Programme Title: MSc in Aerospace Structures and Materials

Programme Specification (PG)

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 Structures and Materials
Name of interim award(s):	
Duration of study / period of registration:	1 Year
QMUL programme code(s):	PMSF-QMENNG1
QAA Benchmark Group:	Engineering
FHEQ Level of Award:	Level 7
Programme accredited by:	Accreditation will be sought from The Royal Aeronautical Society, The Institution of Mechanical Engineers and The Institution of Materials Minerals and Mining
Date Programme Specification approved:	
Responsible School / Institute:	School of Engineering & Materials Science

Schools / Institutes which will also be involved in teaching part of the programme:
NA

Collaborative institution(s) / organisation(s) involved in delivering the programme:
NA

Programme outline

Aerospace Structures differ from other structures due to their high demands for performance and lightweight. Modern aerospace structures typically require the use of composite materials, advanced manufacturing of structural components, optimal design and thin-walled constructions. Aircraft manufacturers today face the challenge of developing lighter, fuel-efficient and environmentally-friendly aircraft. To cope with requirements of development of novel aero-structures, advanced techniques in manufacturing make effective use of advanced materials. This course combines Queen Mary University of London's long-standing expertise for delivering high-quality Masters' programmes in both aerospace and materials. There is a strong emphasis on applying knowledge in the industrial environment.

This MSc programme allows students to gain advanced skills by providing specialised taught modules in Aero Structures as well as the closely related field of Materials Science. The structure of the programme includes Aerospace Structures, Composites and Research Methods and Experimental Techniques in Engineering. Students will also pursure a MSc research project which combines elements of both structural mechanics applied to Aero structures, and Materials Science.

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Aims of the programme

This programme aims to improve and develop structure design of aerospace and materials for aviation applications, including optimisation, smart and functional materials due to their high demands for performance and lightweight. The numerical simulations in aerospace structures manufacturing are also included in this programme.

What will you be expected to achieve?

All modules are designed to meet the training needs of industry and have a strong input from experts in their sector. You will be taught by experts from QMUL and industry with substantial experience in manufacturing, numerical modeling, research and consultancy. The individual research projects are designed by the academic staff to develop student's research capability and ability to provide aerospace structures strength analysis, material technology and engineering solutions to real problems in aerospace.

Academic Content:	
A 1	Gain advanced knowledge and research capability in the facts, fundamental concepts, principles and theories of aerospace structures, materials and manufacturing.
A 2	Have in-depth understanding of the development cycle of aerospace structures and be able to contribute to advanced strength analysis including crashworthiness, fatigue life, material selection and design of composites.
A 3	Gain the knowledge and ability needed to find 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 the UK Aerospace priority theme of Aircraft Structures.
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 the feasibility of analytical, computational and experimental techniques in use and propose practical methods for their improvement.

Attributes:	
C 1	Engage critically with knowledge.

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C2	Be able to understand both the application and limitation of mathematical, computational and experimental techniques available to an engineer.
C3	Undertake independent research using state of the art processing, characterisation and testing facilities.
C4	Gain research capacity and information expertise.
C5	Understand the application and use of aerospace technology in related engineering subjects.

How will you learn?

Acquisition of knowledge is achieved mainly through lectures and directed independent learning. Understanding is reinforced through a combination of workshops and problem classes, tutorials and laboratory classes (depending upon the module concerned) which include provision of regular feedback on submitted assignments. Additional learning support is made available through Queen Mary's online learning environment (QMplus) via the provision of various primers and guidance notes, online recordings and other supplementary learning materials. A range of computational solids and fluids software and other scientific software is available through the QMUL Student PC.

You will be taught by a team of dedicated aerospace engineering specialists as well as experts from other related fields of engineering. The programme will be completed in one-year on a full-time basis. The programme is comprised of compulsory and elective modules. You will also complete an extensive four-month individual research project which is made up of a piece of individual research and must include some element of originality. It can be wholly experimental, wholly theoretical, or a mixture of the two.

How will you be assessed?

Assessment of the academic content of the programme is generally through a combination of unseen written examinations and assessed coursework. The exact nature of the coursework varies from module to module, but may include work in the form of problem sheets, essays or other types of written assignments. The coursework mark may also include a contribution from computer-based assessments and in-course tests. Interim and final oral presentations for the individual research report also form part of the Programme assessment.

How is the programme structured?

Please specify the structure of the programme diets for all variants of the programme (e.g. full-time, part-time - if applicable). The description should be sufficiently detailed to fully define the structure of the diet.

Students are required to register for modules to a value of 180 credits in one academic year; this will consist of 60 credits in each semester, follows:

- 4 x 15 credit modules in Semester 1 including 1 compulsory module: Research Methods and Experimental Techniques in Engineering (DENM014)
- 4 x 15 credit modules in Semester 2 including 2 compulsory modules: Advanced Aerospace Structures (DENM307), and Composites (MTRM730)
- 1 x 60 credit project (Semester 3)

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Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Advanced Aerospace Structures	DENM307	15	7	Compulsory	1	Semester 2
Research Methods and Experimental Techniques in Engineering	DENM014	15	7	Compulsory	1	Semester 1
Composites	MTRM730	15	7	Compulsory	1	Semester 2
Material Selection in Design	MTRM011	15	7	Elective	1	Semester 1
Polymer Physics	MTRM798	15	7	Elective	1	Semester 1
Computational Engineering	DENM004	15	7	Elective	1	Semester 1
Numerical Optimization in Engineering Design	DENM026	15	7	Elective	1	Semester 2
Advanced Structure-Property Relationships in Materials	MTRM065	15	7	Elective	1	Semester 2
Failure of Solids	MTRM025	15	7	Elective	1	Semester 2
Manufacturing Processes	MTRM713	15	7	Elective	1	Semester 2
Robotics	DENM011	15	7	Elective	1	Semester 2
Advanced Aircraft Design	DENM305	15	7	Elective	1	Semester 2
Advanced Materials Characterization Techniques	MTRM066	15	7	Elective	1	Semester 2
Aeroelasticity	DENM032	15	7	Elective	1	Semester 2
Vehicular Crashworthiness	DENM033	15	7	Elective	1	Semester 2
Aerospace Research Project	DENM003	60	7	Core	1	Semester 3

What are the entry requirements?

High 2:2 (>55%) BEng degree or equivalent qualification in a materials science or aerospace/mechanical engineering subject or an equivalent academic programme, as well as supporting references. Other subjects in a related area, including but not limited to Physics ,and Mathematics, will be considered and assessed on an individual basis.

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A minimum of IELTS 6.5 or equivalent is required for non-native English speakers.

How will the quality of the programme be managed and enhanced?

At Institutional level, the programme will be managed and enhanced through an Annual Programme Review. At School level, the Programme will be managed by a Programme Director, who sits on the School's Education Board, chaired by the School's Director of Education. The day-to-day running of the Programme will be monitored by the School's Student Experience Group. Additionally, student feedback (via SSLC and Module Evaluations) will be considered.

How do we listen to and act on your feedback?

The Postgraduate Taught Programmes Staff-Student Liaison Committee (SSLC) provides a formal means of communication and discussion between the School and its students. The committee consists of student representatives from each MSc Programme and appropriate representation from staff within the school. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. The SSLC meets regularly throughout the year.

In addition, students sit on a variety of School committees concerned with Education provision. More immediate concerns and issues can be addressed via online forums (at module, programme and School level), anonymous suggestion boxes and via personal tutors and project supervisors.

What academic support is available?

All students will have all the standard induction, advice and supervisory arrangements normally offered to students within SEMS. The school handbook will be provided (and made accessible at all times) to students, where all the channels of support will be outlined. These include the support channels within the school and also those available across Queen Mary.

Each module has a module coordinator, whose role is to ensure that the module runs smoothly, and that an appropriate level of information is provided to students of the module.

Project-work is carried out under the guidance of a specific academic member of staff, whose role includes the provision of academic and technical guidance, as well as monitoring your progress throughout the project.

Programme-specific rules and facts

N/A

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

SEMS enjoys a wealth of collaborative links with like-minded research centres across the world, in the USA, Europe, and Asia, and a regular flow of international research visitors contribute to the lively and cosmopolitan atmosphere.

The staff involved in SEMS have strong links and research collaboration with industrial partners. The MSc degree offers a high-level of training in aerospace engineering, with coverage of all the major areas to an advanced level. Graduates of this MSc programme generally have significantly more experience in aerospace engineering than would be the case for graduates of the corresponding BEng degree, and have experience of undertaking an extended research project. SEMS graduates can therefore be expected to possess a wider range of practical skills, and a greater ability to undertake independent research studies. The degree is therefore particularly suitable for those seeking to pursue a career in professional design, manufacturing and research in aerospace engineering.

Graduates of SEMS degree courses are generally recognised by employers as having good technical and transferable skills: including skills in theoretical/numerical analysis, experiments, application of commercial software, problem solving, communication, IT and computation, independent research, and time management.

Opportunities for employment within the field of aerospace engineering would include careers in the following areas: aerospace industry; advanced material sciences; stress/fatigue analysis; teaching and education.

Opportunities for employment outside the field of aerospace would include careers in the following areas:
finance; commerce; civil service; technical sales; information technology.

In addition, additional information such as lecture notes are made available as well as previous years' examinations papers, and other useful resources like an extensive database of potential employers that have expressed an interest in employing our postgraduates in the past.

Programme Specification Approval

Person completing Programme Specification:	Adrian Briggs
Person responsible for management of programme:	Pihua Wen
Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:	27 Feb 2019
Date Programme Specification approved by Taught Programmes Board:	

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