Template C4

Kingston University London

Programme Specification

Title of Course: *BSc (Hons) Aerospace Engineering*

Date first produced	01/01/2013
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Version number	4
Faculty	Faculty of Engineering, Computing and the Environment
School	School of Engineering
Department	Department of Aerospace and Aircraft Engineering
Delivery Institution	AAC

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 modules can be found in the course VLE site and in individual Module Descriptors.

SECTION 1: GENERAL INFORMATION

Award(s) and Title(s): ***Up to 10 pathways***	BSc (Hons) Aerospace Engineering
Intermediate Awards(s) and Title(s): ***There are 4 Intermediate awards for each pathway***	Cert HE in Aerospace Engineering BSc Aerospace Engineering Dip HE in Aerospace Engineering
Course Code ***For each pathway and mode of delivery***	NAEKUDH3F
UCAS code ***For each pathway***	H400 (full-time, part-time) H401 (sandwich)

RQF Level for the Final Award:	Level 6
Awarding Institution:	Kingston University
Teaching Institution:	AAC
Location:	AAC, Sri Lanka Lvls 4 and 5 and KU lvl 6
Language of Delivery:	English
Modes of Delivery:	Full-time
Available as:	Full field
Minimum period of registration:	Full-time - 3 years
Maximum period of registration:	Full-time - 6 years
Entry Requirements:	The minimum entry qualifications for the programme are: From A levels: 96 points from three A Levels to include a Maths and Science subject. General studies and Native Language are not included in tariff points. BTEC: Extended Diploma or Diploma: In Engineering or related subject (Aerospace/Aeronautical/Electrical/Electronic/M

	anufacturing and Mechanical Engineering considered) – 112 points. Access to HE in a suitable Engineering subject considered: Equivalent of 96 points with all Maths and Science modules at Level 3 passed with Merit grades. Plus: GCSE (A*-C) minimum of 5 subjects including English Language and Mathematics. A minimum International English Language Testing System (IELTS) score of 6.0 (min 5.5 in Speaking, Writing, Listening and Reading) or equivalent is required for those for whom English is not their first language.
Programme Accredited by:	none
QAA Subject Benchmark Statements:	Engineering
Approved Variants:	None
Is this Higher or Degree Apprentices hip course?	

For Higher or Degree Apprenticeship proposals only	
Higher or Degree Apprenticeship standard:	n/a
Recruitment, Selection and Admission process:	n/a
End Point Assessment Organisation(s):	n/a

SECTION 2: THE COURSE

A. Aims of the Course

The general aims of the course are:

- To equip graduates with the engineering, design, management, business and personal skills required to become professional aerospace engineers, as well as enabling them to follow careers in related professional disciplines.

- To meet the academic requirements for Incorporated Membership of the Royal Aeronautical Society (RAes) by ensuring that the course is accredited by that body.

More specific aims of the course are:

- To produce graduates with a breadth and depth of knowledge and a comprehension of the key aspects of aerospace engineering.

- To allow graduates to communicate effectively orally and in writing and to use sketches and diagrams to convey engineering ideas and concepts.

- To develop graduates with an aptitude for applying technology to engineering problems.

- To prepare graduates with an ability to solve design problems and the technical skills needed to realise these solutions.

- To equip graduates with the research skills required for postgraduate study and employability skills required for work in the construction industry.

- To furnish graduates with a firm grasp of sustainability and Health and Safety.

B. Intended Learning Outcomes

The field/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. The programme outcomes are referenced to the QAA subject benchmarks for and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008), and relate to the typical student.
The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes as shown in Table 1.
The programme also provides an opportunity for the students to develop and demonstrate the key skills shown in Table 2.

The programme learning outcomes are the high-level learning outcomes that will have been achieved by all students receiving this award. They must align to the levels set out in the 'Sector Recognised Standards in England' (OFS 2022).

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
A6	Relate all their studies to a knowledge and understanding of sustainability and the environmental impact of their industry	B6	Recognise the importance of professional bodies and the professional conduct expected of Incorporated Engineers	C4	Use appropriate industry-standard computer software in the solution of practical problems
A5	Demonstrate their understanding of the importance of Health and Safety in the engineering industry	B5	Demonstrate a positive attitude to learning that encourages continuing professional development throughout their careers	C3	Use a range of equipment, gaining a basic appreciation of the application of the technology
A4	Relate management and business applications to aerospace engineering	B4	Manage projects, people, resources and time taking account of legal and statutory requirements, risk, safety, quality and reliability	C2	Undertake practical work and analyse the data obtained for use in planning and design
A2	Demonstrate knowledge of electrical and electronic systems, control and manufacturing	B1	Apply fundamental theoretical principles that underpin engineering and specifically aerospace engineering	C1	Use workshop and laboratory equipment safely for manufacture and experimental investigation
A1	Demonstrate knowledge and understanding of the core aerospace engineering subjects of statics, dynamics, materials, thermodynamics/propulsion, fluid mechanics/aerodynamics and design	B2	Use mathematics as a tool for solving complex problems, communicating results, concepts and ideas	C5	Comply with Health and Safety regulations within the work place and as they apply to aerospace design
A3	Show a knowledge of broader technical and non-technical engineering subjects	B3	Solve standard practical engineering design problems		

In addition to the programme learning outcomes, 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

C. Outline Programme Structure

This programme is offered in full-time mode, this leads to the award of BSc (Hons) Aerospace Engineering. The first 2 years of the programme is delivered at AAC-Sri Lanka and the last year at Kingston university.

Intake to all modes of study is normally in January as in Sri Lanka AL results are released in December.

BSc (Hons) Aerospace Engineering

Level 4							
BSc (Hons) Aerospace Engineering							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Engineering Design and Professional Practice	EG4010	30	4	TY13		1	
Engineering Mathematics and Computing Applications	EG4012	30	4	TY13		1	
Engineering Mechanics, Structures and Materials	EG4011	30	4	TY13		1	
Fluid Mechanics and Engineering Science	EG4013	30	4	TY13		1	
Optional Modules							

Progression to Level 5

Progression to Level 5 requires completion of 120 credits worth of modules at Level 4.Students exiting the programme at this point who have successfully completed 120 credits are eligible for the award of Certificate of Higher Education (CertHe)

Level 5							
BSc (Hons) Aerospace Engineering							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Aerospace Engineering	AE5122	30	5	1&2			
Aircraft Systems	AE5101	30	5	TY13		2	
Electronic Systems, Control and Computing	ME5012	30	5	TY13		2	
Engineering Project Management	EG5014	30	5	TY13		2	
Optional Modules							

Progression to Level 6

Progression to Level 6 requires completion of 120 credits worth of modules at Level 5.
Students exiting the programme at this point who have successfully completed 120 credits are eligible for the award of Diploma of Higher Education (DipHE).

Level 6							
BSc (Hons) Aerospace Engineering							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Aerospace Technology	AE6204	30	6	TY13		3	
Air Transport Economics	AE6601	30	6	1&2			
Group Project	AE6110	30	6	TY13		3	
Individual Project (Aircraft IEng)	AE6200	30	6	TY13		3	
Optional Modules							

D. Principles of Teaching, Learning and Assessment

This programme has been designed taking into account the Kingston University Curriculum Design Principles to help develop student learning from dependent to independent learning and encourage lifelong learners. A wide range of teaching and

learning methods is utilised, allowing students to be fully engaged throughout the course. Teaching, learning and assessment methods are constructed to align with the learning outcomes and syllabus content of the modules. The assessment regime of a module is designed to provide formative opportunities that allow students to improve their performance following feedback in preparation for later summative assessment. Key skills are developed throughout the programme, which are assessed formatively and summatively. Students also have access to S^3 (Academic Skills Centre) for additional support on a drop-in basis giving students the opportunity to take responsibility for their own achievements and consequent learning. Generally the course will be delivered by instructional lectures whilst associated tutorials, laboratory practicals, industrial visits and design classes are used to enhance the lecture material. The course is devised to encourage and develop students making them confident in their interpersonal and communication skills, as well as emphasising group work, data analysis and ICT skills. The contact hours associated with a module very much depends on the module type, but typically a module would comprise five hours per week of contact, which would include lecture, seminar/tutorial and design/practical sessions in various combinations.

The teaching and learning strategies utilised in this course are formulated to cultivate key transferable skills considered central to academic, vocational and personal development. These skills underpin how students learn, their ability to recognise their own achievement and ability, to review and evaluate that achievement and identify future learning requirements.

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 EG4012 Engineering Mathematics and Computing, practical skills (EG4011 and EG4013) and the initial development of key employability skills in EG4010). 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 AE6200 Individual project and the Project-Based group work of AE6110 Aerospace Group Design project. Self-Assessment questions and tutorials are used in the other two modules at this level to support independent learning.

Research Informed Teaching

The majority of the course team are either 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. Their actives take them into, amongst other areas, materials research both coatings and compound, into fire and explosion research both cause and prevention, into active control research and on through sustainable power generation to electric vehicle technology with particular success of the zero emissions electric motorbike.

Students are also able to and 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 evidentiary information in an argument, which are 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 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 been embedded into the study space. Use of Electronic Voting System in the class room for summative and formative assessments is another example of the pedagogic research.

Types of contact
Contact with students and engagement with the programme takes many forms, some of the more widely encountered on the BSc course are:

Lectures
Lectures are formal staff-led sessions designed to introduce new topics and material or provide an overview of a topic for further student study. Lectures make use of various media, supplemented by material uploaded to Canvas. The School's academic staff is convinced that students learn better through active participation and hence lectures would generally overlap with tutorials in expecting students to be actively involved in sketching, designing and calculating.

Tutorials
Academic tutorials are provided where lecturers assist students in solving typical engineering problems and in discussing lecture material. In many modules the tutorials and lectures will be integrated as described above.

e-Learning
The main resources to support lectures and tutorials are provided through a Virtual Learning Environment called Canvas, which uses a range of e-learning experiences. Specialist Computer software such as Computer Aided Drawing and Design packages

(CAD), Simulation packages such as Finite Elements for solids and Computational Fluid Dynamics (CFD) for Fluid analysis, which are all widely used in industry are taught and students are expected and encouraged to use them in most of their modules including the project works.

Work-related Learning
Between level 5 and level 6 students are given the opportunity to pursue a year's placement in industry in the UK or abroad, providing significant learning and employability enhancement opportunities.

Design workshops
Workshops may be staff-led or student-led where students participate in group design work emphasising the need for effective oral communication. Design classes, case studies and workshops often integrate material from different academic areas and would include a practical real-world emphasis.

Practical sessions
Practical sessions are designed to enable students to acquire practical and analytical skills through the application of theory. The sessions will include data collection, analysis, presentation and reporting. Practical work will generally be carried out in small groups, requiring the production of individual or group reports depending on the nature of the activity.

Engineering workshop sessions
Throughout the first year of the course the students are given a basic introduction to common hand and machine tools, this helps reinforce design and manufacturing topics. In the following years of the programme students will have access to the engineering workshops in support of their project and design work.

Group work
Good team-working skills are an essential skill for graduates aspiring to work in any engineering industry; hence, teamwork plays an important role in the academic development of an aerospace Engineering undergraduate. Group work projects throughout all three levels illustrate the value of team work, developing interpersonal skills and fostering cooperation and supportive peer relationships.

Individual project
A fundamental element of level 6 is the individual capstone project allowing students to integrate material from their programme in an independent study of a research topic. A student's research skills will be developed with the assistance of targeted lectures, as well as an assigned supervisor, encouraging students to work effectively independently, communicating their findings clearly and succinctly through graphical, oral and written presentation.

Self-Directed Study
Students are expected and in some case signposted to undertake private reading, engagement with e-learning resources, reflection on feedback and assignment research or preparation work for lectures, practicals, presentations and other such module activities.

Personal Tutors: All students are assigned an Advisor of Studies who can advise essentially on academic matters.

Assessment methods

Various assessment methods are adopted in each module to enable students to demonstrate their acquisition of knowledge and skills as outlined in the module learning outcomes. The assessment regime for each module has been designed to provide formative opportunities that allow students to improve their performance, following feedback, in preparation for summative assessment. The development of skills is threaded through the programme and assessed both formatively and summatively. The methods of assessment used in the course comprise:

- Report writing
- Individual and group project reports
- Individual and group designs
- Investigation of case studies
- Model building
- Short in-class tests
- Unseen and seen formal written examinations
- Individual and group practical laboratory reports
- Computer software and output analysis
- Individual and group oral presentations
- Posters

E. Support for Students and their Learning

Students are supported by:

- **A Module Leader** for each module
- **A Field Leader** to help students understand their programme structure and provide academic support
- **A Personal Tutor** (PT) to provide academic and personal support
- **A Student Support Officer** (SSO) who provides additional pastoral and practical advice and support, especially to students encountering difficulties
- A dedicated Undergraduate Course Administrator
- **An induction programme** and study skills sessions at the start of each academic year
- **An Academic Study Centre** to provide support and advice to students on a daily 'drop-in' basis
- **StudySpace** – a versatile on-line interactive intranet and learning environment accessible both on-site and remotely
- **A Staff Student Consultative Committee** with student Course Representatives for each level
- **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 Aerospace and Aircraft Engineering

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

Overall Aims

- To build a rapport between staff and students and contribute to personalising students' experience within the School of Aerospace and Aircraft 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 personal 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

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.

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 of Aerospace and Aircraft 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 week 6-7

- End of academic year individual ‘wrap up’ email

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 consider 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 end of 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 final 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 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 end of 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.

F. 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
- Boards of Study with student representation
- Annual review and development
- Periodic review undertaken at the subject level
- Student evaluation
- Moderation policies

G. Employability and work-based learning

This 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. 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 level 5 and level 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 log book of their activities and involvement and produce a final report on their placement, 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 tutor will discuss progress with the student and employer and will recommend any improvements to the learning opportunities. Students fulfilling the requirements for an Industrial Placement will be awarded a Sandwich Degree on the completion of level 6.

This Course has been designed to fulfil the core curriculum requirements (with further learning) for Incorporated Engineer (IEng) status. Most graduates will aspire to careers in aerospace and mechanical related industries and to becoming Incorporated Engineers. Graduates develop careers in all branches of aerospace and related engineering industries both here in the UK and throughout the world; as contract and consulting engineers, within local authorities, utility, manufacturing and transport companies, government organisations and the defence industry. In many cases, students taking an industrial placement are able to secure employment with the placement organisation following graduation. The academic and key skills developed throughout an engineering course also allow graduates to follow careers in other professions such as ICT, finance, accountancy and teaching. In addition, a number of graduates will progress to MSc courses in Aerospace and Mechanical Engineering and related specialist areas before continuing their career in industry or research.

Professional practice in aerospace engineering is introduced in the first year in the newly designed module 'Introduction to Aerospace Engineering AE4020', in which the students are introduced to the employment opportunities in the Aerospace field, this is followed through all other modules at levels 5 and 6, specifically in Project Management and Individual Project modules (AE5021 and AE6100) as well as more specialised modules.

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

Work placements are actively encouraged, with sandwich students generally taking an Industrial Placement year after level 5. It is the responsibility of individual students to source and secure such placements, but the Faculty offers considerable assistance to find employment. Industrial placements allow students to reflect upon their own personal experience of working in an applied setting. This opportunity enables students to focus on aspects that can clearly relate theoretical concepts to practice. Historically many sandwich placements are reasonably well remunerated.

H. Other sources of information that you may wish to consult

Engineering subject benchmark:
http://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/sbs-engineering-15.pdf?sfvrsn=f99df781_10
Professional bodies:
https://www.aerosociety.com/
www.imeche.org/
Professional accreditation:
www.engc.org.uk/ https://www.aerosociety.com/
www.imeche.org/
School Website:
http://sec.kingston.ac.uk/about-SEC/schools/aerospace-and-aircraft-engineering/

I. Development of Course Learning Outcomes in Modules

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

Module Code	Level 4	Level 5	Level 6

		EG4013	EG4012	EG4011	EG4010	ME5012	EG5014	AE5122	AE5101	AE6200	AE6601	AE6204	AE6110
Knowledge & Understanding	A6							S			S		
	A5							S					
	A4							S			S		
	A2												
	A1												
	A3							S			S		
Intellectual Skills	B6							S			S		
	B5							S			F		
	B4							S			F		
	B1												
	B2							F			F		
	B3							F					
Practical Skills	C4							S			F		
	C3												
	C2												
	C1												
	C5							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.