Programme Title: MSc in Aerospace Engineering

Programme Specification

Awarding Body/Institution	Queen Mary, University of London
Teaching Institution	Queen Mary, University of London
Name of Final Award and Programme Title	MSc in Aerospace Engineering
Name of Interim Award(s)	PG Certificate / PG Diploma
Duration of Study / Period of Registration	1 calendar year
QM Programme Code / UCAS Code(s)	H4S1
QAA Benchmark Group	Masters degrees
FHEQ Level of Award	Level 7
Programme Accredited by	Royal Aeronautical Society and Institution of Mechanical Engineers
Date Programme Specification Approved	11 Apr 2016
Responsible School / Institute	School of Engineering & Materials Science

Schools which will also be involved in teaching part of the programme
Centre for Commercial Law Studies

Institution(s) other than Queen Mary that will provide some teaching for the programme

Programme Outline

Aerospace engineering has come a long way since the Wright brothers first succeeded in powered flight in 1903. Recently the UK government recognized the importance of the field to the UK economy and identified four priority themes: Aerodynamics, Aero-structures, Propulsion and Systems. It invests in Aero MSc bursaries in corporation with the Royal Aeronautical Society, academia and industry.

This MSc programme allows students to gain advanced skills and offers the ability to compete for Aerospace posts in at least two of the four priority themes by providing specialised taught modules in Systems, Aerodynamics and Aero Structures as well as pursuing an MSc research project in one of the noted priority themes. Thus after consulting with the programme director the student is expected to take at least two taught modules from our systems specialized modules and two taught modules from our aerodynamics or aero-structures modules. The student must also take the compulsory taught module of Research Methods that prepares him/her for the compulsory MSc individual research project.

Overall the student will take and pass eight taught modules and an MSc research project. Recognizing the MSc student as a mature student, the student is given the option to choose the last three taught modules as a tool for a further specialization in his/her chosen taught themes of Systems/Aerodynamics or Systems/Aero Structures, or broadening their general skills by taking for example the Law and Commerce module for Scientists and Engineers given by the our highly esteemed Centre for

Commercial Law Studies.

The MSc research project is to be supported by our research activities and our state of the art facilities. Several high performance computing clusters owned by the university support a full spectrum of computational research. Our aerospace labs include a wide range of wind tunnels and an anechoic chamber supporting aerodynamic research. An advanced UK CueSim Flight Simulator and France-Price Induction Jet engine test bench support Systems, Aerodynamics and Propulsion research. Systems and in particular Space Engineering research is also supported by our micro-injector labs. Further Aero Structure research is supported by the facilities and expertise provided by Nanoforce, a company directly associated with the School.

Aims of the Programme

The programme aims to prepare specialists with advanced taught and research skills in two of of the UK Aerospace priority themes of Systems, Aerodynamics and Aero Structures. Advanced research skills in propulsion as related to one of the previously noted themes can be pursued through the research project. Students completing this programme will be able to develop novel computational, experimental and technology products for the Aerospace industries while at the same the opportunity is provided to gain the capability to understand engineering-related issues in commerce and law. In particular the programme has the following aims.

1. Teaching advanced computational, experimental and analytical techniques applicable to Aerospace Engineering themes of Systems, Aerodynamics and Aero Structures.
2. Teaching advanced research methods applicable to Aerospace Engineering in industry and academia
3. Teaching modern design procedures used by the leading Aerospace research and development units.
4. Developing a research/design project in one of the UK Aerospace themes of Systems, Aerodynamics, Aero Structures and Propulsion.
5. Providing students with insight into advanced developments in Aerospace Engineering.
6. Enabling students to participate in advanced research and industrial developments in Aerospace Engineering.
7. Introducing the students who are interested to selected issues in commerce and law that they may encounter in UK industry.

What Will You Be Expected to Achieve?

Students who complete successfully this programme will be able to compete for industrial post in Systems, Aerodynamics and Aero Structures as well as being well prepared to pursue a doctoral research study in aerospace engineering.

Academic Content:	
A 1	Gain advanced knowledge and research capability in the Aerospace themes of Systems/Aerodynamics or Systems/ Aero Structures.
A 2	Have in-depth understanding of the development cycle of novel Aerospace technologies and be able to contribute to advanced design developments
A 3	Gain in-depth knowledge into finding practical solutions to Aerospace problems using advanced computational, experimental and theoretical methods

Disciplinary Skills - able to:	
B 1	Undertake independent research on a topic related to Aerospace Engineering in one of the UK Aerospace priority themes of Systems, Aerodynamics, Aero Structures or Propulsion.
B 2	Apply advanced Engineering methods to a range of Aerospace related applications

B 3	Optimally select analysis techniques for aircraft and system performance assessment
B 4	Critically assess feasibility of analytical, computational and experimental techniques in use and propose practical methods for their improvement.

Attributes:	
C 1	Engage critically with knowledge.
C 2	Be able to understand both the application and limitation of mathematical, computational and experimental techniques available to an engineer.
C 3	Undertake independent research using state of the art processing, characterisation and testing facilities.
C 4	Research Capacity and Information expertise
C 5	Understand the application and use of aerospace technology in related engineering subjects.

How Will You Learn?

Through a wide range of different interactions including lectures, tutorials, laboratory classes, exercise classes and project supervisions. It is expected that the programme will demand between 1800 and 2000 hours in total to complete. About 10% of this time will be in scheduled lectures.
A significant amount of independent personal study is anticipated as part of this programme.

How Will You Be Assessed?

The taught modules will be assessed through both coursework and examinations. The details are as outlined in the individual module specifications. The examinations will all take place in the standard college examination period in May. The final project thesis will be assessed in September and the student will also complete a presentation as well as an oral examination.

How is the Programme Structured?

The student is expected to take and pass successfully eight taught modules worth 15 credits each and an MSc research project worth 60 credits. Four to five modules will be taken during Semester A which is usually from September to December and three to four taught modules will be taken during Semester B which is usually from January to April. All taught module examinations will be in the standard examination period during May. The research project topic will be decided during Semester A and the

student is expected to work part-time on his/her project during Semesters A&B, while being assisted by a supervision of a designated academic member of staff. The student will work full time on the research project after the exam period and submit the thesis by the end of August provided he/she passed properly the taught modules as specified in the taught post-graduate student handbook. An oral viva will take place in early to mid September.

The student must take the compulsory module of Research Methods and Experimental Techniques that is usually given in Semester A in order to enhance research skills needed for the project. After consulting the programme director the student will take at least two taught modules from our systems-focused modules that include: Advanced aircraft design, advanced spacecraft design, advanced flight control and simulation, and Robotics. The student is also expected to take at least two taught modules from our aerodynamics or aero-structures modules. The aerodynamics modules include Advanced High Speed Aerodynamics, Computational Fluid Dynamics, Mechanics of Continua and Aeroelasticity. The aero-structures modules include Computational Engineering, Vehicular Crashworthiness, Mechanics of Continua and Aeroelasticity. Note that the modules of Mechanics of Continua and Aeroelasticity are both common to the themes of aerodynamics and aero-structures due to their syllabi.

Three more optional taught modules will be chosen by the student after consulting the programme director, taking into account the student's wishes and background. A full list of the available modules is given next.

Academic Year of Study 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Research Methods and Experimental Techniques in Engineering	DENM014	15	7	Compulsory	1	Semester 1
Advanced Flight Control and Simulation of Aerospace Vehicles	DENM001	15	7	Elective	1	Semester 1
Advanced Spacecraft Design: Manoeuvring and Orbital Mechanics	DENM335	15	7	Elective	1	Semester 2
Computational Engineering	DENM004	15	7	Elective	1	Semester 1
Grad, div and curl: Vector Calculus for Engineering	DENM512	15	5	Elective	1	Semester 1
Vehicular Crashworthiness	DENM033	15	7	Elective	1	Semester 2
Advanced High Speed Aerodynamics	DENM405	15	7	Elective	1	Semester 2
Aeroelasticity	DENM032	15	7	Elective	1	Semester 2
Computational Fluid Dynamics	DENM010	15	7	Elective	1	Semester 2
Robotics	DENM011	15	7	Elective	1	Semester 2
Aerospace Research Project	DENM003	60	7	Core	1	Semesters 1-3

Programme Title: MSc in Aerospace Engineering

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Introduction to Law for Science and Engineering	IPLM701P	15	7	Elective	1	Semester 1
Advanced Aircraft Design	DENM305	15	7	Elective	1	Semester 2
Numerical Optimisation in Engineering Design	DENM026	15	7	Elective	1	Semester 2
Composites	MTRM730	15	7	Elective	1	Semester 2

What Are the Entry Requirements?

The entry requirement is that the student to have secured at least a high 2ii (>55%) BEng degree or equivalent qualification in engineering, science or an equivalent academic programme and supporting references. A minimum of IELTS 6.5 or equivalent is required for non-native English speakers.

How Do We Listen and Act on Your Feedback?

The Staff-Student Liaison Committee provides a formal means of communication and discussion between schools/institutes and its students. The committee consists of student representatives from each year in the school/institute together with appropriate representation from staff within the school/institute. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

Each school/institute operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Taught Programmes on all matters relating to the delivery of taught programmes at school level including monitoring the application of relevant QM policies and reviewing all proposals for module and programme approval and amendment before submission to Taught Programmes Board. Student views are incorporated in the committee's work in a number of ways, such as through student membership, or consideration of student surveys.

All schools/institutes operate an Annual Programme Review of their taught undergraduate and postgraduate provision. APR is a continuous process of reflection and action planning which is owned by those responsible for programme delivery; the main document of reference for this process is the Taught Programmes Action Plan (TPAP) which is the summary of the school/institute's work throughout the year to monitor academic standards and to improve the student experience. Students' views are considered in this process through analysis of the NSS and module evaluations.

Academic Support

During induction the students will be welcomed to the college by the programme leader. Early on in the programme the students will select an project supervisor based upon a wide choice of different project areas. This academic will then also act as a personal tutor. Many of the modules are taught to small classes and so a high level of personal support will also be available from the module organiser in the majority of the taught modules.

Queen Mary University of London

Programme Title: MSc in Aerospace Engineering

Programme-specific Rules and Facts

The programme follows the standard QMUL guidelines for MSc delivery.

Specific Support for Disabled Students

Queen Mary has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.

Students can access advice, guidance and support in the following areas:
- Finding out if you have a specific learning difficulty like dyslexia
- Applying for funding through the Disabled Students' Allowance (DSA)
- Arranging DSA assessments of need
- Special arrangements in examinations
- Accessing loaned equipment (e.g. digital recorders)
- Specialist one-to-one "study skills" tuition
- Ensuring access to course materials in alternative formats (e.g. Braille)
- Providing educational support workers (e.g. note-takers, readers, library assistants)
- Mentoring support for students with mental health issues and conditions on the autistic spectrum.

Links With Employers, Placement Opportunities and Transferable Skills

The school has an active Industrial Liaison forum (ILF). This forum has a direct impact on our programmes by encouraging employers to sponsor and support both the students and to provide real design case studies to engage the students throughout the curriculum.

The ILF meets twice a year. The event in October runs in parallel with the SEMS prize day where prospective employers attend the event, meet MSc and final year undergraduate students discussing opportunities and tips for applications. We regularly host employer representatives from the Aerospace sector including Airbus, Alcoa, Astrium, B/E Aerospace, Eaton Aerospace, Marshal Aerospace, Ministry of Defence, Mott McDonald, Price Induction, Rolls Royce and Selex. The new MSc students are encouraged to attend the October event to discuss their projects with industry to forge further ties, where our industrial liaison partners are regularly involved in some of the projects that are of applied research nature. The second industrial forum day takes place in March, where the MSc students are encouraged to meet industrial representatives to discuss potential future employment.

Programme Specification Approval

Person completing Programme Specification	Dr Adrian Briggs
Person responsible for management of programme	Dr Fariborz Motallebi
Date Programme Specification produced/amended by School Learning and Teaching Committee	28 Jan 2019

Queen Mary University of London

Programme Title: MSc in Aerospace Engineering

Date Programme Specification approved by Taught Programmes Board	11 Apr 2016

Queen Mary University of London