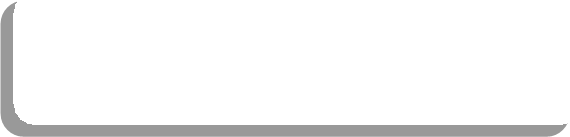
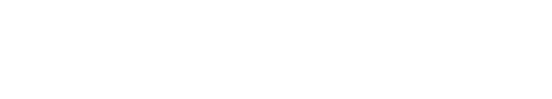
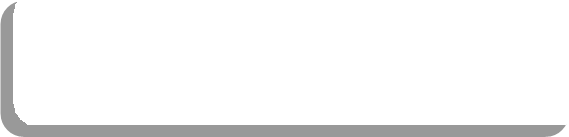
Advanced Materials and Aircraft Structures

15 Credits, AE6XXX



Aircraft propulsion and performance

15 Credits – AE6XXX



Individual Project

30 Credits

EG6XXX

In addition to the programme learning outcomes identified overleaf, the programme of study defined in this programme specification will allow students to develop the following range of Graduate Attributes:

1. Creative Problem Solving
2. Digital Competency
3. Enterprise
4. Questioning Mindset
5. Adaptability
6. Empathy
7. Collaboration
8. Resilience
9. Self-Awareness

### Outline Programme Structure

Each level is made up of four modules each worth 30 credit points. Typically, a student must complete 120 credits at each level. All students will be provided with the University regulations and specific additions that are sometimes required for accreditation by outside bodies (e.g., professional or statutory bodies that confer professional accreditation). Full details of each module will be provided in module descriptors and student module guides.

### Level 4 (all core)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Core modules | Module code | Credit  Value | Level | Teaching Block |
| Navigate for the Professional Engineer | AE4021 | 15 | 4 | 1 |
| Engineering Mathematics | EG4017 | 15 | 4 | 1 |
| Thermodynamics and Fluid Mechanics | EG4024 | 15 | 4 | 2 |
| Introduction to the Aviation Industry | AE4009 | 15 | 4 | 2 |
| Engineering Design and Manufacture | EG4023 | 30 | 4 | 1 & 2 |
| Engineering Mechanics, and Materials | EG4019 | 30 | 4 | 1 & 2 |

This course permits progression from level 4 to level 5 with 90 credits at level 4 or above. The outstanding 30 credits from level 4 can be trailed into level 5 and must be passed before progression to level 6. Students exiting the course at this point who have successfully completed 120 credits at level 4 or above are eligible for the award of Certificate of Higher Education (CertHe) in Aerospace Engineering.

### Level 5 (at least 60 credits = core)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Core modules | Module code | Credit  Value | Level | Teaching Block | Pre-requisites |
| Exploring Engineering Project Management | EG5017 | 15 | 5 | 1 |  |
| Aviation Safety | AE5XXX | 15 | 5 | 1 |  |
| Aircraft Dynamics and Control | AE5XXX | 15 | 5 | 2 | 2 |
| Aviation Operations | AEXXXX | 15 | 5 | 2 | 2 |
| Aerospace Engineering | AE5XXX | 30 | 5 | 1 &2 | 1 &2 |
| Aircraft Systems | AE5101 | 30 | 5 | 1 &2 | 1 & 2 |

This course permits progression from level 5 to level 6 with 90 credits at level 5 or above. The outstanding 30 credits from level 5 can be trailed into level 6 and must be passed before consideration for an award or progression to level 7 (if appropriate).

Students exiting the programme at this point who have successfully completed 120 credits at level 5 or above are eligible for the award of a Diploma of Higher Education in Aerospace Engineering.

### Level 6 (at least 60 credits = core)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Core modules | Module code | Credit  Value | Level | Teaching Block | Pre-requisites |
| Apply Business Management | EG6026 | 15 | 6 | 1 |  |
| Aircraft propulsion and performance | AE6XXX | 15 | 6 | 1 |  |
| Advanced Materials and Structures | AE6XXX | 15 | 6 | 1 |  |
| Aircraft Maintenance Operations | AE6201 | 30 | 6 | 1 & 2 |  |
| Air Transport Economics | AE6xxx | 15 | 6 | 2 |  |
| Individual Project | EG6017 | 30 | 6 | 1 & 2 |  |

This course permits progression from level 6 to level 7 with 90 credits at level 6 or above. The outstanding 30 credits from level 6 can be trailed into level 7 and must be passed before consideration for an award.

## Principles of Teaching, Learning and Assessment

The BSc course in Aerospace has been designed, taking into account the Kingston University Curriculum Design Principles, to help develop students into graduates that are professional, thoughtful, creative, resilient, proactive and globally aware and independent, equipping them to be lifelong learners.

**Development of Independent learning through the course**

The learning, teaching and assessment strategy of the course is aimed at supporting progression in curriculum content and skills development through the levels of study. At level 4 there is a clear structure and guidance for students’ learning with an emphasis on the acquisition of fundamental engineering knowledge and skills (e.g. Mathematics and IT in **EG4017 Engineering Mathematics,** practical skills in **EG4019 Engineering Mechanics and Materials,** design skills in **EG4018 Engineering Design and Manufacture**) and the initial development of **Future Skills** in **AE4021 Navigate for the Professional Engineer**. Level 4 students would also learn the basics of the course in **AE4009 Introduction to Aviation Industry**. This provides a solid foundation for students to undertake a deeper study in a specific engineering discipline at level 5. At level 5 there will be an increased expectation of independent study, supported by a reduced emphasis on the use of traditional lectures. Students will continue to receive clear guidance on how to assess their understanding of the material through self-assessment questions and at scheduled tutorials. At level 6 students will be expected to take greater ownership of their independent study with academics taking on more of a supervisory role of student independent study, this is exemplified in the individual and **EG6XXX Individual project** and the Project-Based group work of **AE6XXX Aircraft Maintenance.**

Module guides set out clear expectations for guided independent learning. Students will be directed to reading and Technology Enhanced Learning (TEL) packages to prepare for individual topics or sessions and also to problem sets or exercises to consolidate and test their learning afterwards. This will be introduced at level 4. The Virtual Learning Environment (VLE) at Kingston will support learning throughout the course through a variety of TEL objects such as videos, screencasts, online MCQs, discussion boards, Mentimeter and interactive teaching packages. It will also deliver teaching material such as lecture notes/presentations, problem sets and worked examples. For example, an extensive library of engineering videos mapped to every lecture topic is embedded in the VLE for the module **Aerospace Engineering**. This helps support an inclusive approach as students can access learning material at their convenience and work through it at their own pace with the opportunity to pause and rewind as they wish.

**Integrated first year and interdisciplinary collaboration.**

All engineering students at Kingston University take a common set of four 15 credits modules and two 30 credit modules. This allows all students to experience various engineering disciplines before deciding on an area of specialisation. Due to a specialist strand in TB2 for one of the modules, students are expected to pick the chosen engineering pathway at the end of TB1. Although students may have a firm idea of which branch of engineering they would like to study when they start (e.g. civil and infrastructure) exposure to a variety of branches in the first teaching block will allow students to make a more informed choice. The opportunity to study and work with students from different branches of engineering is a distinct feature of the course at Kingston and is extended into the second year when all students take a common level 5 module. Project-based learning (PjBL) is employed requiring interdisciplinary teams to design, build and present solutions to small scale engineering challenges, the outputs of these will be part of the summative assessment. Interdisciplinary group work will be further developed at level 5 in **EG5016 Exploring Engineering Project Management** where students are taught about group project management in TB1 and then will spend much of TB2 working on a more complex challenge that will comprise 60% of the module assessment. In this module, students are likely to tackle a live, real-world problem supplied by a well know company or organization. This will give the students an opportunity to talk about how they have worked with an external company on an engineering problem as part of a team when they apply for an industrial placement At level 6, students will consolidate their group working skills in **Aircraft Maintenance** when undertaking a group design project in their own engineering discipline, using the team working skills learned in earlier years.

**Focus on active learning and enhancing student engagement**

A feature of the learning, teaching and assessment strategy in the School of Engineering is that many instructional lectures have been replaced by collaborative, problem solving or enquiry-based learning workshops and tutorials. These BSc (Hons) Aerospace Engineering require students to prepare for, and participate in, classroom activities, rather than passively listening to the lecturer. Students are expected to engage in guided learning to prepare for these teaching sessions and consolidate their learning after the session. These interactive sessions also provide students with opportunities for peer learning, group work and presentation practice. In these sessions, the lecturer facilitates learning by supporting students in creating their own knowledge and understanding. Lecturers may also introduce and summarize key concepts with short mini-lectures. These collaborative activities encourage students to draw on their own set of experiences and cultural backgrounds when tackling real-world challenges. Where the curriculum (lecture content) of a small topic is delivered via online materials (screencasts, videos or study packs) and then developed and applied in workshops (4 hours). At levels 5 and 6, a flipped class approach will be adopted in **Aerospace Engineering, Aircraft Systems,** and  **Aircraft Propulsion and Performance.**

Active and collaborative learning is also incorporated in traditional lectures which may have question-and-answer sessions, brief student discussions, and clicker activities integrated into the lecture. These methods ensure that valuable contact time is focussed on the application and critical analysis of knowledge and the development of key skills such as problem-solving, communication, and group work.

The high percentage use of active learning sessions in the teaching hours is aimed at improving student engagement, creativity, confidence and self-reliance. The course endeavours to further secure student engagement by making students feel part of a community and increasing their sense of belonging which is supported to improve retention and progression. This is achieved by providing opportunities to interact with staff and students both socially and academically. In addition, to the active learning sessions and group work, this is achieved through: the PT scheme, fieldwork, industrial visits, extra-curricular seminars, research internships, course representative system, student ambassador work, peer mentoring, PAL civic engagement and outreach opportunities.

**Developments of employability skills**

The progressive development of a range of key employability skills is another feature of the course as exemplified in teamwork/group work discussed above. Regarding communication skills, at level 4 the focus is on writing individual practical reports **(EG4024 Thermodynamics and Fluid Mechanics**) using a standard format and style and encouraging students to orally communicate the outcomes of small group exercises in the active learning teaching sessions in **EG4019 (Engineering Mechanics and Materials)**. At level 5 students will be required to produce a substantial written group report and present their individual findings in **Aerospace Engineering**, individual laboratory reports on more challenging topics. To help the development of these skills students will be required to submit a draft of a reportto the Support for Academic Success Centre for feedback and to discuss this with their personal tutor. At level 6, in the **Individual Project** module, students will be taught how to synthesise and critically review information from a variety of sources and report this and their research results in a formal research report and an oral presentation.

To complement the development of employability skills within the curriculum, Personal tutors will encourage students to engage in a range of extra-curricular activities such as student representation, part-time work, sports and recreation, society membership, volunteering; student ambassadorship, leadership and mentoring; cultural and creative activities; academic and professional collaboration; placement activity; enterprise activity; KU Talent events and opportunities. Activity in these areas is recognised by the university’s Kingston Award Scheme. KU Talent offers a range of events, including Careers Uncovered fairs, which include employers coming to campus to promote internship, placement and graduate opportunities, and Spotlight on engineering networking activities where employers and alumni are invited on campus to talk about career pathways.

**Hands-on Practical work**

Hands-on practical experience in workshops and laboratories is fundamental in developing practical skills as well as enhancing data collection and analysis skills. Students will have the opportunity to work in laboratories and workshops in most of their modules. Practical work is closely related to the taught content to provide context for the theoretical work. At level 4 students are introduced to basic measurement and manufacturing processes and how to apply these in a laboratory and testing environment**.** At level 5 the focus is the manufacturing of composite materials used to make aircraft structures in the composite Laboratory and performing more complex measurements in the wind tunnel laboratory in **Aerospace Engineering**. Students also will learn basic flying skills and aircraft stability modes using the flight simulator. In **Aircraft Systems,** sample systems will be used to demonstrate the typical operation of each of the aircraft systems. This is delivered through supervised practical sessions with experiment protocols. At level 6 students and expected to select and apply requisite practical skills in their own independent research work in **the Individual project** module.

**Research Informed Teaching**

The majority of the course team are either in engineering research active or are involved in industry related professional activities, through KTPs or other direct involvement with industry. These activities played a major part in informing the course design and content, as did the direct input from industry through the activities of the Industrial Advisory Board.

Most of the teaching staff are also actively involved in the various Research Centres and/or Research Groups of the Faculty or may be following interest areas of their own. These activities take them into, amongst other areas, materials research both coatings and composites, fire and explosion research both cause and prevention, dynamics and control research and on through sustainable power generation to electric vehicle technology with the particular success of the zero emissions electric motorbike. The modules at levels 5 and 6 are mainly taught and managed by academic staff, who are engaged in research in areas such as materials, aerodynamics, aero elasticity, control engineering and structural analysis. Students are encouraged to develop their own research skills which are a fundamental part of the curriculum throughout all levels of the programme. They are often encouraged, through project work, to work with research active staff on elements of live projects, and these research skills enable students to determine, distinguish and present appropriate evidence in an argument, which is of great value to employers.

Academic staff are also engaged widely with the research and development of ideas in teaching and learning in Higher Education and into wider pedagogic issues which will then feed through to support learning in lectures and other forms of student engagement in the programme, both formal and extra-curricular. As parts of pedagogic research computing resources in fundamental subjects such as Maths and Mechanics/Physics have been developed and embedded into the VLE system. The use of an Electronic Voting System in the classroom for summative and formative assessments is another example of pedagogic research undertaken by the teaching staff. This reflective, evidence-based professional practice by academic staff serves as an exemplar to students in their future professional practice.

**Assessment for Learning**

The assessment strategy has been designed help students to learn and prepare them for employment, rather than just a tool to measure their learning. The assessment is designed to be authentic, inclusive and transparent. The assessment tasks focus on the real world-engineering activities that enhance students’ employability. For example, the **Aircraft Maintenance** module provides students with opportunities to work on a collaborative group work based on a virtual industrial environment in which they have to develop a realistic and cost-effective maintenance solution for an airline operation. Students will develop the ability to solve open-ended problems with real-world constraints and airline regulatory requirements. All modules have explicit formative assessments to provide opportunities for practice and the chance to use ‘feed-forward’ to help students improve their work in subsequent summative assessments (give examples- module codes). Examinations are still used as they are an effective way of assessing basic knowledge and understanding, and professional bodies expect to see examinations covering key curriculum content. However, the strategy recognises that other assessment methods are better suited to assessing higher level problem-solving skills. This is reflected in the decreasing use of examination from level 4&5 to level 6. The use of a well-balanced range of assessment BSc (Hons) Aerospace Engineering methods is a key part of our inclusive assessment strategy. Group and teamwork assessment is instrumental in developing and recognising this important employability skill.

**Engineering curriculum**

The purpose of the Level 4 stage of the programme is to enable students from various academic backgrounds to transition smoothly to a Higher Education environment and harness the provision of academic and pastoral support provided by the University. The BSc (Hons) Aerospace Engineering programme shares a common Level 4 with the BEng (Hons) Aerospace, Mechanical and Civil Engineering programmes. The BSc (Hons) Aerospace Engineering students will typically have lower entry tariff points, coming from more diverse academic and socioeconomic backgrounds. At Level 4, the PTS is a core feature of the programme that is used proactively to identify specific weaknesses and support needed by the students in each module. They are required to have a learning logbook for the problem sets for self-monitoring. The personal tutors will monitor their progress periodically and signpost any support available.

The **AE4021 Navigate for the Professional Engineer** is designed to develop key employability skills such as communication, presentation, team-working, planning and project management. It also provides an opportunity for students to adapt reflective practice and develop engineering skills and transferable skills to support Continuous Professional Development (CPD). The **EG4017 Engineering Mathematics and EG4019 Engineering Mechanics and Materials** modules allow students to develop theoretical and numerical skills that are necessary in the design of real world structures. The **EG4017 Engineering Mathematics** equips students with the mathematical skills for solving engineering problems. It also introduces the use of computing methods in engineering with the use of mathematical and statistical software.

Level 5 of the core programme builds on the fundamental knowledge and skills gained at Level 4. It focuses on knowledge and understanding of the engineering principles underpinning aircraft technologies and aviation operations The **Aviation Safety** focuses on the statistical methods and techniques used in airline operations, safety and incident analysis, and the effective implementation of a Safety Management System. The module enables students to apply mathematical methods to analyse complex data for the purpose of improving efficiency, optimising processes and quantifying risk. The problem-based and inquiry-based group work fosters collaborative thinking and develops attributes expected of an aerospace graduate.

The **Aerospace Engineering** introduces the application of aerospace engineering principles to aircraft aerodynamics, propulsion, materials and structural analysis. The module enhances the development of students’ analytical, problem-solving, critical thinking and laboratory skills. It provides an understanding of how the principles of aerodynamics, propulsion, structures and materials science all determine the configuration and performance of fixed and rotary wing aircraft. It also develops software modelling skills for analysing composite aerospace structures using FEM techniques and CAD. The module involves the use of composite and wind tunnel laboratories and the flight simulator to enhance students' learning experience through Learning-By-Doing. Staff encourages students to develop curiosity and a desire to learn for life using active learning techniques.

The **Aircraft Systems** module is designed to give students knowledge and understanding of the aircraft systems, and the requirements for maintaining the airworthiness of aircraft and the licensing of maintenance personnel. It enables students to develop a systems engineering perspective to look at the interaction and integration of the systems. It also ensures students have a thorough understanding of the requirements for airworthiness and the licensing of maintenance personnel. The live Learjet business aircraft is used to demonstrate the typical operation of each of the systems and to facilitate Learning-By-doing through the hands-on practice of real-world hardware.

The **EG5016 Exploring Engineering Project Management Modules** introduce the principles and commercial practices for the management of engineering projects and related wider business operations. The nature of project engineering and business management is considered in the context of time, quality, risk and sustainability aspects. It introduces the legal, commercial, social and ethical framework in engineering environments. This module provides opportunities for developing team-working and communication skills in group discussions and seminars**.**

Level 6 of the programme continues the aerospace theme but it emphasises the development of self-management, independent learning, professional skills, and a deep understanding of the knowledge required in aerospace engineering.

In the **Aircraft Maintenance** module students are taught about maintenance logistics, maintenance cost drivers and the key aspects of project planning before engaging in a group project based in this field and drawing on knowledge and experience gained previously. It will consist of substantial Project-Based Learning (PjBL) driven by the students with supervisor/facilitators to encourage professionalism and leadership in a group activity support. It provides students with an understanding of the process of project planning and an opportunity to put theory into practice in a virtual industrial project. The module encourages professionalism and leadership in a collaborative group setting in which sustainability and ethics are embedded within the project context. (virtual industrial)

The **Aircraft Propulsion and Performance and Advanced Materials and Structures** encompass the principles of aerodynamics, propulsion, structures and materials science and performance of fixed and rotary wing aircraft. The module enables students to apply engineering analyses and modelling techniques to solve engineering problems and optimise the performance of an aircraft system or components. The module develops the analytical and problem-solving skills of the students.

The **Individual Project** module combines the technical and academic facets of the programme and provides students with an opportunity to complete a capstone project applying the knowledge and skills learnt during the course to achieve agreed deliverables. It enables students to develop their research skills using and applying information from the technical literature.

**Inclusive Teaching Practice**

Staff Student Consultative Committees and Boards of Study provide opportunities for students to make suggestions on how to develop a more inclusive curriculum by taking into account the specific circumstances of the student body. The variety of teaching activities also takes account of the student’s different learning preferences and experiences and there is a careful balance of individual and group-based activities.

Marking criteria are provided for all assessments as part of the assessment booklet at the beginning of the year for each module and care is taken to ensure that the language used is clear**.** Assessment and marking criteria for all substantial assessments are discussed in class so all students have an opportunity to interrogate the criteria.

In the programme, the following components are used in the assessment of the various modules:

* Practical exercises: to assess students’ understanding and technical competence.
* Individual and group-based case project work: to assess the ability to understand requirements, to provide solutions to realistic problems and to interact and work effectively with others as a contributing member of a team.
* The outcomes can be:
  + Written reports, where the ability to communicate the relevant concepts, methods, results and conclusions effectively will be assessed.
  + Oral presentations, where the ability to summarise accurately and clearly communicate the key points from the work in a brief presentation will be assessed.
  + Video, which may replicate features of oral presentations but allows advanced preparation away from the audience (which may suit some students better).
  + Multiple choice or short answer questions: to assess competence in basic techniques and understanding of concepts.
  + Long answer structured questions in coursework assignments: to assess the ability to apply learned techniques to solve simple to medium problems and which may include a limited investigative component.
  + Long answer structured questions in end-of-module examinations: to assess the overall breadth of knowledge and technical competence to provide concise and accurate solutions within restricted time.
  + Project: The individual project module represents an opportunity for students to draw together different aspects of their learning on the course and to apply the techniques learned in an extended study. As such the assessment here will place a greater emphasis on the ability to plan work, manage time effectively, and research background information, culminating in a written report and interview.
  + Individual and group practical laboratory reports.

**Employability/Placement**

Initially, students are guided towards learning about employability skills and career pathways, but as they move through the course, they are expected to become more independent and take ownership of their career development by engaging with classes provided by KU Talent, including; Professional Communication, Time and Self-Management and Identifying and Articulating Skills. There are also opportunities to perfect skills required to gain employment such as CV writing, Psychometric Tests and Using LinkedIn. A student’s development and career options are discussed in personal tutor meetings and guidance is given as appropriate. This is in liaison with the KU Talent team, the University’s Careers Service.

## Support for Students and their Learning

Student support is provided at Kingston University and is available online when students are in second year staff. This permits students to raise concerns, queries or ask advice which can usually be answered on-site although referral is made to Kingston University Student Support when required.

Student support recognises that the student experience is unique to each student. A key part of our approach to an inclusive curriculum is that we acknowledge and where possible accommodate their individual circumstances. The personal tutor scheme is central to the efforts to provide a personalised learning experience. (See PT section of programme specification) At level 4 and 5 a core set of problems for each engineering module are issued to students. These cover the whole curriculum for a particular level. Students are required to work through these formative assessment problems as they cover the relevant curriculum. This allows students to test their learning and measure their progress. Discussion of progress on these problem sets will be a key part of the personal tutor scheme. Students are required to upload their progress on these activities onto the **Learning Log** created on the University VLE system. The Learning Log will be available to the relevant personal tutors for further discussion during one-to-one meetings. There will be milestones for students to meet at every level, and it will be one of the personal tutor’s roles to monitor the students’ progress and give appropriate advice*.* Where difficulties are encountered PTs will be able to help or direct students to available support including peer mentoring schemes, PAL, Maths aid and online resources etc.

Students are supported by:

* **A Module Leader** for each module
* **A Course Leader** to help students understand their programme structure and provide academic support
* **A Personal Tutor** (PT) to provide academic and personal support
* There is a **Student Support and Engagement Team** to help students with any problem that is affecting their studies.
* A dedicated Undergraduate Course Administrator
* **An induction programme** and study skills sessions at the start of each academic year
* **Academic Success Centre** is a one-to-one drop-in Study Skills session for students every weekday. Help is available on a range of academic skills from writing reports, and note-taking, to exam revision, referencing, programming and mathematical skills.
* **VLE** – a versatile on-line interactive intranet and learning environment accessible both on-site and remotely.
* **Course Representative scheme**
* **Talent A University Careers** and Employability Service
* Comprehensive University support systems including the provision of advice on finance, regulations, legal matters, accommodation, international student support, disability and equality support.
* The Students’ Union
* An Academic Team that seeks to maintain an open-door policy in the spirit of supporting students.

**Personal Tutor Scheme (PTS) in the School of Engineering**

The following provides the aims and structure of the Personal Tutor Scheme (PTS) for the School of Engineering. It is intended that the PTS be embedded within the provision of the BEng programme.

**Overall Aims**

* To build a rapport between staff and students and contribute to personalising students’ experience within the School of Engineering
* To support students in the development of their academic skills providing appropriate advice and guidance to students throughout their time at Kingston, while monitoring their progress, helping to identify individual needs and referring students to other University services as appropriate.
* To help students to develop the ability to be self-reliant and confident self-reflective learners who use feedback to their best advantage
* To encourage students to reflect on how their learning relates to a wider context and their career progression

**Allocation of Personal Tutors**

* Personal tutors will be allocated during induction week
* Tutors will be allocated on a course basis where appropriate with student numbers being equally divided amongst the staff within the school
* Students will keep the same tutor throughout their course of study
* If they change discipline at the end of TB1 a change of PT is likely to occur to allow comprehensive support through the programme.

There are specific aims and outcomes for each level, as the PTS is progressive and cumulative students will find that they are building on the skills developed in previous levels. Formative assessment will be provided in the form of regular feedback during meetings.

This needs to reference specific modules linked to the PTs and activities expected of students.

**Level 4: Settling in and building confidence**

**Aims and Learning Outcomes**

* To assist students in making the transition to Higher Education and to generate a sense of belonging to the School Engineering with an emphasis on widening participation issues
* To help students to develop good academic habits and to gain the confidence to operate successfully in a university context
* To prepare students to make the most of feedback throughout their course

**Contact:**

* Teaching block 1: three one-to-one meetings during induction week, weeks 2 and 6-7
* Teaching block 2: two one-to-one meetings during week 1 and weeks 6-7
* End of the academic year individual ‘wrap up’ email

In addition to a core set of problems for each module, students are also given a list of engagement activities that they are encouraged to take advantage of at level 4. PT will discuss progress on problem sets and engagement with certain activities with tutees throughout the year.The Learning Log will be available to the relevant personal tutors for further discussion during one-to-one meetings. There will be milestones for students to meet at every level, and personal tutors will monitor the students’ progress and give appropriate advice.

**Level 5: Stepping it Up and broadening horizons**

**Aims and Learning Outcomes**

* To help students comprehend and plan for the academic demands of level 5 and to support increasing independence
* To encourage students to look forward, to take up opportunities to develop wider skills and to take responsibility for their personal development
* To foster students’ ability to build on and respond proactively to the feedback they have received
* To assist students in reflecting on the skills that they are developing and considering how they relate to employability

**Contact:**

* One-to-one meeting in week 1
* Email contact at the end of teaching block 1
* Individual ‘wrap up’ email at the end of the academic year

**Level 6: Maximising success and moving on**

**Aims and Learning Outcomes**

* To support students with the planning necessary to maximise success in their penultimate undergraduate year
* To encourage students to reflect on the employability skills they have developed and be proactive in moving towards a professional life and/or further study
* To help students to make the best use of the feedback they have received so that they can build on their strengths and take steps to address any weaknesses

**Contact:**

* One-to-one meeting in week 1
* Email contact at the end of teaching block 1
* Individual ‘wrap-up’ email at the end of the academic year

Personal Tutors would have access to all the formative and summative assessment results of their tutees and would be responsible to discuss them with their tutees and assist them to prepare plans for further improvements and advise on any academic issues they may have. The personal tutors are also responsible for giving a bigger and more complete picture of learning, teaching, learning outcome and assessment and their linkage to the tutees.

## Ensuring and Enhancing the Quality of the Course

The University has several methods for evaluating and improving the quality and standards of its provision. These include:

* External examiners - Annually
* Boards of study with student representation – Bi-annually
* Annual review and development
* A periodic review undertaken at the subject level
* Student evaluation – Mid and end of module
* Moderation policies – After every summative assessment

## Employability and work-based learning

The BSc (Hons) Aerospace Engineering focuses on the key technical and employability skills, and desired attributes required to be a competent aerospace engineer. It aligns with the knowledge, skills and behaviours defined in the accreditation of Incorporated Engineering (IEng) programmes by the Royal Aeronautical Society. The mapping of the learning outcomes with the current edition of the UK Standard for Professional Engineering Competence (UK-SPEC) is shown in section M. With the rapid growth of the air transport industry, there are strong demands for Incorporated Engineers within the Aerospace sector. The BSc Aerospace Engineering graduates are destined to work primarily with airworthiness, aviation management, systems integration, design, support and manufacturing. The employability skills will be developed through a range of aviation and general engineering modules in the programme described in Section Principles of Teaching and Learning. The programme provides students with opportunities to take personal responsibility for their actions, manage projects and develop leadership in Project Based Learning (PjBL) activities such as formal group projects, hands-on mini-projects, enquiry based case studies, and co-and extra-curriculum activities. The development of transferable skills such as communication, interpersonal, team-working skills, analytical and problem-solving skills is embedded within the programme. Students will be aware of the professionalism, code of conduct and ethical standards required in self-directed PjBL activities.

The curriculum embeds the development of employability skills throughout the Course and is designed to equip students with the ability to relate the knowledge and skills that they have learnt to the real-world contexts in which they may work in the future. Group work in conjunction with external organisations at level 4 will provide students with relevant experience to add to their CVs when they are applying for placement in level 5. Students are required to produce a CV early at level 5 and to improve this following feedback. The school strongly encourages and supports all students in applying for positions in industry for an Industrial Placement year between levels 5 and 6, the School emphasises the benefits to be obtained from an approved placement in industry.

An Industrial Placement comprises a period of at least 36 weeks with an approved employer. Students are required to maintain a logbook of their activities and involvement and produce a final report on their activities as well as the organisational and business aspects of the company. They are supported throughout the period by their personal tutor, who will visit them at their place of work on at least one occasion. The University tutor will discuss progress with the student and employer and will recommend any improvements to the learning opportunities.

Professional practice is introduced in the first year in the module EG4XXX, in which the students are introduced to employment opportunities in the specialist engineering field, this is followed by all other modules at levels 5, 6 and 7, especially **in Project Engineering Management, Aviation Safety and Individual project**.

**Work-based learning, including sandwich courses and higher or degree apprenticeships**

Work placements are actively encouraged – although it is the responsibility of individual students to source and secure such placements. This allows students to reflect upon their own experience of working in an applied setting, to focus on aspects of this experience that they can clearly relate to theoretical concepts and to evaluate the relationship between theory and practice.

**Other sources of information that you may wish to consult**

## Full details of this programme can be found at [www.kingston.ac.uk](http://www.kingston.ac.uk)

## Development of Course Learning Outcomes in Modules

This map identifies where the programme learning outcomes are assessed across the modules for this programme. It provides an aid to academic staff in understanding how individual modules contribute to the programme aims, and a means to help students monitor their learning, personal and professional development as the programme progresses and a checklist for quality assurance purposes.

Key:

**S** – Indicates where summative assessment occurs.

**F** – Indicates where summative assessment also provides student feedback and/or feed-forward (is formative).

All modules will have elements of informal formative assessment associated with them.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Level 4** | | | | | | **Level 5** | | | | | | **Level 6** | | | | | |
|  |  | AE4021 - Navigate for the Professional Engineer | EG4024 – Thermodynamics and Fluid Mechanics | AE4009– Introduction to Aviation Industry | EG4017 – Engineering Mathematics | EG4023  Engineering Design and Manufacture | EG4019 – Engineering Mechanics and Materials | EG5XXX – Exploring Engineering Project Management | AE5XXX – Aviation Safety | AE5XXX – Aerospace Engineering and Design | AE5XXX – Aviation Operations | AE5101 – Aircraft Systems | AE5XXX – Aircraft Dynamics and controls | EG6XXX – Applying Business Management | AE6XXX – Aircraft Propulsion and Performance | AE6XXX – Advanced materials and Aircraft Structures | AE6XXX – Aircraft Maintenance (Group Project) | EG6XXX – Individual Project | AE6XXX – Air Transport Economics |
| **Knowledge & understanding** | A1 |  | S | S | S | S | S |  |  | S |  |  |  |  |  | S |  |  |  |
| A2 |  |  |  |  | S |  |  |  |  |  |  |  |  |  |  | S |  |  |
| A3 |  |  |  |  | S |  |  |  |  | S | S |  |  |  |  | S |  | S |
| A4 |  |  | S |  |  |  | S |  |  | S | S |  | S |  |  |  |  | S |
| A5 |  |  |  |  |  |  | S |  |  | S | S |  |  |  |  |  | S | S |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Intellectual Skills** | B1 |  | S |  |  |  |  |  |  | S |  |  |  |  |  | S |  | S | S |
| B2 |  | S |  |  |  |  |  | S | S | S | S | S |  |  |  | S | S | S |
| B3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | S | S |
| B4 |  |  |  |  |  |  |  |  |  |  |  |  | S |  |  |  |  |  |
| B5 |  |  |  |  |  |  |  |  |  | S |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Practical Skills** | C1 |  | S |  | S | S | S |  |  | S | S | S |  |  |  | S | S | S |  |
| C2 |  |  |  |  | S |  |  |  |  | S |  |  |  |  |  | S |  |  |
| C3 |  |  |  | S |  |  |  |  |  | S |  |  |  |  |  | S | S | S |
| C4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | S | S |
| C5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | S | S |

Students will be provided with formative assessment opportunities throughout the course to practise and develop their proficiency in the range of assessment methods utilised

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|  | **Level 4** | | | | | | | **Level 5** | | | | | | **Level 6** | | | | | | |
| **Module code** | EG4XXX - Navigate | EG4XXX – Thermo dynamics and Fluid Mechanics | EG4XXX – Introduction to Aerospace Engineering | EG4XXX – Engineering Mathematics | EG4XXX – Engineering Design and Manufacture | EG4XXX –Mechanics, Materials and Electronics | EG5XXX – Explore and Project Management | | AE5XXX – Aviation Safety | AE5XXX – Aerospace Engineering | AE5XXX – Aircraft Maintenance and Management | AE5101 – Aircraft Systems | AE5XXX – Aircraft Dynamics and controls | EG6XXX – Apply Business Management | AE6XXX – Aircraft Propulsion and Performance | AE6XXX – Advanced materials and Aircraft Structures | AE6XXX – Aircraft Maintenance (Group Project) | EG6XXX – Individual Project | AE6XXX – Air Transport Economics |
| B1 |  | ü |  | ü | ü | ü |  | |  | ü |  |  |  | ü |  |  |  | ü |  |
| B2 |  | ü |  |  | ü | ü |  | |  | ü |  |  |  |  |  | ü |  | ü |  |
| B3 |  |  |  | ü | ü |  |  | | ü | ü |  |  |  |  |  |  |  | ü |  |
| B4 |  |  |  |  |  |  |  | |  | ü |  |  |  |  |  |  |  | ü |  |
| B5 | ü |  |  |  | ü |  | ü | | ü |  |  | ü |  | ü |  |  |  |  |  |
| B6 |  |  |  |  |  |  |  | | ü | ü |  |  |  |  |  |  |  |  |  |
| B7 |  |  | ü |  |  |  | ü | |  |  |  |  |  |  |  | ü |  |  |  |
| B8 |  |  |  |  |  |  |  | |  |  | ü | ü |  |  |  |  |  |  |  |
| B9 |  |  |  |  |  |  |  | |  |  | ü |  |  |  |  |  |  | ü |  |
| B10 |  |  |  |  |  |  |  | |  |  | ü |  |  |  |  |  |  |  |  |
| B11 |  |  |  |  |  |  |  | |  |  | ü |  |  |  |  |  |  |  |  |
| B12 |  |  |  | ü | ü |  |  | |  | ü |  |  |  |  |  |  |  |  |  |
| B13 |  |  |  |  | ü |  |  | |  | ü |  |  |  |  |  | ü | ü |  |  |
| B14 |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | ü |  |  |
| B15 |  |  |  |  |  |  |  | | ü |  | ü |  |  |  |  |  | ü | ü |  |
| B16 |  |  |  |  |  |  |  | | ü |  |  |  |  |  |  |  | ü |  |  |
| B17 |  |  |  | ü |  |  |  | | ü |  |  |  |  |  |  |  | ü | ü |  |
| B18 | ü |  | ü |  |  |  | ü | |  |  |  |  |  |  |  |  |  |  |  |

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| **AHEP4 Bachelors (Honors) degrees** | |
| B1. | Apply knowledge of mathematics, statistics, natural science and Engineering principles to broadly-defined problems. Some of the Knowledge will be informed by current developments in the subject of study. |
| B2. | Analyse broadly-defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. |
| B3. | Select and apply appropriate computational and analytical techniques to model broadly defined problems, recognising the limitations of the techniques employed. |
| B4. | Select and evaluate technical literature and other sources of information to address broadly defined problems. |
| B5. | Design solutions for broadly defined problems that meet a combination of societal, user, business and customer need as appropriate. This will involve  consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards. |
| B6. | Apply an integrated or systems approach to the solution of broadly defined  problems. |
| B7. | Evaluate the environmental and societal impact of solutions to broadly-defined problems. |
| B8. | Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct. |
| B9. | Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity. |
| B10. | Adopt a holistic and proportionate approach to the mitigation of security risks. |
| B11. | Recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. |
| B12. | Use practical laboratory and workshop skills to investigate broadly defined  problems. |
| B13. | Select and apply appropriate materials, equipment, engineering technologies and processes. |
| B14. | Recognise the need for quality management systems and continuous improvement in the context of broadly defined problems. |
| B15. | Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters. |
| B16. | Function effectively as an individual, and as a member or leader of a team. |
| B17. | Communicate effectively with technical and non-technical audiences. |
| B18. | Plan and record self-learning and development as the foundation for lifelong learning/CPD. |

## Entry Requirements

The ‘typical offer’ entry qualifications for the programme are:

* 96 UCAS tariff points from at least three A-levels or equivalent. Any subjects accepted and General Studies accepted at half points.
* 96 UCAS tariff points (grades MMM) from a suite of BTEC National QCF qualifications in an engineering, science or technology subject.
* 96 UCAS tariff points from access course with pass required in an engineering, science or technology subject.
* Successful completion of a Foundation Degree in Engineering/Science.
* European Baccalaureate with an average mark of 70% or above.
* International Baccalaureate with a score 24 points and a minimum of grade 5 at standard level in Mathematics and English Language.
* Welsh Baccalaureate with a grade C or above. However other qualifications, preferably in an Engineering or Science must be combined to achieve a UCAS point score of 96 points.
* Scottish Highers with a UCAS point score of 96 points from a maximum of five subjects.
* Irish Leaving Certificate with a UCAS points score of 96 points from Higher Level subjects.