

PROGRAMME SPECIFICATION

KEY FACTS

Programme name	Aeronautical Engineering, Aeronautical Engineering with Placement
Award	BEng (Hons)
School	School of Mathematics, Computer Science and Engineering
Department or equivalent	Mechanical Engineering and Aeronautics
UCAS Code	H410, H401
Programme code	USAERB, USAEBY
Type of study	Full Time
Total UK credits	360
Total ECTS	180
Partner (partnership programme only)	
Type of Partnership	

PROGRAMME SUMMARY

The BEng Honours Programme is a three-year full time or four-year sandwich course of 360 credits (3600 study hours) structured as three Programme Stages, each delivered over typically 20 contact weeks, six examination weeks, four reflective learning (private study) weeks and eight vacation weeks (which may be used for private study) per academic year. A BEng Honours Programme therefore requires a commitment of 40 study hours per week during the academic year. The industrial placement lasts a year and occurs between Programme Stage 2 and Programme Stage 3 of the programme.

Engineering knowledge and skills are developed with specific objectives during each of the three Programme Stages. Programme Stage 1 is designed to give you a thorough grounding in the skills and science appropriate to the formation of an engineer, as well as developing personal skills such as time and quality management. In Programme Stage 2 you learn to apply engineering analysis to simple but representative components of engineering systems. Design skills and team work are also developed. Management themes in Programme Stage 2 include project management and risk analysis. Over one third of Programme Stage 3 is focused upon project work, both individual and in groups. This gives you a realistic exercise in the practice of engineering at a professional level and enables you to integrate and apply knowledge gained over a number of subject areas. In Programme Stage 3 you also study specialist topics which span both increasing depth of analysis and increasing breadth of engineering system complexity. Management at Programme Stage 3 focuses upon people and organisations with case studies and invited lectures from industry professionals. If you wish to gain practical experience you have the option of spending a year on paid industrial placement. The Information relevant to the administration of the placement can be found in the "SMCSE Placement & Internships Resource Centre", which helps you find placements and internships, and will be

publicised through the student facing “Focal Point” in Moodle, the online learning environment.

Classroom-based learning, practical work, tutorials and clinics, project work, site visits, research and private study are used in all years and key skills are assessed both by examination and by continuous assessment (coursework) for all types of engineering practice. The split between examination and coursework assessment is very close to 50:50 over the programme lifetime.

At the end of the programme, you will have acquired the knowledge and understanding, analysis and design techniques, practical and personal skills required for a career in engineering.

The BEng Aeronautical Engineering Route shares Programme Stage 1 with all other BEng and MEng Programmes in the Mechanical Engineering and Aeronautics Department; Programme Stage 2, which begins to introduce the fundamentals of flight and aircraft design. Also at Programme Stage 3 are the important topics of Reliability and Safety. At Programme Stage 3 the design disciplines of aerodynamics, aircraft structures, flight dynamics and propulsion are introduced along with the numerical tools used for analysis in industry today. Final year Individual Projects are available across a range of topics and there is significant industrial input into the aircraft Group Design activities.

Certificate of Higher Education

The first exit route is for Certificate of Higher Education in Aeronautical Engineering which you are entitled to if you successfully complete and gain the credits of all the modules in Programme Stage 1.

For all of you completing Programme Stage 1 *or* the Certificate of Higher Education in Aeronautical Engineering you will be able to discuss underlying concepts and principles associated with fundamental science and technology and to develop skills in time and quality management and present, interpret and evaluate quantitative and qualitative data within your subject of study appropriate to the formation of an engineer.

Diploma of Higher Education

The second exit route is for Diploma of Higher Education in Aeronautical Engineering which you are entitled to if you successfully complete and gain the credits of all the modules in Programme Stages 1 and 2.

For all of you completing Programme Stage 2 *or* the Diploma of Higher Education in Aeronautical Engineering you will build on your previous knowledge and experience and develop critical understanding of the well-established principles, and of the way in which those principles have developed in your area of study. You will develop skills of enquiry and different approaches to problem-solving as well as identify the limitations of your knowledge in your subject.

BEng (Hons) Degree

The final exit route is for the award of the BEng(Hons) degree in Aeronautical

Engineering which you are entitled to if you successfully complete and gain the credits of all the modules in Programme Stages 1, 2 and 3. _

For all of you completing Programme Stage 3 in Aeronautical Engineering, you will further develop a coherent systematic, detailed knowledge of your discipline. You will be able to confidently develop and employ appropriate techniques and methods in mathematical modelling and experimentation for engineering problem-solving, analysis and design.

Aims

The overall aim of the programme and its more specialised routes is to provide a well-rounded education and also specialised training for a professional career in the aeronautical, air transport and associated industries. This will include the research, development, design, production, commissioning and management aspects of those industries.

The specific aims of the Route are to produce graduates who:

- have the ability and confidence to play an effective role in industry
- have a broad and in-depth knowledge and understanding to solve complex technical problems in engineering and design environments
- have a sound knowledge and understanding of business and management to participate effectively in team work and large commercial organisations;
- are aware of their professional and ethical responsibilities, the global and societal impact of engineering solutions, as well as the economic and political issues
- are able to communicate effectively.

WHAT WILL I BE EXPECTED TO ACHIEVE?

On successful completion of this programme, you will be expected to be able to:

Knowledge and understanding:

- Understand the scientific principles upon which aeronautical and air transport engineering are based (UK- SPEC KU1, US1, E1);
- Understand the mathematical and computational approaches used to analyse engineering components and systems (UK-SPEC KU1, US2, E1);
- Build on experience of the engineering design/build/test process, including customer requirements, dependencies, assumptions, constraints and creative solutions to problems (UK-SPEC IA2, D1, D2, D3, D4, D6);
- Understand the concept of fitness for purpose and the separate consideration of production, operation, maintenance and disposal of an engineering system (UK-SPEC D2, D5, P7);
- Appreciate the multi-disciplinary character of engineering and the importance of social, environmental/sustainable development, ethical, legal, economic and commercial considerations when exercising engineering judgement (UK-SPEC

KU2, KU3, US3, D3, S1, S4);

- Explain current manufacturing and/or operational practice in a relevant industry (UK-SPEC S1, S3, P1, P3, P6).
- Understand the broad range of management tools and techniques required to run an engineering business (UK-SPEC S2, S4, P5).
- Demonstrate extended knowledge and understanding, of the type described above, specific to the principles and practice of flight and to aircraft design, manufacture, operation and maintenance (UK- SPEC US1, US3, E4);
- Demonstrate a broad knowledge of the aeronautical engineering industry as a business enterprise in national and international economies (UK-SPEC E3, S1, P6).

Skills:

- Gather, integrate and evaluate information from various sources including technical literature (UK-SPEC GT1, P4);
- Break down a problem into a series of engineering tasks to be solved under a set of multi-disciplinary constraints (UK-SPEC D1);
- Communicate effectively in technical and non-technical languages, written, oral and graphical forms to individuals and large audiences (UK-SPEC GT1);
- Use CAD, IT and communications systems effectively (UK-SPEC GT1);
- Use laboratory equipment for data measurement, processing, interpreting and analysis (UK-SPEC P2, P8);
- Use workshop equipment to produce or modify an engineering component (UK-SPEC PS1, P2); Use analytical, computational and experimental techniques, coupled with experience and decision- making, to solve engineering problems (UK-SPEC 1A1, E2, E3, D1);
- Design, construct and test a system, component or process to meet specifications (UK-SPEC E4, D5, D6);
- Evaluate designs, processes or products and make improvements (UK-SPEC IA2, D6, P7); Work with technical uncertainty (UK-SPEC P8);
- work with levels of detail appropriate to the criticality of the task (UK-SPEC IA3);
- Plan for and manage time/cost/quality of an engineering task (UK-SPEC PS1, D3, D6, P7).
- Apply analytical, computational and CAD techniques specifically to the analysis and design of aircraft (UK-SPEC US2, E3).

Values and attitudes:

- An ability to put the needs of the team ahead of those of the individual (UK-SPEC GT1);
- Willingly take on the professional and ethical responsibilities of engineers in society (UK-SPEC KU3, S5); Commit to continuous improvement to enhance professional skills and benefit society (UK-SPEC GT1, P7).
- Appreciate the value of aviation to society and to the global economy (UK-SPEC KU3). Appreciate the need for aviation to contribute in a sustainable way (UK-SPEC S3).

This programme has been developed in accordance with the QAA Subject Benchmark for Engineering.

HOW WILL I LEARN?

Typically 70% of learning in Higher Education is through private study. Engineering is a practical discipline which cannot be learnt just in the classroom. The remaining 30% of contact time is there to assist and to focus private study. In Programme Stage 1 there is a higher proportion of supervised study with typically 9 or 10 hours of lectures, 4 hours of tutorial and 8 hours of practical work timetabled per week. By Programme Stage 3 the tutorial and practical elements are managed by you as part of individual and group project work. The remaining 16 hours per week of private study are essential to achievement of the learning outcomes and are guided using formative and summative coursework tasks set during the course of the year.

Contact hours are made up of: lectures, which direct you towards the most important topics in the field and which allow discussion and clarification of areas of uncertainty with expert staff; tutorials where staff are on hand to help with problem-solving exercises; laboratory and workshop classes where practical situations and methods are encountered; and research or design/build projects, both individually and in groups, where personal skills, teamwork, creativity and critical thinking are developed and where knowledge built up elsewhere in the programme is integrated and developed. Field trips are used to place taught sessions in the context of real-world industries or products.

WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?

Assessment and Assessment Criteria

Each Programme is subdivided into Programme Stages (years of study) and each Programme Stage into modules (coherent groupings of syllabus topics addressing particular Learning Outcome types). Each module in the programme will have one or more assessment components of varying types. Assessment components may involve more than one assessment task (e.g. they may be an aggregate of different coursework marks or multiple examination papers).

Many modules will have an examination component as well as a coursework (continuous assessment) component. Examinations are used because they provide a controlled environment in which to assess knowledge & understanding and problem-solving skills. The time pressure and lack of prior warning about specific problems to be tackled is also representative of real-world situations faced by practising engineers. Coursework assessments vary from paper assignments (which may be similar to examinations but with longer time scales and with access permitted to information sources) to the assessment of practical skills which cannot be done in the exam hall. For example communication skills (e.g. presentations, drawings and written reports),

personal skills (such as team work or leadership), planning and design (both software and hardware), data analysis, critical review of information and the use of workbench and CAE tools are usually assessed by means of coursework tasks.

Often coursework tasks may be set which are not to be assessed but which are valuable as a learning experience. This is known as formative coursework and is often the key to improving grades on assessed or summative coursework. You will receive feedback from all coursework assessments, both formative and summative, within three weeks of submission, to allow you to learn from mistakes made in the assessment.

Assessment Criteria are descriptions, based on the intended learning outcomes, of the skills, knowledge or attitudes that you need to demonstrate in order to complete an assessment successfully, providing a mechanism by which the quality of an assessment can be measured. Grade- Related Criteria are descriptions of the level of skills, knowledge or attributes that you need to demonstrate in order to achieve a certain grade or mark in an assessment, providing a mechanism by which the quality of an assessment can be measured and placed within the overall set of marks. Assessment Criteria and Grade-Related Criteria will be made available to you to support you in completing assessments. These may be provided in programme handbooks, module specifications, on the virtual learning environment or attached to a specific assessment task.

Feedback on assessment

Feedback will be provided in line with our Assessment and Feedback Policy. In particular, you will normally be provided with feedback within three weeks of the submission deadline or assessment date. This may be written (on the hard copies and online) or oral (in class), specific to you or generally applicable, and would normally include a provisional grade or mark. If the coursework submitted is a laboratory report your work will not be returned until three weeks after the last report has been submitted. Laboratories are undertaken by groups of you in rotation over periods of many weeks and consequently the last group of you may complete the laboratory and submit the report many weeks after the first group.

For end of module examinations or an equivalent significant task (e.g. an end of module project), a generic feedback will normally be provided within four weeks of the last day of exam period. The timescale for feedback on final year projects or dissertations may be longer and starts from the date of the final presentation of the project. The full policy can be found at:

https://www.city.ac.uk/_data/assets/pdf_file/0008/68921/assessment_and_feedback_policy.pdf

Assessment Regulations

In order to pass your Programme, you should complete successfully or be exempted from the relevant modules and assessments and will therefore acquire the required number of credits. You also need to pass each Programme Stage of your Programme in order to progress to the following Programme Stage.

Your overall aggregate mark will be calculated by combining the aggregate marks from Programme Stages 1, 2 and 3 in the ratio 0:3.33:6.67.

The pass mark for each module is 40. In most modules there is also a requirement to pass individual components of the module. The pass mark for these individual components is also 40%. The details of which assessment components need to be passed individually is given in the module specification.

If you fail an assessment component or a module, the following will apply:

1. Compensation: where you fail up to a total of one sixth of the total credits of a Programme Stage at first or resit attempt, you may be allowed compensation if:
 - Compensation is permitted for the module involved (see the What will I Study section of the programme specification), and
 - It can be demonstrated that you have satisfied all the Learning Outcomes of the modules in the Programme Stage, and
 - A minimum overall mark of no more than 10% below the module pass mark has been achieved in the module to be compensated, and
 - An aggregate mark of 40% has been achieved for the Programme Stage.

When you are eligible for compensation at the first attempt, this will be applied in the first instance rather than offering a resit opportunity.

If you receive a compensated pass in a module you will be awarded the credit for that module. The original component marks will be retained in the record of marks and your original module mark will be used for the purpose of your Award calculation.

2. Resit: where you are not eligible for compensation at the first attempt, you will be offered one resit attempt. However, for certain modules the right to resit is withheld either by the accrediting bodies or because failure in one or other assessment clearly indicates a lack of engagement with the programme. These modules are specifically listed in the progression rules for each Programme Stage.

If you are successful in the resit, you will be awarded the credit for that module. The mark for each assessment component that is subject to a resit will be capped at the pass mark for the module. This capped mark will be used in the calculation of the final module mark together with the original marks for the components that you passed at first attempt.

If you do not meet the pass requirements for a module and do not complete your resit by the date specified you will not progress to the next Programme Stage and the Assessment Board will require you to be withdrawn from the Programme.

If you fail to meet the requirements for a particular Programme Stage or the Programme, the Assessment Board will consider whether you are eligible for an Exit Award as per the table below.

If you would like to know more about the way in which assessment works at City,

please see the full version of the Assessment Regulations at:
http://www.city.ac.uk/_data/assets/word_doc/0003/69249/s19.doc

WHAT AWARD CAN I GET?

Bachelor's Degree with Honours:

Programme Stage	HE Level	Credits	Weighting (%)	Class	% required
1	4	120	0	I	70
2	5	120	33.3	II upper division	60
3	6	120	66.7	II lower division	50
				III	40

Ordinary Degree:

Programme Stage	HE Level	Credits	Weighting (%)	Class	% required
1	4	120	10		
2	5	120	30		
3	6	60	60		

Diploma of Higher Education:

Programme Stage	HE Level	Credits	Weighting (%)	Class	% required
1	4	120	35		
2	5	120	65		

Certificate of Higher Education:

Programme Stage	HE Level	Credits	Weighting (%)	Class	% required
1	4	120	100		

Programme Stage 1

To pass Programme Stage 1 you must have acquired 120 credits and must pass all modules studied in the Programme Stage. The "In-year Progress" assessment component of ME1110, Engineering Practice 1, must be passed as a first attempt for a re-sit opportunity to be granted for any of the other assessments in this module. Where prior practical experience can be demonstrated, exemptions may be granted (at the pass mark) for some of the module assessments, according to the module specification.

You may be exempted from coursework re-assessment tasks in ME1109 and ME1111,

provided that you have passed the examination component and overall pass mark of the modules at first attempt and the Assessment Board deems that you have successfully met the learning outcomes of the modules.

Programme Stage 1 comprises three compulsory modules designed to give you a thorough grounding in the scientific understanding, mathematical analysis and practical skills appropriate to the formation of an engineer. Continuous assessment accounts for 50% of the marks available for the Programme Stage and a coursework schedule is published each year, specifying which subjects are to have coursework set in any one week so that you can manage your coursework over the year.

Module Title	SITS Code	Module Credits	Core/ Elective	Can be compensated?	Level
Engineering Science 1	ME1109	60	C	N	4
Engineering Practice 1	ME1110	30	C	N	4
Mathematics and Computation 1	ME1111	30	C	N	4

Programme Stage 2

To pass Programme Stage 2 you must have acquired 120 credits and must pass all modules studied in the Programme Stage, and you must make a valid first attempt at the examination component of all Programme Stage 2 modules listed below.

You may be exempted from coursework re-assessment tasks in ME2109 and ME2111, provided that you have passed the examination component and overall pass mark of the modules at first attempt and the Assessment Board deems that you have successfully met the learning outcomes of the modules.

You may be exempted from management coursework re-assessment tasks in ME2110, provided that you have passed the management examination component and overall pass mark at first attempt and the Assessment Board deems that you have successfully met the learning outcomes of module.

For module AE2203 where multiple design tasks are set based on design specifications and requirements and assessed against a set of specific learning outcomes, failure of the design component at first attempt may require you to resit all design tasks with full attendance in the following year in order to achieve all the learning outcomes for the module.

Programme Stage 2 comprises four compulsory modules in which you learn to apply engineering science and analysis to simple but representative components of engineering systems. Design skills and team work are also developed with more complex design and build tasks. Engineering Practice themes in Programme Stage 2 include marketing, project management risk analysis as well as laboratory work and

reporting. Also in Programme Stage 2, Flight Test experience is gained at the flight test school at Cranfield or by controlled experiments in a glider, one-to-one with a qualified instructor.

Module Title	SITS Code	Module Credits	Core/ Elective	Can be compensated?	Level
Aeronautical Design and Analysis	AE2203	30	C	N	5
Engineering Science 2	ME2109	45	C	N	5
Engineering Practice 2	ME2110	15	C	N	5
Mathematics and Computation 2	ME2111	30	C	N	5

Programme Stage 3

Normal progression to an award from Programme Stage 3 is by passing modules up to 120 credits and you must make a valid first attempt at the examination component of all Programme Stage 3 modules. The AE3030, Individual Project, module must be passed as a first attempt.

The individual project, worth 30 credits, which must be sufficiently challenging in depth as well as in breadth, plays a significant role in the degree course: you are expected to apply critical scrutiny to previous work reported in the literature, to demonstrate creative abilities and imagination, to manage quality, time and resources effectively in pursuing your project to a successful conclusion and to report the findings, both in written and oral form. Engineering Management focuses at Programme Stage 3 upon people and organisations, using case studies and invited lectures from industry professionals. At Programme Stage 3 you take five further modules covering essential specialist knowledge.

Module Title	SITS Code	Module Credits	Core/ Elective	Can be compensated?	Level
Individual Project	AE3030	30	C	N	6
Aircraft Systems Reliability and Safety	AE3311	15	C	Y	6
Dynamics of Flight	AE3214	15	C	Y	6
Aerodynamics and Propulsion	AE3303	15	C	Y	6
Structural Analysis & FEM	ME3302	15	C	Y	6
Fluid Mechanics	AE3301	15	C	Y	6
Engineering Management	ET3051	15	C	Y	6

TO WHAT KIND OF CAREER MIGHT I GO ON?

Most graduates choose to enter the Aeronautical engineering profession either with consultants or major aircraft and airline industries. They also work in other high-tech industries motor manufacturing and offshore. The Aeronautical Engineering course prepares you with required technical expertise, initiative and management skills to be able to face modern challenges in relevant industries.

The Centre for Career & Skills Development provides a service to current full-time and part-time undergraduates and postgraduates and to recent graduates of the University. Your aim is to give you advice, information and skills you need to make a smooth transition into the world of Engineering works.

If you would like more information on the Careers support available at City, please go to: <http://www.city.ac.uk/careers/for-students-and-recent-graduates>.

WHAT STUDY ABROAD OPTIONS ARE AVAILABLE?

City, University of London offers a wide range of International Study exchange opportunities to you at partner institutions around the world for both undergraduate and postgraduate programmes. The programme has to be approved by the SEMS exchange coordinator, City International Exchange Office and the partner institute to ensure the compatibilities of the exchange programmes at both institutes. In addition we have a Liaison Exchange Office at MEA department which acts as personal tutor to all exchange students (incoming and outgoing) and supports and advice you who want to apply for this.

If you would like more information on the City Student Exchange Programme, please go to:

<http://www.city.ac.uk/international/international-students/exchange-programmes>

WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?

If you are on an approved placement your experience is graded on the basis of reports from two visits made by the Visiting Tutor (a member of academic staff) familiar to the subject and your final report; informal contact is maintained throughout the year as necessary. However, although your placement is reported on the degree transcript but it does not contribute to the final degree result.

Placement guidelines are issued to you and your employer at the commencement of training, and these include a placement health and safety booklet; the guidelines include a section on workplace learning. Early in the placement year, you are required to produce a placement plan in conjunction with your Workplace Supervisor and the Visiting Tutor.

If you wish to take a professional placement you are advised to register accordingly at the beginning of Programme Stage. The School of Engineering & Mathematical Sciences Professional Liaison Unit Work Based Learning Advisor collaborates with the University Career and Skills Development Service to deliver a series of Professional Development workshops during Period 1 of Programme Stage 2 to prepare you for searching for and applying for a work placement. The Professional Liaison Unit is in regular contact with companies and other organisations concerning the availability of training placements and will advise you on making applications.

You are welcome to make your own applications at any time but are strongly advised to discuss these with the Work Based Learning Advisor. Support is provided in the SMCSE Placement & Internships Resource Centre module on Moodle.

WILL I GET ANY PROFESSIONAL RECOGNITION?

Accrediting Body: The Institution of Mechanical Engineers

Nature of Accreditation

Accreditation submission and visit every 5 years.

Accreditation leading to Chartered Engineer's status.

Accrediting Body: Royal Aeronautical Society

Nature of Accreditation

Accreditation submission and visit every 5 years.

Accreditation leading to Chartered Engineer's status.

HOW DO I ENTER THE PROGRAMME?

A/AS-level :

320 UCAS tariff points, typically ABB including A-level mathematics at grade B.

A-level physics desirable.

IB: 33 including a minimum of 5 in mathematics at higher level.

14-19 Advanced Diploma:

Engineering at grade B/250; acceptable only with A-Level mathematics at grade B.

English language requirements:

IELTS:6.0 with a minimum of 6.0 in all components.

GCSE: English language grade C.

Please note that TOEFL is not accepted as evidence of English language ability for students that require a Confirmation of Acceptance for Studies.

Successful completion of the Westminster-Kingsway College engineering foundation course, the INTO City University London International Foundation in Engineering, Computer Science and Mathematics and Engineering Foundation courses offered by Kaplan International College with an overall score of 65%.

RPL/RPEL Requirements

Direct entry into Programme Stage 2 may be considered for any candidate who has one of the following qualifications: Successful completion of the first year of a similar accredited BEng course.

Scholarship

Scholarships are awarded on an annual basis to you attaining first class results on entry and at the end of Programme Stages 1 and 2.

City, University of London is offering a Scholarship of up to £3,000 per year to UK and EU undergraduate students achieving grades AAB or above at A-level (or equivalent) starting an undergraduate course at City in September 2012. Further details can be found on the University's website at <http://www.city.ac.uk/study/why-study-at-city/fees-and-finance/scholarships>.

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