

A woman with dark hair is looking intently at a camera mounted on a drone. She is adjusting the camera. The background is a plain, light-colored wall. The image is overlaid with a dark blue and maroon diagonal graphic.

**Cranfield
University**

Postgraduate
master's courses in

Aerospace

Academic year 2024/25 entry

Cranfield University

We are the UK's only specialist postgraduate university in technology and management, with longstanding relationships with some of the most prestigious global companies. Our close collaboration with industry, and passion for the areas we operate in, will help your career.

Specialist postgraduate

A research-focused professional community

88%

of our research is world-leading or internationally excellent

Research Excellence Framework (REF) 2021



THE QUEEN'S ANNIVERSARY PRIZES FOR HIGHER AND FURTHER EDUCATION 2019

Over **£150 million** of investment in new facilities over the past five years

Six-time winner of the Queen's Anniversary Prize for Higher and Further Education

A professional network of **75,000+** alumni, from 177 countries

5,000+ postgraduate students from 100+ countries

UK Top 5 for Engineering (Mechanical, Aeronautical and Manufacturing) QS World University Rankings by subject, 2022

As we are postgraduate only, we are not listed in league tables that help compare undergraduate universities, such as *The Times World Rankings* and *The Complete University Guide*.

"Cranfield allowed me to gain knowledge in an exceptionally specialised topic, relevant to today's rapidly developing aerospace industry. It was a rewarding experience to conduct research. Our innovative group project concerned drone swarm solutions. My individual thesis project was industry-supported. Equally important was the environment. Immensely international and open-minded with people from all around the world, from whom I had a chance to learn and make long-lasting friendships."

Aleksandra Marciniak, Systems and Software Engineer at Rolls-Royce, (Autonomous Vehicle Dynamics and Control 2021)



Reasons to study **Aerospace** with us

1 **Aerospace Integration Research Centre**

Co-funded by Airbus, Rolls-Royce and the Higher Education Funding Council for England, this £35 million collaboration between industry and academia is developing the breakthrough solutions that will radically change the design of aircraft in the future.

2 **Specialist technical facilities**

In addition to our runway, global research airport, wind tunnels, flight simulators and air and space propulsion laboratories, our newest research facility, the £67 million Digital Aviation Research and Technology Centre (DARTEC) addresses the challenges and opportunities in the digital aviation technology field.

3 **From concept to flight**

Our industry-scale production and testing capabilities ensure that our ground-breaking, research-generated design concepts can be taken from the drawing board to the runway.

4 **Global contribution**

Our work embraces the entire spectrum of aviation, combining academic excellence and strong industry focus. We work with leading businesses, including Airbus, BAE Systems, Boeing, Rolls-Royce and Thales directly contributing to the economic growth of the global aerospace sector.

5 **Centre of aerospace excellence**

We are the UK's top destination for aerospace engineering postgraduate students and the largest provider of accredited aerospace degree courses.

6 **Career development**

Our alumni go on to enjoy successful careers in aerospace, space and associated industries. Many senior employees in global aerospace organisations around the world have a connection to Cranfield, as former students, researchers or through our professional development programmes.

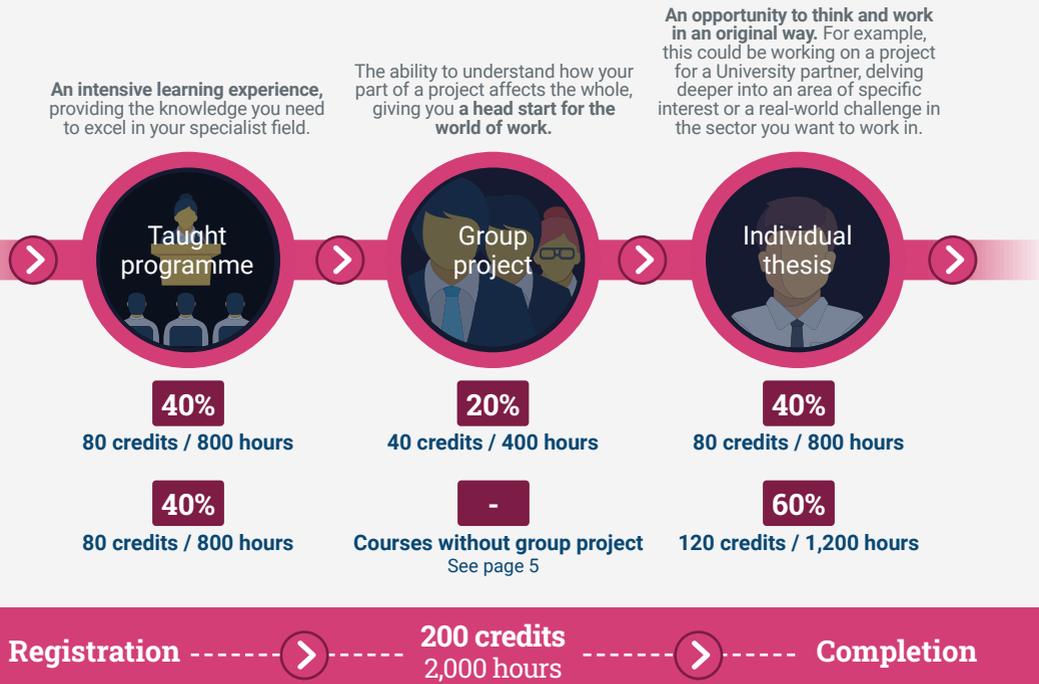


Cranfield graduates are highly sought after by our industry partners.

Course structure

Our specialist, sector-facing master's courses are set up and developed in close collaboration with industry partners, ensuring the content of our courses remain industry-relevant and employers remain impressed with your business-readiness.

This diagram illustrates the typical course structure of many of our full-time master's courses. Please check your course structure online for more detailed information, including the weight of each phase and part-time course structure variations.



Evaluating robot performance for human robot collaboration



Volante Vision Concept. Developed in partnership with Aston Martin, Cranfield Aerospace Solutions and Rolls-Royce.

Industry-sponsored group projects

The group project provides you with invaluable experience of delivering a collaborative piece of work in a team environment. With the assistance of industry, group projects are designed to mimic typical working environments within the sector.

The following courses include a group project:

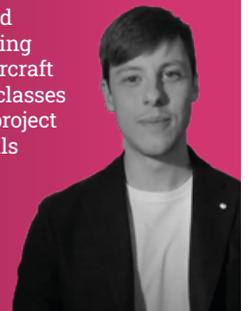
- Advanced Lightweight and Composite Structures MSc,
- Advanced Air Mobility Systems MSc,
- Aerospace Computational Engineering MSc,
- Aerospace Dynamics MSc,
- Aerospace Vehicle Design MSc,
- Aircraft Engineering MSc,
- Applied Artificial Intelligence MSc,
- Astronautics and Space Engineering MSc,
- Autonomous Vehicle Dynamics and Control MSc,
- Aviation Digital Technology Management MSc,
- Computational and Software Techniques in Engineering MSc,
- Robotics MSc.

2022/2023 example projects:

- **Astronautics and Space Engineering MSc:** Our space mission design study is conducted in teams of 10-15 students. It emphasises space systems engineering methodologies and is designed to prepare our graduates for the project-based working environment. Recent group projects have included:
 - Asteroid Sample Return,
 - 5G and Beyond from Space,
 - Space-Based Solar Power.
- **Robotics MSc:** In-To-Net-Bot-2019 group project. Students worked to explore the feasibility of a self-learning ball-catching robot system that can potentially solve logistics and mobility issues in human-robot interaction.

"My experience at Cranfield has been extremely positive and exceeded my expectations. I delivered an interesting group design project working with Airbus on advanced Finite Element simulation techniques for aircraft design, applying the knowledge and competencies I acquired during classes and workshops in a real work environment. My individual research project focused on the design and analysis of novel mechanical metamaterials resulted in my first publication in a top scientific journal."

Guglielmo Cimolai, Simulation Process and Data Management (SPDM) Consultant, Airbus Helicopters, (Advanced Lightweight and Composite Structures MSc 2021)



Courses

Cranfield University is at the forefront of the global aerospace technology industry and has provided world-class postgraduate education and training for over 75 years. With our drive towards net zero, the development of expertise and innovations across multiple fields pertaining to the aviation ecosystem and beyond is critical to success. As the only university in Europe with its own airport, aircraft and air navigation service provider, Cranfield offers a unique opportunity to students to contribute to this globally relevant mission.

The courses described in this brochure are a perfect illustration of the breadth and depth of our aerospace portfolio, providing you with skills and expertise valued around the world. Within a number of courses there are a range of options to suit individual interests.

Modules typically form 40% of the course content, with the group and individual projects making up the other 60%. See page 4 for the course structure and page 5 for which courses include a group project.

This brochure shows the compulsory and (where applicable) some elective modules offered in the 2022-2023 academic year, to give you an idea of course content. To keep our courses relevant and up-to-date, modules are subject to change so please check the latest information on our website.

Aerospace Dynamics

www.cranfield.ac.uk/Aerodynamics • Accredited, see page 16
October intake

MSc, PgCert
Full- or part-time

Focusing on experimental and computational aerodynamics and flight dynamics, this course will give you exposure to hands-on experience with computational modelling and simulation. Among the few institutions involved in experimental hypersonic aerothermodynamics, our unique combination of facilities including aircraft, wind tunnels and flight simulators will prepare you for a career in vehicle design in the aerospace and automotive industries. The course will give you the opportunity to work with key industry partners and gain exposure to potential employers.

Compulsory modules

- Introduction to Aircraft Aerodynamics,
- Flight Experimental Methods.

Electives (choose eight)

- Compressible Flows,
- Viscous Flow,
- Control Systems,
- Fundamentals of Rotorcraft Performance Stability and Control,
- Flight Dynamics Principles,
- Flying Qualities and Flight Control,

- Multivariable Control Systems for Aerospace Applications,
- Air-Vehicle Modelling and Simulation,
- Launch and Re-Entry Aerodynamics,
- CFD for Aerospace,
- Experimental Aerodynamics,
- Aerospace Navigation and Sensors,
- Transonic Aerodynamic Design,
- Fundamentals of Aircraft System Identification,
- Introduction to CFD,
- Modelling of Dynamic Systems,
- Technology for Sustainable Aviation.

Advanced Air Mobility Systems

www.cranfield.ac.uk/AdvAirMobility • October intake

MSc
Full- or part-time

This unique course offers a combination of emerging subjects in aviation, air traffic management, uncrewed traffic management and drone industries. You will gain the skills to support the shift from road travel to new advanced air mobility routes, lowering CO2 emissions, and pursue careers in managerial and advisory roles.

Compulsory modules

- Air Traffic Management Systems,
- Artificial Intelligence for Autonomous Systems,
- Communications Systems,
- Guidance and Navigation for Autonomous Systems,
- Intelligent Cyber Physical Systems,
- Sensor Fusion,
- Systems Engineering,
- Uncrewed Traffic Management.

Advanced Lightweight and Composite Structures

www.cranfield.ac.uk/LWCompStructures • Accredited, see page 16
October intake

MSc
Full-time

With applications in aerospace, automotive, motorsport, marine and renewable energy industries, the course covers topics in structural design and analysis, impact and crashworthiness, materials characterisation and failure and advanced simulation of lightweight metallic and composite structures. Designed to meet the requirement of next generation engineers, you will gain the knowledge and skills to design and develop green and sustainable aircraft, electric vehicles and wind turbine structures to meet ever demanding targets of weight-saving and carbon-reduction without compromising safety.

Compulsory modules

- Advanced Composite Analysis and Impact,
- Advanced Simulation for Impact,
- Crashworthiness,
- Finite Element Methods,
- Introduction to Continuum Mechanics,
- Materials Characterisation and Failure Simulations,
- Structural Stability,
- Thin-walled Structures.

Aerospace Computational Engineering

www.cranfield.ac.uk/AeroCompEng • September intake

MSc
Full- or part-time

This course blends skills-based and subject-specific material to provide you with a unique combination of practical skills and cutting-edge knowledge adaptable to a wide variety of applications in aerospace computational engineering. The course also presents the opportunity for qualified engineers to incorporate CFD into their skill-set.

Compulsory modules

- C++ Programming (Integrated),
- Computational Methods (Integrated),
- Numerical Modelling for Compressible Flows,
- Computational Aerodynamics,
- CAD and Airframe Design,
- Modelling Approaches for Aerospace Applications,
- Computational Engineering Structures,
- Validation and Verification for Aerospace Applications.

Aerospace Vehicle Design

www.cranfield.ac.uk/AerospaceVehicleDesign • Accredited, see page 16
October and March intakes

MSc

Full-time

This MSc focuses on the technical, business and management aspects of aircraft design and development. This world-leading programme will build your knowledge of the design of flying vehicles such as aircraft, missiles, airships and spacecraft and prepare you for an exciting career. There are three specialist options available:

- **Aircraft Design** – a comprehensive overview of aircraft performance, structures and systems.
- **Avionics Systems Design** – understand the design of avionic systems, analysis, development, test and airframe integration.
- **Structural Design** (October intake only) – covers aircraft structures, airworthiness requirements, design standards, stress analysis, fatigue and fracture and fundamentals of aerodynamics and loading.

Modules:	✓ = compulsory module	Aircraft Design	Avionics Systems Design	Structural Design
Aeroelasticity		Elective		Elective
Aeronautical Communication Systems			✓	
Aerospace Software Engineering and Ada			✓	
Aerospace System Development and Life Cycle Model		Elective	Elective	Elective
Aircraft Aerodynamics		Elective	Elective	Elective
Aircraft Performance		✓	✓	Elective
Aircraft Power Plant Installation		Elective	Elective	Elective
Aircraft Stability and Control		✓	✓	Elective
Avionics Air Traffic Control			✓	
Avionics Data Networking, Hardware Integration and Testing			✓	
Cockpit Environment			✓	
Computer Aided Design (CAD)		Elective	Elective	Elective
Control Systems			✓	
Design and Analysis of Composite Structures		✓		✓
Design for Manufacture and Operation		✓		✓
Design of Airframe Systems		✓	✓	Elective
Detail Stressing		Elective		✓
Fatigue, Fracture Mechanics and Damage Tolerance		Elective		✓
Fault Tolerant Avionics Design			✓	
Finite Element Analysis		Elective		✓
Flight Experience		✓	✓	Elective
Inertial and Satellite Navigation Systems			✓	
Initial Aircraft Design		✓	Elective	✓
Integrated Navigation Systems			✓	
Integrated Vehicle Health Management		Elective	Elective	
Landing Gear Design		Elective		Elective
Loading Actions		✓		✓
Modelling of Dynamic Systems			✓	
Radio Systems			✓	
Reliability, Safety Assessment and Certification		✓	✓	✓
Structural Stability		Elective		✓

Notes:

1. To successfully complete the MSc, certain modules are compulsory and hence marked accordingly.
2. You will be required to select some elective modules to meet the total number of teaching hours for the course. These will allow you to customise your studies and aid in your group project and individual thesis. They do not count as credits towards your final mark.

Computational and Software Techniques in Engineering

www.cranfield.ac.uk/CompSWTechEng • September intake

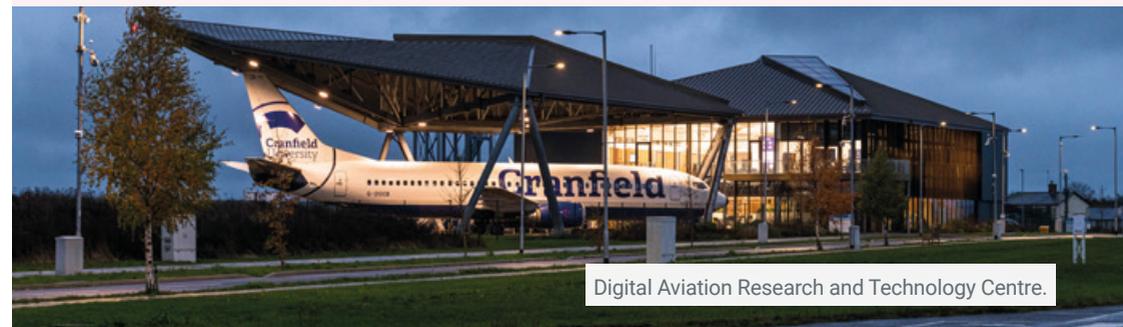
MSc

Full- or part-time

Engineering software development is one of the key areas in the information technology sector. This course equips you with the hands-on skills and up-to-date knowledge adaptable to a wide variety of applications. You can specialise in:

- **Computational Engineering Design** - provides the skills necessary to develop and use core CAD and CAE solution software in diverse industrial settings.
- **Computational Intelligence for Data Analytics** - focuses on the fundamentals of computationally intelligent data handling algorithms and their application in disciplines needing fast and automated decision-making.
- **Computer and Machine Vision** - focuses on aerial and robotic vision-based systems and the theory and application of signal processing and computer vision algorithms.
- **Software Engineering for Technical Computing** - provides a unique insight into the development of computer applications across modern computing environments.

Modules:	✓ = compulsory module	Computational Engineering Design	Computational Intelligence for Data Analytics	Computer and Machine Vision	Software Engineering for Technical Computing
C++ Programming		✓	✓	✓	✓
Management for Technology		✓	✓	✓	✓
Computational Methods		✓		✓	✓
Visualisation		✓		✓	✓
Geometric Modelling and Design		✓			
Digital Engineering and Product Design		✓			
Computational Engineering Structures		✓			
Computational Optimisation Design		✓			
Computational Engineering Fluids		✓			
Signal Analysis				✓	
Digital Signal Processing				✓	
Image Processing and Analysis				✓	
Computer Vision				✓	
Machine Learning (for Computer Vision)				✓	
Requirements Analysis and System Design					✓
Software Testing and Quality Assurance					✓
Small-Scale Parallel Programming			✓		✓
Cloud Computing			✓		✓
High Performance Technical Computing			✓		✓
Advanced Java and Advanced Python			✓		
Machine Learning and Big Data			✓		
Artificial Intelligence			✓		
Internet of Things			✓		



Digital Aviation Research and Technology Centre.

Aircraft Engineering

www.cranfield.ac.uk/AircraftEng • Accredited, see page 16
February intake

MSc, PgDip, PgCert
Part-time

This course is specifically designed for professionals working in engineering or technical management positions in the aerospace industry who wish to study for an accredited master's degree whilst in employment. The course will broaden your understanding of aircraft engineering and design subjects and provide you with a strong foundation for career development in technical, integration and leadership roles.

Compulsory modules

- Initial Aerospace Vehicle Design,
- Major Component Design and Manufacture, Manufacturing,
- Methodologies for Integrated Product Development,
- Tools for Integrated Product Development.
- Detail Stressing,
- Fatigue, Fracture Mechanics and Damage Tolerance,
- Finite Element Analysis,
- Flight Dynamics Principles for Aircraft Engineering,
- Introduction to Aircraft Structural Crashworthiness,
- Introduction to Autonomous Systems,
- Introduction to Avionics,
- Through-life System Effectiveness.
- Technology for Sustainable Aviation.

Electives (choose two)

- Aircraft Loading Actions and Aeroelasticity,
- Aircraft Performance for Aircraft Engineering,
- Design and Development of Airframe Systems,
- Design, Durability and Integrity of Composite Aircraft Structures,

Applied Artificial Intelligence

www.cranfield.ac.uk/AAI • October intake

MSc
Full- or part-time

Artificial Intelligence (AI) technologies are being increasingly adopted across a broad range of industries, creating demand for talented graduates who can help realise the transformative potential. Suitable for individuals from diverse backgrounds in engineering disciplines such as aerospace, mechanical, electronic and electrical, as well as those in computer science and mathematics. With this course you will put into practice AI techniques in real-world environments and work on projects provided by industry partners. Be at the forefront of this revolution, by gaining a cutting-edge combination of theoretical and practical skills, enabling you to work across disciplines and implement AI systems where they are needed.

Compulsory modules

- Data Analytics and Visualisation,
- Deep Learning,
- Ethical, Regulatory and Social Aspects of AI,
- Intelligent Cyber Physical Systems,
- Logic and Automated Reasoning,
- Search and Optimisation,
- Statistical Learning Methods,
- Systems Engineering.

“One of the things that attracted me to study Cranfield University was its remarkable history in aerospace development and research. Joining Cranfield University was a challenge at the same time as being an unbelievable opportunity to develop both my engineering and personal skills. The course is well organised, as the theoretical concepts learned throughout the modules are then applied during practical sessions.”

Enara Martin Garro, Artificial Intelligence Engineer, Promedico,
(Computational and Software Techniques in Engineering MSc 2021)



Astronautics and Space Engineering

www.cranfield.ac.uk/AstroSpaceEng • Accredited, see page 16
October intake

MSc
Full-time

Space activity continues to grow globally, with international efforts under way to return humans to the Moon, and ambitious plans within the UK to play a leading role in the new space age including support for a domestic satellite launch capability. There is a continuing demand for employees with a firm understanding of spacecraft systems engineering and a broad range of specialist technical skills. This course will prepare talented individuals for a wide variety of roles, from Earth observation to planetary exploration and launch vehicles to spacecraft operations, that will shape the future of the space industry.

Compulsory modules

- Astrodynamics and Mission Analysis,
- Space Propulsion,
- Space Systems Engineering.
- Guidance Navigation and Control of Space Systems,
- Mathematics and Programming for Astrodynamics and Trajectory Design,
- Satellite Communications,
- Spacecraft Attitude Dynamics and Control.

Electives (choose two)

- Advanced Composite Analysis and Impact,
- Aerospace Navigation and Sensors,
- Finite Element Methods,



Cockpit environment within a flight simulator.

Autonomous Vehicle Dynamics and Control

www.cranfield.ac.uk/AutonomousVehicleDC
Accredited, see page 16 • October intake

MSc
Full-time

The global market for aerial, ground and marine autonomous vehicles has grown rapidly due to the advancement of drone and driverless car technologies. This course is accredited by the Royal Aeronautical Society (RAeS) and offers a unique combination of modules that places you at an advantage in today's competitive employment market. Suitable for those with backgrounds in engineering, physics and mathematics, you will become conversant in key aspects of autonomy, and will be equipped with advanced skills applicable to the security, defence, marine, environmental and aerospace industries. Cranfield work in partnership with leading industrial companies including: Boeing UK, BAE Systems, Jaguar Land Rover UK, Rolls-Royce and BioCarbon Engineering.

Compulsory modules

- Artificial Intelligence for Autonomous Systems,
- Autonomous Vehicle Control Systems,
- Guidance and Navigation for Unmanned Aircraft Systems,
- Introduction to Unmanned Aircraft Systems,
- Logic and Automated Reasoning,
- Sensor Fusion,
- UAS Dynamics and Control,
- UAS Modelling and Simulation.

Aviation Digital Technology Management

www.cranfield.ac.uk/ADTM • October intake

MSc, PgDip, PgCert
Full- or part-time

This MSc equips professionals with the capabilities to innovate and apply digital technology in the aviation context. It adds the digital component to aeronautical engineering and expands from the design and manufacture foci of established aeronautical engineering programmes to the wider aviation industry opportunities. It can be joined as a route for non-aerospace engineering and computing graduates who aspire to enter the aviation industry. In addition, this course is a career development path for aerospace industry professionals to boost their digital and innovation skills. Course content has been developed in consultation with our Industrial Advisory Board (IAB), comprising leaders from Boeing, Etihad, easyJet, Saab, STS Aviation, SITA, Thales, TUI, and others across the aviation sector.

Compulsory modules

- Aerospace Inspection and Monitoring Tools,
- Aviation Digitalisation,
- Communications and Cybersecurity in Aviation,
- Data-centric Aircraft Systems,
- Digital Aviation Operations and Maintenance Management,
- Digital Aviation Supply Chain Management,
- Digital Engineering,
- Predictive Maintenance Technology.

Computational Fluid Dynamics

www.cranfield.ac.uk/CompFluidDynamics • Accredited, see page 16
October intake

MSc
Full- or part-time

This course enables you to understand, develop and implement CFD across a range of industries. You will learn how to code and implement numerical schemes to solve fluid dynamics problems, and how to apply CFD using commercial and open-source CFD software, tackling turbomachinery and rotorcraft aerodynamics, multi-phase flow and heat transfer, microflows, fluid-structure interaction, environmental flows. The group project simulates a CFD consultancy environment, where you will solve industrial problems across aerospace, automotive or energy sectors.

Compulsory modules

- Introduction to Fluid Mechanics and Heat Transfer,
- Numerical Methods and High Performance Computing,
- Grid Generation / CAD,
- Data Analysis and Uncertainty,
- Numerical Modelling for Compressible Flows,
- Numerical Modelling for Incompressible Flows,
- Turbulence Modelling.

Pre-master's in Engineering

www.cranfield.ac.uk/Premasters • October intake

Full-time

This programme provides an ideal entry route into an engineering MSc and is suited to those looking to change career paths, who need a refresher before getting back into education and for MSc candidates that require additional knowledge and skills before accessing their chosen degree. The course is delivered through a combination of taught modules (lectures, practical laboratory sessions, assignments) and an individual research project covering engineering principles relating to a variety of sectors across aerospace, automotive, offshore and energy. The course will set you up for success in your chosen field of engineering.

Compulsory modules

- Mechanical Design,
- Engineering Stress Analysis,
- Aeronautical Engineering,
- Basic Aerodynamics,
- Propulsion and Power,
- Mathematics I,
- Mathematics II,
- An Introduction to Engineering Materials and Failure Analysis,
- Thermofluids,
- Computer Aided Design (CATIA),
- Computing Course,
- Research Methods.

Robotics

www.cranfield.ac.uk/Robotics • Accredited, see page 16 • October intake

MSc
Full- or part-time

Robots are becoming ubiquitous in industrial environments as well as in everyday life. Industries including automotive, oil and gas, aerospace and energy have significant future growth in the service robot domain. The course provides insight into multiple application domains for intelligent and autonomous robot systems including industry, hazardous environments, health care, domestic/ assistive robotics, and autonomous vehicles. Unique in its focus on human aspects and supported by practical applications, this course will enhance your employment prospects by providing you with relevant theoretical knowledge and practical skills to become a robotics engineer and to meet rising global demand for professionals in this field.

Compulsory modules

- Fundamentals of Robotics,
- Robotics Control,
- Artificial Intelligence and Machine Learning for Robotics,
- Programming Methods for Robotics,
- Human-Robot Interaction,
- Machine Vision for Robotics,
- Autonomy in Robotic Systems,
- Psychology, Ethics and Standards.



Student working on UAV rotor within the Aerospace Autonomy Lab.

Thermal Power and Propulsion

www.cranfield.ac.uk/ThermalPower • Accredited, see page 16
October and March intakes

MSc, PgDip
Full-time

This course provides both fundamental and applied knowledge applicable to the design, operation and maintenance of thermal power and propulsion systems. You will have the opportunity to pursue specialisms across a range of sector applications, contributing to current and future matters related to sustainable propulsion in aeronautics and space, and power generation on land, off-shore and marine.

The course is structured to deliver taught modules within your chosen specialisation as well as providing the opportunity make use of an 8,000 sqm on-site power and propulsion test area. As part of the course, you will undertake an individual research project. Previous projects have been carried out alongside industry partners including BP, Clean Sky, easyJet, Lufthansa Technik, Rolls-Royce, Shell and many other key organisations.

The programme gives you the opportunity to pursue your own specific interests and career aspirations through five specialist options:

- **Aerospace Propulsion (AP)** - for those seeking a career in the design, development, operation and maintenance of propulsion systems.
- **Gas Turbine Technology (GTT)** - examines the increasing application in power generation, oil and gas pumping, chemical processing and power plants for ships and other large vehicles.
- **Marine Propulsion Technology (MPT)** - develop skills in the design, development, operation and maintenance of marine propulsion systems.
- **Power, Propulsion and the Environment (PPE)** - prepares you with a thorough knowledge of, and the ability to, assess anthropogenic emissions.
- **Rotating Machinery, Engineering and Management (RMEM)** - provides you with design and operational skills for rotating equipment in aeronautical, marine, oil, power and process industries, and other surface applications.

	AP	GTT	MPT	PPE	RMEM
✓ = compulsory module AO = Attendance only E = Elective module					
Modules:					
Combustors	✓	✓	✓	✓	✓
Engine Systems	✓	✓	✓	✓	✓
Gas Turbine Performance Simulation and Diagnostics	✓	✓	✓	✓	✓
Turbomachinery and Blade Cooling	✓	✓	✓	✓	✓
Mechanical Design of Turbomachinery	✓	✓	AO	E	✓
Gas Turbine Operations and Rotating Machines		E	✓	✓	✓
Management for Technology	✓	✓	✓	✓	✓
Computational Fluid Dynamics for Gas Turbines	AO	E	AO	E	AO
Propulsion Systems Performance and Integration	✓	E		E	
Jet Engine Control	AO	E		E	
Marine Propulsion Systems Integration		E	✓	E	AO
Space Propulsion	AO	E		E	
Propulsion Electrification	AO	E	AO	E	AO

Notes:

1. To successfully complete the MSc, certain modules are compulsory and hence marked accordingly.
2. For the options Aerospace Propulsion and Rotating Machinery, Engineering and Management the credits from compulsory modules total to 200.
3. For the options Gas Turbine Technology and Power and Propulsion and Environment the credits from compulsory modules total to 90 and to achieve 100 credits from the taught modules, an elective (10 credits) has to be selected and completed from the options available.
4. All non-compulsory modules may be attended, timetable dependent, regardless of option choice.
5. Visit the course webpage for further details.



Student experience flight

Selected aerospace MSc courses offer the opportunity to experience a flight in our National Flying Laboratory Centre's (NFLC) light aircraft.

This flight experience will complement your MSc studies and inspire your aeronautical career. During the flight you will have the opportunity to take control of the aircraft.

Each experience is three hours in duration and includes a pre-flight safety briefing outlining the details of the manoeuvres to be flown, a flight of approximately one hour, and a post-flight debrief to discuss aspects of the flight with the instructor and to provide the opportunity to ask further questions. The following courses offer this experience:

- Aerospace Dynamics MSc,
- Aerospace Vehicle Design MSc,
- Astronautics and Space Engineering MSc,
- Safety and Human Factors in Aviation MSc (see separate brochure).



Students fly in the Saab 340B aircraft.



Outdoor study areas.

Accreditation

Some of our courses are accredited by one or more professional engineering institutions on behalf of the Engineering Council as meeting the requirements for further learning for registration as a Chartered Engineer.

Candidates must hold a CEng accredited BEng/BSc (Hons) undergraduate first degree to comply with full CEng registration requirements.

You can check the accreditation status of this or any other degree programme at www.engc.org.uk/acad or visit the course webpage for further details.



Key facts and statistics

Course information



Full-time
One year



Part-time
Up to three years

See the course page for more information about part-time study.



Start date
Various

See individual course for details.



MSc/PgDip/PgCert

Not all courses offer all awards, see course information for details of awards offered.



Fees

Please see the individual course pages on our website for full fee information and full-time or part-time options. Terms and conditions apply.

See www.cranfield.ac.uk/fees

Cohort profile*



Geographic spread
20% UK
80% International



Countries
60



Average cohort age
19-29 years



Average cohort size
20-40



80% Male
20% Female

*These figures give an indication of the course make-up at registration across our Aerospace programme for the entry year 2022/2023.

"Cranfield University's connection to industry further rekindled my drive to make an impact as students have numerous opportunities awaiting them even before graduating. The group design project is an important part of the master's at Cranfield and it positively enhanced my teamwork, time management and presentation skills. Our project - UAV (Unmanned Aerial Vehicle) SWARM Challenge - was sponsored by BAE Systems. Cranfield is a formidable institution contributing to local, national and international development and I am proud to be associated with it."

Rabiyat Ajibola Usman,
(Applied Artificial Intelligence MSc, 2020)



Industry links

Cranfield has unrivalled links with industry. Our students benefit from our extensive contacts and track record of close collaboration with Government and the aerospace sector. These links include industrial advisory panels and project sponsors.

Industrial advisory panel

Our courses are reviewed each year by a panel of industry experts to ensure that students graduate from Cranfield with the appropriate knowledge and skills to become future leaders in the industry.

Some of the companies represented on our aerospace courses industrial advisory panel include:

AIRBUS

BAE SYSTEMS

BOEING

THALES
Building a future we can all trust

Project sponsors

The group and individual projects that you will take as part of your course are often run in collaboration with our industrial partners.

More information about group projects can be seen on page 5 and some of our partners are shown on the back cover of this brochure.

“Boeing’s long-standing partnership with Cranfield University includes a range of projects across aviation, aeronautics and aircraft development. It is testament to our strong ties that many Boeing employees study at the University, gaining the technical skills and experience to become industry leaders. As a Cranfield graduate myself, I feel equipped with the confidence, skillset and knowledge to develop my career and achieve my end goals.”

Gary Gardner, Engineering Career Foundation Program, Boeing UK



Careers

Our multidisciplinary approach, marrying aeronautical engineering, materials and manufacturing excellence with aviation business processes, practices and management, gives our graduates notable breadth and depth of expertise. It is this combination of technical excellence and real-world business and commercial appreciation that gives our graduates a unique identity and value in the marketplace.

Graduates go on to forge careers in the aerospace, energy, automotive, space and defence sectors. Here are some examples of the type of roles our graduates have gone on to, and the organisations they work for:

Roles:

- Aerodynamics Engineer,
- Aerospace Engineer,
- Computational Fluid Dynamics Engineer,
- Consultant Engineer,
- Design Engineer,
- Flight Test Engineer,
- Fuel System Engineer,
- Mechanical Engineer,
- Performance Engineer,
- Project Manager,
- Research and Development Engineer,
- Robotics Engineer,
- Senior Systems Engineer,
- Stress Engineer,
- Structural Integrity Engineer,
- Systems Engineer,
- Turbine Designer.

Organisations:

- Airbus,
- Alpine F1 Team,
- Alstom,
- Altran,
- Avanti Communications,
- BAE Systems,
- Boeing
- Dassault Aviation,
- General Electric,
- GKN Aerospace,
- PETRONAS,
- Quest Global Engineering,
- Rolls-Royce,
- Safran,
- Siemens,
- Thales.



Aerospace Integration Research Centre (AIRC).



Open laboratory in AIRC.

Academic staff

You will be taught by a wide range of subject specialists from the University and industry professionals who draw on their research and industrial expertise to provide stimulating and relevant input to your learning experience. Here are just a few of our teaching staff:



Professor Karl Jenkins, Head of Centre for Computational Engineering Sciences

Karl is Head of the Centre for Computational Engineering Sciences and is the Programme Director for the master's in Aerospace Computational Engineering, Computational and Software Techniques in Engineering and Computational Fluid Dynamics. He leads research activity in computational engineering with particular expertise in high-fidelity simulations and modelling. He contributes to the UK Consortium on Turbulent Reacting Flows and won the Gaydon prize in 2004.



Professor Vassilios Pachidis, Head of Centre for Propulsion and Thermal Power Engineering

Vassilios is also the Director of the Rolls-Royce University Technology Centre in Aero Systems Design, Integration and Performance, and the Head of the Air and Space Propulsion Institute. He has taught more than 700 postgraduate students and supervised over 165 MSc to completion. Published widely, he holds joint patents filed with Rolls-Royce.



Professor Antonios Tsourdos, Head of the Centre for Autonomous and Cyber-physical Systems

Antonios was appointed Head of the Centre for Autonomous and Cyber-physical Systems at Cranfield in 2007, Professor of Autonomous Systems in 2009 and Director of Aerospace Research in 2015. He leads the research on autonomous systems and has diverse expertise in both unmanned and autonomous vehicles as well as networked systems and space and astronautics.



Professor Phil Webb, Head of Centre for Robotics and Assembly

Phil was appointed Head of Centre in 2012 and since September 2009 has held the Royal Academy of Engineering and Airbus Chair in Industrial Robotics and Assembly. His research focuses on the implementation of large-scale advanced robotics in the aerospace manufacturing industry with a particular emphasis on human in the loop applications. He established and currently leads a significant portfolio of research supported by industrial scale facilities bringing together robotics, computer science and human factors to develop and deploy advanced robotics technologies across multiple application domains.



Professor Mark Westwood, Head of Centre of Aeronautics

Mark has spent his early career at QinetiQ, working primarily in aerospace research and development across a range of civil and military technology demonstrator programmes. In 2010, Mark was appointed as Head of Systems Engineering for Air Division within QinetiQ, responsible for a team of systems engineers working across a wide range of technology projects. Mark joined the Transport Systems Catapult in 2015 to lead projects developing automated and autonomous vehicle technologies, before moving onto the position of CTO where he led the Catapult's activities in drones, advanced air mobility and zero emissions aviation, then joining Cranfield in 2021 as Head of Centre for Aeronautics.

More than a degree with the Cranfield Enhance programme

Cranfield graduates are valued for their distinctive skills and capabilities. We have developed these programmes to complement and enhance what you learn on your chosen qualification. On the Cranfield Enhance programme, you will be able to earn 'digital badges' in areas such as Employability, Entrepreneurship, Sustainability and Outreach to showcase your new skills to prospective employers.

Read more at www.cranfield.ac.uk/enhance

Financing your studies

If you need advice on funding your course or living costs, we can provide information and a range of online tools to help you put together the funding package you need.

There is more information on our website:
www.cranfield.ac.uk/funding

How to apply

Read more about our entry requirements and how to apply:
www.cranfield.ac.uk/apply



Meet us



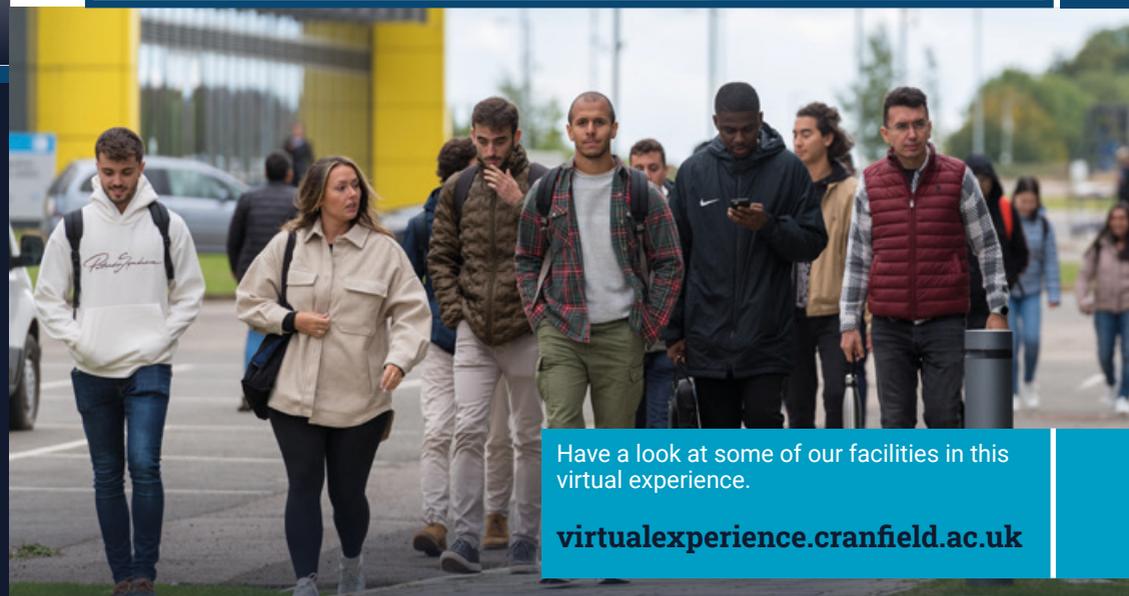
We look forward to meeting you at our Open Day, events or webinars at Cranfield, around the world or online.

www.cranfield.ac.uk/events

A welcoming, professional campus community

Located just over an hour from London in the English countryside, Cranfield's campus environment supports close, working relationships between our multinational postgraduate students and academic and industry experts.

www.cranfield.ac.uk/visit



Have a look at some of our facilities in this virtual experience.

virtualexperience.cranfield.ac.uk

“With every day at Cranfield, the University always surprises me with its outstanding research facilities, the quality of the course and also the support I've received. From the flight engineer test research in the new Saab 340B aircraft, to the flying experience in Slingsby T67 Firefly, plus my thesis on Rolls Royce's Future Systems Simulator, it has all enhanced my technical skillset and trained me at an industrial benchmark to start a progressive career in the Aerospace industry.”

Jeet Makadia, Model Based Systems Engineer, Rolls-Royce on behalf of ALTEN, (Aerospace Dynamics MSc 2021)



Cranfield University works with over

1,500 businesses and governments
based in over 40 countries

These organisations include:

AIRBUS

BAE SYSTEMS

BOEING

EASA
European Aviation Safety Agency

SAAB

SAFRAN

THALES
Building a future we can all trust

Other courses you may also be interested in:

Aerospace Manufacturing MSc

Aerospace Materials MSc

Airport Planning and Management MSc

Air Transport Management MSc

Airworthiness MSc

Military Aerospace and Airworthiness MSc

Safety and Human Factors in Aviation MSc

For a full list of Cranfield courses, please see our prospectus and website.

www.cranfield.ac.uk/aerospace

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blogs.cranfield.ac.uk

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