

PROGRAMME SPECIFICATION KEY FACTS

Programme name	Advanced Aerospace Engineering with Sustainable Technologies
Award	MSc
Exit Awards	<i>PG Dip</i>
Exit Awards	<i>PG Cert</i>
School	School of Science and Technology
Department or equivalent	Engineering
Programme code	PSAEST
Type of study	Full-time
Total UK credits	180
Total ECTS	90

PROGRAMME SUMMARY

The MSc in Advanced Aerospace Engineering with Sustainable Technologies is a multidisciplinary program that will give you the skills, knowledge, and in-depth understanding of the latest technologies used in the growing and evolving aerospace industry. There is a high demand for well-qualified, industry-ready aerospace engineers in the UK and internationally, with applications in a variety of fields, including aerospace research and innovation, defense, advanced manufacturing and materials, renewable energy, structural engineering, autonomous systems, and sustainable aerospace systems. This program will allow you to advance your aerospace engineering skills and qualifications to the master's level. You will be well-trained in the theory and practice of aerospace engineering and related technologies, and you will be prepared for a professional position in the aerospace industry. You will also be able to contribute to future developments in the aerospace industry.

This programme aims to provide you with essential coherent knowledge and skills related to the design and operation of next-generation aerospace vehicles, with particular attention towards improvements in environmental performance of flight vehicles and their operations, and the emerging concepts of automation and autonomy in aircraft production, aircraft operation and ground systems.

Since aerospace engineering is a multidisciplinary field, you will undertake study to an advanced level in both theory and practice, exploring the specialist areas of advanced aerodynamics, flight vehicle performance, alternate-fuelled propulsion systems, advanced manufacturing methods, structural engineering, spacecraft systems, autonomous aerospace vehicles and sustainable technologies for aerospace industry. These features can be achieved by applying the latest advances in laminar flow enabling technologies, composites-based manufacturing, unmanned aircraft systems, sensing technologies, systems engineering and optimization. You can benefit from access to exceptional facilities: including low-speed and high-speed wind tunnels, flight simulation facilities, an autonomous unmanned vehicle (UAV) laboratory, composites and

structures facilities, high-performance computing facilities and associated labs for modelling and simulation. In addition to the technical part of the Programme, you will be introduced to the legal and regulatory framework and ethical issues arising from automation and autonomy of aerospace systems' operation via a series of lectures and seminars. The programme is suited for new graduates and professionals who want to advance their understanding of the field and are interested in pursuing a career in one of the emerging application areas related to Aerospace Engineering.

Aims

This program will prepare you for a career in the growing aerospace industry by providing you with the knowledge, skills, and values you need to succeed. With a particular focus on multidisciplinary aerospace technologies aimed at reducing environmental impact, you will be able to make a positive impact on the world. You will study the theory and practice related to the analysis, design, and evaluation of Aerospace Engineering Systems and the underlying Technologies via 8 15-credits taught modules. Some of these include laboratory components and group-based projects. The programme also includes a 60-credits individual project module where you will demonstrate original application of knowledge in the area, either through the analysis, design, and evaluation of a concept related of systems engineering and its related technologies, or the critical evaluation and extension of the knowledge in the area through a research-led project, which can involve the development of a relevant software and/or hardware application.

Content

The program includes 8 core taught modules spanning multiple disciplines, where in your studies will delve deeply into theory and practice, encompassing advanced aerodynamics, performance optimization, alternative propulsion, cutting-edge manufacturing, robust structures, autonomous flight, and sustainable solutions for the industry. A short description of the content offered within the modules is given below.

- **Green Aerospace Technologies:** This module offers you a unique combination of multi-disciplinary topics related to the key technological advances, and the corresponding underlying principles, for a greener aerospace industry.
- **Unmanned Aerial Vehicles:** This module offers a unique combination of multi-disciplinary topics related to the design and operational aspects of Unmanned Aerial Vehicles, which is desired in the autonomous vehicle industry.
- **Experimental Methods in Aerospace Engineering:** In this module you will be able to acquire comprehensive knowledge and understanding of topics related to the design and execution of experimental campaigns in aerospace engineering.
- **Computational Fluid Dynamics:** This module introduces the theory and application of CFD techniques for predicting fluid flow and heat and mass transfer.
- **Advanced Aerodynamics:** In this module you will be able to gain knowledge and understanding of subsonic and supersonic flows and their relevance for aircraft design.
- **Structural Dynamics and Aeroelasticity:** The module aims to provide you with an insight and understanding of structural dynamic and aeroelastic phenomena found in flexible structures and aircraft under the effects of aerodynamic forces.
- **Advanced Manufacturing:** This module aims to provide you with an understanding of the principles behind some of the most traditional and recent developments in the manufacturing of high value-added engineering components.
- **Sustainable Airworthiness and Maintenance:** This module offers you the understanding and experience of the methodologies used to develop, review, and update sustainable maintenance programmes.

Registration Period

Minimum period of Registration: 1 year. Maximum period of Registration: 3 years.

WHAT WILL I BE EXPECTED TO ACHIEVE?

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

Knowledge

- Evaluate and apply the concepts of aerodynamics, structures and emerging aerospace systems and technologies conducive towards the development of a next-generation sustainable air transport industry.
- Apply systematic engineering analysis methods and research skills to solve complex real-world aerospace engineering problems.
- Develop innovative designs and adapt design processes and methodologies to fulfil the requirements of current and future aerospace systems.
- Evaluate critically the engineering systems and their application to the design of UAVs and unmanned operations.
- Evaluate the application of human-machine interaction in the context of autonomous aerospace systems and their operation.
- Systematically review the dynamic behaviour of aircraft and assess air-vehicle performance.
- Review and evaluate professional, legal, social and ethical issues in the subject area, including the sustainability of aerospace systems.

Skills

- Critically evaluate and optimise solutions to analytical, design and practical problems in aerospace engineering and other cross-cutting technology areas.
- Apply practical engineering techniques and professional industrial practices.
- Develop skills to follow recent and future developments in the Aerospace Industry by critically evaluating theoretical research and emerging technologies required to deliver leading sustainability solutions.
- Develop skills for critical thinking, problem solving and reflection.
- Communicate competently the results of analysis and design in scientific reports and oral presentations.
- Develop and apply Research Skills and Techniques to further develop knowledge in the field.

Values and attitudes

- Appreciate the impacts to society and the ethical issues arising from expanding the use of aerospace vehicles.
- Act responsibly when developing safe and reliable products and solutions, incorporating the socio-economic and environmental impacts.
- Develop the attributes necessary to work effectively at an advanced level both individually and in groups, to demonstrate independence and to manage time effectively.
- Learn to apply good communication and problem-solving skills and develop a professional approach to written reports and oral presentations.

This programme has been developed in accordance with the QAA Subject Benchmark for generic masters' level programmes.

WHAT WILL I STUDY?

Taught component.

The programme consists of eight taught modules. All modules have a value of 15-credits.

Taught modules

Module Title	SITS Code	Module Credits	Core/ Elective	Compensation Yes/No	Level
Green Aerospace Technologies	EPM919	15	Core	No	7
Advanced Aerodynamics	EG4103	15	Core	No	7
Structural Dynamics and Aeroelasticity	EG4105	15	Core	No	7
Computational Fluid Dynamics	EG4104	15	Core	No	7
Unmanned Aerial Vehicles	EG4102	15	Core	No	7
Sustainable Airworthiness and Maintenance	EG4106	15	Core	No	7
Advanced Manufacturing	EG4204	15	Core	No	7
Experimental Methods in Aerospace Engineering	EPM222	15	Core	No	7

Dissertation module

Module Title	SITS Code	Module Credits	Core/ Elective	Compensation Yes/No	Level
Individual Project	EPM949	60	Core	N	7

You are normally required to complete all the taught modules successfully before progressing to the dissertation. It is expected that the learning objectives of the taught components be met by the time the Individual Project is started.

Details of information on compensation awards to be found in the Assessment Regulations section of the Programme Specifications document.

HOW WILL I LEARN?

You will be taught using a variety of teaching methods, including formal lectures, case studies, group work and tutorials (guided group sessions). Lectures will be delivered by academics, practitioners and external experts to relate theory to current practice in relevant topics, and you will be encouraged to share your experience with other students via debate and discussion. The style of teaching will consider your prior experience as an engineering graduate. The aim is to provide a structured context based on a set of pre-determined learning outcomes in which you

can consolidate and develop your existing knowledge and skills, share your experience with other students, and incorporate what you learn into your professional practice. In addition to the taught elements of the modules there will be the need for private study. This time will be spent working on background reading, revision of notes, work on tutorial problems and coursework.

Online learning will be provided with support documentation, experiments, and exercises. Considerable time should be dedicated to developing and modelling options and solutions.

Tutorials and labs provide practical training and develop skills in modelling the efficacy and efficiency of air vehicle technologies to meet mission objectives. Online resources will be available, including support material for lectures, pointers to relevant literature, technical specification manuals and software code. Towards this the programme will be supported by the use of the Moodle Virtual Learning Environment (VLE) as a repository of learning resources (e.g. presentation slides, links to resources/industry papers, etc), and to provide you with a forum for discussion, tutorial support and a facility for the submission of coursework.

Statement on overall number of learning and teaching hours for each stage of the programme, relating hours to credits and sector norms. Where these are different to professional body placements requirements refer to this.

WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?

Assessment and Assessment Criteria

Assessment of the programme modules comprises written examinations and coursework which could be laboratory based. Each individual module coursework will require some design activities and will be combined with the written module examination, where applicable, to provide an overall module mark.

The examinations will be closed book and have a duration of 2 hours. Depending on the specific module the coursework component could comprise of individual or group-based work with report to submitted as part of summative assessments. The details of the module-specific coursework components are available in their respective module specification documents.

The research project/dissertation aims to provide you with the opportunity to deal with problems in areas where new subject knowledge is required. This involves literature search, assessment of the relevance of previous work, the development of the research task, self-directed research, and the presentation of research results. The Individual Research Project is assessed primarily through a dissertation but with contributions from an interim report, work carried out during the project period and oral examination. The expected length of the Dissertation is around 60-80 pages (12,000 – 15,000 words) including illustrations and with no more than 30 pages of appendices (total maximum number of pages between 90-110). The project will additionally be assessed by a 50-minute oral examination, including a 15–20-minute presentation highlighting the work done during the project.

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. Grade-related Criteria are descriptions of the level of skills, knowledge, or attributes that you need to demonstrate in order achieve a certain grade or mark in an assessment. 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, 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. You will normally be provided with feedback within three weeks of the submission deadline or assessment date. This would normally include a provisional grade or mark. For end of module examinations or an equivalent significant task (e.g. an end of module project), feedback will normally be provided within four weeks. The timescale for feedback on final year projects or dissertations may be longer. The full policy can be found at: [Assessment-and-Feedback-Policy.pdf](#)

Assessment Regulations

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.

The pass mark for each module is 50% for both Coursework and Examination combined. If you fail an assessment component or a module, the following will apply:

1. Compensation: where you fail up to a total of 20 credits at first or resit attempt (15 for a Postgraduate Certificate), you may be allowed compensation if:
 - Compensation is permitted for the module involved (see the module specification), and
 - It can be demonstrated that you have satisfied all the Learning Outcomes of the modules in the Programme, 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 50% has been achieved overall.

Where 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 shall 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.

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 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, and the Assessment Board will require that you be withdrawn from the Programme.

If you fail to meet the requirements for the Programme, the Assessment Board will consider whether you are eligible for an Exit Award as per table below. If you would like to know more

about the way in which assessment works at City St George's, please see the full version of the Assessment Regulations at: [Senate-Regulation19-2024_25v3.pdf](#)

WHAT AWARD CAN I GET?

Master's Degree

For all of you completing the MSc in Advanced Aerospace Engineering with Sustainable Technologies you will demonstrate original application of knowledge to conduct thorough and insightful assessments of complex analytical theories and frameworks and in choice of approaches to practice. You will be engaged in research or scholarly activity that contributes new views to tackle intricate real-world challenges by drawing upon a systems-oriented approach. To obtain the MSc in Advanced Aerospace Engineering with Sustainable Technologies, in addition to the Diploma requirement above, you will undertake a project to demonstrate original application of knowledge, specific technology, a critical evaluation and extension of knowledge through a research-led project.

(8 X 15-credit taught modules = 120 credits and the 60-credits individual project module for 180 credits in total)

Programme credits and weighting

Programme Stage	HE Level	Credits	Weighting (%)
Taught	7	120	67
Dissertation	7	60	33

Class requirements

Class	% required
With Distinction	70
With Merit	60
Without classification	50

Postgraduate Diploma

For all of you completing the Postgraduate Diploma in Advanced Aerospace Engineering with Sustainable Technologies, in addition to the above you will explore and apply knowledge related to the fundamental principles of aerodynamics, flight dynamics, structural mechanics to critically evaluate, design and analyse next-generation air vehicles. You will also cultivate the ability to appraise critically the strength and limitations of evidence supporting knowledge claims in aerospace engineering from different perspectives to broaden your expertise and skills. You will be awarded a Postgraduate Diploma in Advanced Aerospace Engineering with Sustainable technologies, when you exit the course with having acquired knowledge related to the full taught part of the Programme, passing all taught modules with associated lab reports.

(8 X 15-credit taught modules = 120 credits in total)

Programme credits and weighting

Programme Stage	HE Level	Credits	Weighting (%)
Taught	7	120	100%

Class requirements

Class	% required
With Distinction	70
With Merit	60
Without classification	50

Postgraduate Certificate:

For all of you completing the Postgraduate Certificate in Advanced Aerospace Engineering with Sustainable Technologies, you will be able to examine the theories that would help you develop a critical insight into the multidisciplinary facets of aerospace engineering, and be able to draw upon the foundations of mathematics and computation to address practical challenges therein. You will also use a range of techniques to undertake your scholarly work and develop the proficiency to independently and/or collaboratively solve common engineering problems. You will be awarded a Postgraduate Certificate in Advanced Aerospace Engineering with Sustainable technologies, when you exit the course with having successfully completed at least any 4 15-credit taught modules (60 credits in total).

Programme credits and weighting

Programme Stage	HE Level	Credits	Weighting (%)
Taught	7	60	100%

Class requirements

Class	% required
With Distinction	70
With Merit	60
Without classification	50

EMPLOYABILITY AT CITY ST GEORGE'S

WHAT KIND OF CAREER MIGHT I GO ONTO?

The UK currently has the second largest aerospace industry in the world, employing around 230,000 people in over 3,000 companies, including BAE Systems, GKN Aerospace and Rolls-Royce, and a range of international companies with operations in the UK, such as Airbus, Cobham, Leonardo, Lockheed Martin, Thales, Boeing, SAFRAN, MBDA and Spirit Aerosystems. A global skills shortage continues to ensure that aerospace engineers remain among the most in-demand professions in an industry where the average wages and salaries are 58% higher than the UK average. Furthermore, Engineering UK predicts 186,000 people with engineering skills will be needed annually through to 2024 to meet demand.

The specialist topics studied on the programme are designed to prepare you for work in companies involved with aerospace engineering, but there are also many roles in related industries that rely on the same technology, such as the automotive industry and renewable energy systems. Possible destinations could include the fields of Design, Research and Development, Operations and Management, as well as projects, systems, structural and avionics engineering.

Upon successful completion of the course, you will have developed a wide range of transferrable professional and technical skills during your studies, including the ability to produce technical, written reports and deliver oral presentations, engage in self-directed study, operate as part of a team, demonstrate a critical awareness of professional, legal, social and ethical issues.

City St George's, University of London is committed to preparing you for your future career and aims to give you a competitive edge in the graduate job market. The university's Careers Support Team provides a wide range of support services to help you plan and prepare for your career.

Graduates starting a new business can benefit from City St George's City Venture and City St George's links to Tech City, providing support for start-up businesses.

For more information on the Careers support available at City St George's, please go to: <https://www.citystgeorges.ac.uk/prospective-students/career-development/pathways>

WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?

Internships: you can participate in our professional placement programme, which is supported by the Professional Liaison Unit. This will enable you to undertake your dissertation within an industrial or research placement over an extended period compared to regular projects. The School Professional Liaison Unit provides support to prepare CVs, interviews, and application for internships.

WILL I GET ANY PROFESSIONAL RECOGNITION?

Accreditation from relevant Professional, Statutory or Regulatory Bodies (PSRB) will be sought. Accreditation from Royal Aeronautical Society (RAeS) and the Institute of Mechanical Engineers (iMechE) will be sought, and typically, it is granted for programmes running for at least three years. Please note that in such cases, it is standard practice to backdate the programme accreditation. The backdating would be applied up to the first intake and graduates of the cohort.

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For use from: 2025/26

Information is provided subject to Terms and Conditions for study at City St George's, University of London.