

The University of Manchester

## Aerospace Engineering

2020 Undergraduate brochure

## Aerospace Engineering at Manchester

We have outstanding laboratory facilities and our students get to work with world-leading academic staff who deliver teaching inspired by cutting-edge research.



Professor Alice Larkin Head of Department

# What is Aerospace Engineering?

Aerospace engineers take on a range of technological and managerial challenges from designing, building and manufacturing complex equipment, to managing large and complex human enterprises. And of course they are involved in creating and designing aircraft and spacecraft as well as flying and operating airlines. The diverse nature of the industry makes aerospace engineering one of the most dynamic and exciting sectors of the British economy. Aerospace engineering deals with designing and building machines that fly, and is therefore one of the newest branches of engineering which began in the 19th century with the first experiments in powered flight. Engineers in the aerospace industry are involved in designing aircraft, such as powered lighter-than-air craft, gliders, fixed wing airplanes and jets, autogyros and helicopters as well as astronautical engineering, which focuses on the design and development of spacecraft.



## **Open days**

Our open days provide an opportunity for you and your family to visit not only our Department but also the wider University.

During your visit you'll have the opportunity to talk to staff and current students, find out more about courses and subjects,

## visit labs and take part in demonstrations.

If you aren't able to visit us in person, why not take a look around the Department and hear from some of our staff and students on our Virtual Open Day?

www.mace.manchester.ac.uk/study/ open-days



## Facilities & resources

## Our well-equipped laboratories include state-of-the-art facilities such as:

- Flight simulation
- Wind tunnels (both sub-and super-sonic)

Our courses are taught through a mixture of lectures, tutorials, example classes and laboratory sessions, supplemented by extensive online resource.

• Space environment testing laboratories

### Extensive workshop and manufacturing capabilities.



Using our unique experimental and numerical facilities, you will be taught by world-leading experts across a broad range of aerospace engineering topics.

Dr Mark Quinn Lecturer in Aerospace Engineering







## Learning support

### Peer support scheme

Our peer support scheme is one of the largest in Europe. Peer mentors are higher-year students on the same degree programme as you, who will help you find your feet when you arrive here and adjust to student life. As they'll have already been a student at Manchester for at least a year, they should be able to help you with anything you might be worried or unsure about.

### **PASS** (Peer Assisted Study Sessions)

All our first year students have a PASS group who they meet with weekly. Led by volunteer students, PASS sessions will often be based around a specific area of study. You'll have the opportunity to consolidate and build on your existing knowledge through discussion with other students in an informal and supportive environment where you can compare notes, analyse, ask questions and talk through ideas.



### Academic advisers

Our students are assigned an academic adviser who is there to give advice about any academic issues throughout the duration of the course. Your adviser will be able to help you with the transition from school or college to university – and can help you get to grips with studying and learning more independently. They'll also be able to help you develop your skills in academic writing or research, or any other skills that are specific to your degree programme.

### **Student welfare**

Our Department has a dedicated Student Welfare team who are available to help and support with any queries, worries or issues you may face and provide advice and guidance around pastoral issues.

## **Disability support**

If you have additional needs arising from a medical condition, physical or sensory disability, a specific learning disability such as dyslexia, or a mental health difficulty that affects your study, we can provide support. Contact or visit our Disability Advisory and Support Office before you apply, to discuss your needs and the support available.

www.manchester.ac.uk/dass

Find out more about the personal and academic support available to you throughout your studies: <a href="https://www.manchester.ac.uk/study/experience/student-life/university/student-support">www.manchester.ac.uk/study/experience/student-life/university/student-support</a>



### How to apply

All applications for entry onto our undergraduate courses are made online through UCAS, where you should include details of your qualifications and your personal statement. A teacher or tutor will then provide a reference and details of any predicted grades.

We do not hold interviews as part of our admissions process, however if we have any queries about your application or qualifications, we will contact you by email to request further information in order to consider your application.

www.manchester.ac.uk/study/ undergraduate/applications

Please note that the course units listed in this brochure only represent a sample of the full breadth of available units for each course. Units are reviewed on an annual basis and as such may vary slightly to those advertised.

For up-to-date course information, including unit detail and entry requirements in full, visit our course finder: www.manchester.ac.uk/undergraduate

## Typical offer

## BEng

A-level: AAB including Mathematics and Physics

**IB:** 35 points including 6,6,5 at Higher Level to include Mathematics, Physics and one other subject and 5 in English Language at Standard Level

## MEng

A-level: AAA including Mathematics and Physics

**IB:** 36 points including 6,6,6 at Higher Level to include Mathematics, Physics and one other subject and 5 in English Language at Standard Level

For full details of our entry requirements: www.manchester.ac.uk/ugcourses

## **Our courses**

Aerospace Engineering	BEng	3 years
	MEng	4 years
Aerospace Engineering with Industrial Experience	MEng	5 years
Aerospace Engineering with Management	MEng	4 years



## Which course?

## **Choosing your course**

Studying for one of our degrees means gaining the opportunity to enhance your employability by taking on valuable, exciting industrial experience.

Our Master of Engineering (MEng) is a four-year course. The addition of a fourth year includes options for more specialised topics and a major group design project.

The MEng can be extended to five years of study with the extra year spent in industry, enabling you to graduate as an experienced engineer.

## **Industrial experience**

Competition in the graduate job market has risen dramatically over the last ten years, and students are increasingly looking for ways to differentiate themselves.

An excellent way to do this is by choosing an industrial placement as part of your degree course. This involves spending a year working in industry, typically after your third year of study. As well as the salary that you earn during your placement, you also gain practical experience that can be invaluable both in your final-year project and when competing for graduate jobs.

## With management

Many professional engineers will find themselves in positions of responsibility. Projects must be planned, costed and managed, and products must be designed, manufactured and marketed in the real world. An engineer is thus often required to possess skills in management, decision-making and finance.

We collaborate with the Alliance Manchester Business School in order to offer degree courses with management, which provides our students with additional knowledge and skills in engineering management.

Read more about industrial placements and studying with management: www.mace.manchester.ac.uk/study/undergraduate/industrial-experience



# Aerospace Engineering

Our courses prepare you for professional careers in the aerospace industry (design, development, testing and operation of vehicles and systems), as well as in other areas, such as research, management, technical development and finance.

We aim to instil not just a theoretical knowledge of engineering science, but also a solid base of practical skills, an understanding of design, comprehension of the commercial world and competence in transferable skills (problem solving, teamworking, creativity and IT).

The second year of the course includes a short Flight Test Course, whilst in the third year all students undertake a significant individual project. For those on the MEng programme, year 4 includes a substantial group design project.

## **Course overview**

- Our degrees follow a flexible common pathway during the first two years which allows transfer between the BEng and MEng, subject to academic performance
- Developed in consultation with industry to ensure our graduates are prepared for professional careers in the aerospace industry
- Excellent facilities, including wind tunnels, flight simulation, space environment testing laboratories and high-spec computer clusters
- Wide range of enguiry-based learning gives our graduates particular strengths in teamworking, creativity and adaptability.

Year Sample course units



- > Mechanics and Materials
- > Space Systems 2 > Aircraft Performance & Stability > Modelling & Simulation
- > Aerospace Propulsion 3 > Flight Dynamics > Control Engineering
- > Spacecraft Systems Δ > Helicopters
  - > Acoustics & Advanced Vibrations

Engineering is all about practical problem solving; our courses integrate a wealth of practical experience with key theoretical concepts.

**Dr Katharine Smith** 

BEng 3y H400 UCAS code MEng 4y H402



## Aerospace Engineering with Industrial Experience

This course aims to give students a comprehensive knowledge of engineering science and a strong base of practical skills. The course will develop competence in transferable skills, particularly teamworking, creativity and adaptability, as well as enabling students to specialise in advanced aerospace engineering topics.

In the third year, all students undertake a significant individual project and in your final year you'll undertake a substantial group design project.

The year in industry gives students the ability to bring work experience into their studies and an appreciation of the application of engineering science in the workplace.

Our MEng course gives you hands-on industrial and commercial experience to boost your career prospects and therefore our graduates are well prepared to take up leadership positions in a successful career in industry.

### **Course overview**

- Five-year integrated master's degree which includes a placement year working in industry
- Provides the opportunity to gain valuable work experience and boost your employability
- Opportunity to apply skills developed to engineering practice during your undergraduate degree.



 Introduction to Aircraft Design
 Fluid Mechanics and Thermodynamics

Sample course units

Year

- > Mechanics and Materials
- 2 > Space Systems > Aircraft Performance & Stability
  - > Modelling & Simulation
- 3 > Aerospace Propulsion
  > Flight Dynamics
  > Control Engineering
- Year in Industry
- 5 > Spacecraft Systems > Helicopters > Acoustics & Advanced Vibrations

## Aerospace Engineering with Management

Engineering is not just about technology. It is about people, companies, manufacturing and commerce.

Engineering decisions must normally be made within a commercial context and engineers are often found in senior management positions where they are required to be leaders and strategic planners, as well as problem-solvers and designers.

Combining engineering with management produces a lively, interesting and multidisciplinary degree, with excellent career prospects for graduates.

You'll emerge from this degree as a well-rounded graduate with not only a solid engineering training, but also a useful insight into the commercial world. In the third year all students undertake a significant individual project and in your fourth year you'll undertake a substantial group design project.

This course equips you for a wide range of careers, including general management and sales, as well as jobs in more technical fields.

## **Course overview**

- Four-year integrated master's degree in Aerospace Engineering coupled with specialism in business, finance and project management
- Focus on development of both theoretical and practical engineering skills
- Wide range of enquiry-based learning gives our graduates particular strengths in team working, creativity and adaptability.

UCAS code MEng 4y H4ND ROYAL ASSOCIATY

### Year Sample course units

- 1 > Introduction to Aircraft Design
  - Fluid Mechanics and Thermodynamics
  - > Mechanics and Materials

 > Space Systems
 > Aircraft Performance and Stability

> Marketing

2

3

> Aerospace Propulsion
 > Flight Dynamics



- > Spacecraft Systems
- > Helicopters> Risk Management

We utilise our strong links with the aerospace industry to ensure our students are exposed to real engineering problems.

**Dr Nicholas Bojdo** Lecturer in Aerospace Engineeri

## **Career opportunities**

Aerospace Engineering graduates from The University of Manchester :

**70% 20%** Further study

## Salaries

UK average	£23,000
UK Aero Eng	£24,818
UoM Aero Eng	£26,847

## What our graduates do:

## Where our graduates work:

Aerospace Business Development	Ro
Specialist	BA
Methods Engineer	Air
Composite Manufacturing Engineer	Jao
Asset Management	GE
	Bri

Rolls Royce	
BAE Systems	
Airbus	
Jaguar Land Rover	
GE Aviation	
British Airways	
UTC Aerospace Systems	







## Women in engineering

Very few engineering departments around the world are led by a female academic who holds diversity and equality as central values. Under the direction of Professor Alice Larkin, our Department is driving forward rapidly with a range of initiatives to improve diversity and representation of female staff and students. Our students are taught and inspired by our female staff, we hold networking events and talks to celebrate women in engineering, and we run award-winning peer-to-peer mentor schemes where gender balance is a critical part of ensuring a positive experience for all our students.

Read about our Women of Wonder: www.se.manchester.ac.uk/people/women-of-wonder

Watch the stories of some of the women in our Faculty: www.mub.eps.manchester.ac.uk/scienceengineering/2017/03/06/women-of-wonder Misconceptions you may hear about women in engineering might include: 'they won't find it interesting', 'they wont be so good at the creative and practical elements', or, 'they won't be physically strong enough to conduct activities in workshops and with machinery' - all nonsense!

The future looks bright for women in engineering. The workplace is changing rapidly, and increasingly engineering organisations are recognising the huge value in having a diverse workforce. Furthermore, the societal importance of engineering, and ensuring that there are clear opportunities to make a difference, is helping to inspire more women to take up this exciting and impactful career path.

Diversity is a great thing – and one that can only benefit engineering and help to solve societal challenges. At the moment, the majority of engineering graduates are male – but it doesn't have to be that way. Come to Manchester and be a part of that change!

## Make your mark with Stellify

I wanted to try something completely new. Transforming unused and overgrown land into areas where fruit and vegetables can be grown gave my volunteering an environmental focus.

Volunteering is a different experience from study. For me, as a chemical engineering student, it's enabled me to think outside my discipline, which by its nature is very technical.

Here at Manchester, volunteering is embedded in the very heart of the University's culture – there are so many opportunities to try something new, which in turn can have such a positive impact on our communities.



MEng Chemical Engineering with Industrial Experience

Alessia Xu

Read Alessia's story at: www.manchester.ac.uk/make-your-mark At Manchester you'll find a whole host of transformational academic and extracurricular activities to help you stand out and make your mark on the world. You could even prove your abilities to potential employers by gaining a prestigious award.

We call this process **Stellify**: to change, or be changed, into a star.

**Stellify** offers you opportunities to develop and grow at a university leading the way in social responsibility. Here's how.



### Learn without boundaries

 Enjoy interdisciplinary, international and entrepreneurial study options outside your course.

## Understand the issues that matter

Become ethically, socially and politically informed on some of humanity's most pressing global issues.



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### Make a difference

Contribute to and learn from local and global communities through volunteering.



### Step up and lead

Gain confidence and experience by assisting and inspiring your peers.

## $\sqrt{2}$

### Create your future

Explore countless opportunities for professional career development.

## STELLIFY

www.manchester.ac.uk/stellify

## Manchester engineering campus development

A world-leading campus for teaching, learning and research, providing a brand new home for the next generation of engineers and material scientists.

It's a playground for engineers! It's got facilities and spaces - some social, some very technical - to let you work with other people to do some really amazing things.

Its workshops and lab spaces will become amplified centres of creativity, innovation and identity, allowing students to solve problems collaboratively to reflect the way industry works.

Learning will not be confined to the classroom – it will deliver a variety of adaptable and innovative learning spaces, recognising that there is no one right teaching and learning style.

Engineering is about creativity and the first thing you will see when you come into the building is students 'making' and 'doing'.

Our new campus reflects our pride in Manchester's rich academic and civic heritage, while showcasing our ongoing evolution of education and research.



### The University of Manchester

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This brochure was printed in 2019 for the purposes of the 2020 intake. It has therefore been printed in advance of course starting dates and for this reason, course information may be amended prior to you applying for a place. There are a number of reasons why changes to course information and/or published term dates may need to be made prior to you applying for a place – more details can be found on our website. Prospective students are therefore reminded that they are responsible for ensuring, prior to applying to study, that they review up-to-date course information by searching for the relevant course at:

### www.manchester.ac.uk/undergraduate/courses

Further information describing the teaching, examination, assessment and other educational services offered by The University of Manchester is available at:

### www.manchester.ac.uk/undergraduate

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