Aeronautical and Automotive Engineering

School of Aeronautical, Automotive, Chemical and Materials Engineering
Loughborough University is regarded as one of the best institutions in the UK to study Aeronautical Engineering and Automotive Engineering.

Our reputation for pioneering and topical research is built on a rich and successful history, with programmes dating back to 1919. So, by choosing Loughborough as your destination to study, you can draw on the wealth of experience and expertise acquired throughout the department’s 100 years of excellence.

Today, our course content remains industry relevant and research driven, thanks to the active involvement of our academics in leadership roles across the aircraft, aerospace and automotive sectors. Your learning will be driven by expertise from leading research groups in these fields and will benefit from our close working links with BAE Systems, Caterpillar, Ford Motor Company, Jaguar Land Rover, Lotus, Rolls-Royce and more.

You will get the opportunity to acquire practical experience with access to state-of-the-art tools and industry-standard software and complete either a week-long flight test or professional-level vehicle test, providing you with valuable hands-on experience.

You may also choose to undertake a year working in industry, which will provide you with the opportunity to gain vital paid-work experience in a professional environment boosting your graduate employability prospects.

Studying at Loughborough is an enriching and valuable experience that opens routes to many career possibilities. We aim to realise the potential of all our students, and to help you find your place in the busy, exciting and fulfilling world of engineering.

Welcome

Professor Martin Passmore
Head of Aeronautical and Automotive Engineering

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To help you prepare for your future career we place great importance on practical experience, and that is why our courses are embedded with real-life projects, giving you the opportunity to boost your knowledge and skill set.

**Flight test course**
As part of the BEng and MEng Aeronautical Engineering course you will take part in a week-long flight test. You’ll see how the theories and calculations you learn during lectures apply to real flight dynamics and gain valuable first-hand experience of testing and flight procedures in a Saab 340B aircraft.

**Professional level vehicle testing**
As part of the BEng and MEng Automotive Engineering course you will take part in a week-long vehicle testing course at the Motor Industry Research Association (MIRA) proving ground.
You’ll test your theoretical understanding in a series of practical tests on production vehicles, helping you gain a broader understanding of the subject and an insight into the world of the professional engineer. Previous students have worked on real vehicle experiments including ISO drive-by-noise of a Lotus Evora and data analysis with our dedicated instrumented test vehicles.

**Formula Student**
Formula Student is Europe’s most established educational engineering competition backed by industry and high-profile engineers. Each year, Formula Student sees over 100 university teams, studying various degree programmes from across the world, compete in the design, build and test of a racing car. It is viewed by the motorsport industry as the standard for engineering graduates to meet – combining practical engineering experience with soft skills including business planning and project management.
Whilst involvement is voluntary, participation always proves to be an enriching, social and challenging experience.
As part of the Automotive Engineering MEng course, in your third year you can undertake the Automotive Group Project, designing, engineering and testing the Formula Student Car.
Find out more at www.lomotorport.com

**Women in Engineering**
In 1919, four female engineering students were admitted onto an entirely male dominated engineering programme at the then, Loughborough Technical College. 100 years on and Loughborough University continues to celebrate women in engineering – through our annual memorial lecture dedicated to Claudia Parsons, one of the original four students. The University is a strong advocate for women in Science, Technology, Engineering and Mathematics (STEM) – creating a professional network of female engineers, celebrating women in engineering and showcasing what can be achieved in the field for future engineers.
The Loughborough Women’s Engineering Society (WES) offers support, networking and volunteering opportunities for all students. Many of our engineering departments have achieved Athena SWAN awards, recognising our commitment to advancing women’s careers in engineering.
Read more at: lboro.ac.uk/engineering/engineering-centenary
“During my placement I worked at the British luxury car maker, Aston Martin Lagonda. I worked in the Advanced Manufacturing Department and got involved with the design process to build the vehicles, but also the practical element of helping to resolve any issues on the physical factory line. I really enjoyed getting a chance to see both sides of the engineering discipline.”

Hannah
Automotive Engineering BEng

If you are looking for hands-on industry experience with some of the world’s top companies, our School is the place for you.

All students are given the option to undertake industrial training with a placement year. During your placement year, you will work towards one of three Diplomas, Diploma in Industrial Studies (DIS) or Diploma in Professional Studies (DPS), both of which count as an additional qualification to your degree. Some students may opt to complete a Diploma in International Studies (DIntS) for work completed outside the UK. This year of practical work gives you a clearer understanding of the industry, helping with the later stages of your study and deciding your future career direction.

You will be supported by dedicated staff in securing a placement that best suits your skills and professional aspirations.

During the placement year, your employer will nominate an industry specialist who will supervise you. You will also be visited by your University tutor at your place of work and will be required to write reports on your progress and experience.

The value of a placement year:
- Improved career prospects. A placement gives you real life experience that will help you stand out when applying for jobs. It can often lead to sponsorship during the final year of your course and a job offer upon graduation.
- Salary. Most placements are fully salaried, with average salaries from £15,000 to £20,000.
- Additional qualification. An additional diploma is awarded upon successful completion of a placement year.
- Professional skill development. A placement year helps you develop your skills in time management, team working, presentation skills and project management that will be essential for your future career.
- Put your knowledge to the test. It is your chance to put your knowledge gained during your degree into practice within a professional environment and get a feel for your future role.

A selection of the companies providing recent placements include:
- Airbus
- AMG Petronas
- BAE
- Bentley
- Cummins
- Ford
- General Motors
- Jaguar Land Rover
- JCB
- Lockheed Martin
- Lotus
- Marshall Aerospace
- McLaren
- Red Bull Racing
- Robi Williams Racing
- Rolls-Royce
- Toyota
- Triumph

We also offer a variety of postgraduate degrees in the Department of Aeronautical and Automotive Engineering. Find out more: lboro.ac.uk/aae

Engineer your career

A selection of the companies providing recent placements include:
- Airbus
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MORE ENGINEERING STUDENTS ON PLACEMENTS THAN ANY OTHER UK UNIVERSITY
HESA UK STUDENT RECORD 2016/2017: ENGINEERING & TECHNOLOGY

MORE ENGINEERING STUDENTS ON PLACEMENTS THAN ANY OTHER UK UNIVERSITY
HESA UK STUDENT RECORD 2016/2017: ENGINEERING & TECHNOLOGY

15%
Inspiring graduates

Your time at Loughborough will form a launchpad from which you can build an exciting career. With so many opportunities available, you’ll never be short of ways to improve your employability prospects.

Engineers have some of the top earning starting salaries due to the unique and specialist skill set. Chartered Engineers and Commercial Managers command even higher salaries and once you have reached this status you can expect to earn a salary of over £50,000 per year.

Our degree programmes provide you with a diverse skill set that include project management, communication, teamwork, leadership, critical thinking and analysis. These skills, combined with your specific, technical expertise, will set you up for a successful career.

The University holds its own engineering-specific careers fair. In recent years, this has had over 70 companies attending specifically to employ our students. This includes major consulting and contracting companies as well as more local and specialist firms.

Careers Network
Our award-winning Careers Network team is here to help and support you, offering everything from CV workshops, one-to-one advice sessions and mock interview practice sessions to high-profile employer events. We’ve got everything you need for a successful future.

Find out more: lboro.ac.uk/services/careers

Luke
Aeronautical Engineering MEng
Graduate Vehicle Systems Engineer: BAE Systems

I joined the BAE Systems Graduate Development Scheme and for the first two years I went on rotations around the business, which included working on the Eurofighter Typhoon and the Future Combat Air System.

I help to develop new unmanned air vehicles by developing and integrating key aircraft flight systems including the air data, ice protection and flight control actuation systems. This involves working closely with wider departments including aerodynamics, design and external suppliers to understand the possibilities given technical, programme and commercial considerations.

BAE Systems is a fantastic place to work with so many opportunities available to suit your individual interests and development needs. My studies at Loughborough have provided me with the necessary mix of technical and soft skills that have been vital in allowing me to pursue an interesting and rewarding career.

Recent graduate destinations include:

91% OF RECENT GRADUATES IN WORK OR FURTHER STUDY
DLHE 2016/17

£27,000 AVERAGE STARTING SALARY
DLHE 2016/17
Outstanding facilities

Our £14 million state-of-the-art facilities allow you to use some of the UK’s best aeronautical and automotive equipment.

STEMlab
A £17 million investment in a new state-of-the-art facility and part of a wider £25 million investment in our campus, which includes an adjacent student learning and teaching hub. It houses a suite of laboratories for practical work, allowing students the crucial opportunity to gain applied experience. These enhanced facilities further increase our ability to train and develop skilled graduates that are targeted by major employers from across the world. Take an interactive tour of STEMlab: lboro.ac.uk/stemlab

Stewart Miller building
Home to our Automotive and Aeronautical students, the Stewart Miller building has recently benefitted from significant investment, with upgrades to study and teaching spaces. The building’s display and demonstration area also incorporates various hardware exhibits of aeronautical and automotive systems technology, including a full-scale Hawk 200 Aircraft.

£17m
STEMlab Teaching Facilities

Outstanding facilities

We offer our students an excellent environment in which to study and develop their practical skills.

Our facilities include:

• A chassis dynamometer
• A computer controlled rolling road with an exhaust emissions measurement system
• A fuel cell laboratory
• A powertrain laboratory with eight purpose-built automotive engine test cells
• A six-axis of motion aircraft/road vehicle simulator
• An acoustics and vibration laboratory with anechoic chamber
• An electric vehicle research laboratory
• Composite materials manufacture and structures testing
• Dedicated computer labs with all necessary software provided, including many industry standard technical software packages
• Hawk aircraft
• Instrumented gas turbine engines
• Numerous instrumented test vehicles
• One of the UK’s largest indoor and outdoor unmanned aerial vehicle laboratories
• Wind tunnels equipped with force balances and flow visualisation and measurement systems

“Loughborough has an engineering history which is what I was drawn to initially. It was not until I came to visit that I completely fell in love. The campus, facilities and extracurricular opportunities are second to none.”
Ashley
Aeronautical Engineering MEng
This course is designed to prepare you for a career in the aerospace industry, evidenced by our ranking in the top 10 for Aeronautical Engineering in The Times Good University Guide 2020 and The Complete University Guide 2021. It will allow you to study specialist subjects alongside fundamental engineering principles.

Course overview
As well as studying the traditional core subjects involved in the mechanical engineering sciences, there is a significant proportion of aircraft design, gas turbine design, spacecraft design and related theoretical analysis. Specialisation in subjects key to the aviation industry is possible later in the course in fields such as composite structures, propulsion design for the environment, turbulence and advanced reliability.

Throughout the course there is extensive group and individual project work, including aircraft and jet engine design projects supervised by industry-based designers and engineers. You’ll have access to our outstanding facilities, which include wind tunnels, a flight simulator, an instrumented turbojet engine and an airflow laboratory equipped with laser systems.

All students on this course take part in a week-long flight test on a Saab 340B aircraft, enabling you to apply the theories and calculations learnt during lectures and gain essential hands-on experience.

While the broad philosophy of the MEng and BEng courses is the same, MEng students are required to study a wider range of technical subjects with additional depth and are also exposed to several management topics.

Year 1
This year begins with an Introduction to Aircraft Design, and covers engineering fundamentals and modules focusing on Aircraft Systems and Performance, Computing, Engineering Materials, and Engineering Mechanics. It also covers Mathematics modules, providing you with a foundation on which to build your theoretical skills.

Year 2
In year two studies focus on aero-specific design modules and engineering fundamentals, including a Structural Design Project, Aerodynamics, Turbomachinery and Propulsion.

Optional placement year/study abroad
BEng final year or MEng year 3
This year sees the introduction of optional modules, allowing you to specialise in your preferred areas of aeronautical engineering. If you’re studying the BEng option, you’ll also be preparing and completing your individual project.

Optional modules typically cover more specific topics such as Noise Control, Spacraft Engineering, and Gas Turbine Design.

MEng final year
Much of this year is spent on your individual project, but you will also take part in a group design project and put together a business model. You’ll also get the chance to study further optional modules, which may focus on Aircraft Structural Analysis or Propulsion Design for the Environment.

Laura
Aeronautical Engineering MEng

As part of her year in industry, Laura joined the Aerodynamics department at Mercedes-AMG Petronas Formula One Team, and established herself as a valuable part of the front of car development group. The team were so proud of Laura’s significant contribution to their World Championship winning car – that they welcomed her back as part of their team upon her graduation.

“You’ve got to put yourself forward, apply yourself and then you can experience it. It will be a brilliant experience so I really encourage people to just go for it.”

Accredited by:

AERONAUTICAL AND AUTOMOTIVE ENGINEERING

LOUGHBOROUGH UNIVERSITY

AERONAUTICAL AND AUTOMOTIVE ENGINEERING

Typical offers correct at the time of print. Please check our website for the latest version and other qualifications.

Please note that optional modules are subject to availability and timetable permitting.
Automotive Engineering

MEng/BEng

Automotive Engineering design and development has become a wide-ranging branch of engineering encompassing electronics, computing, materials science and ergonomics, as well as the traditional core subjects involved in the mechanical engineering sciences. This degree was the first of its kind in the UK and has established a national and international reputation for the quality of the course and the graduates produced.

As part of this course you will take part in a week-long vehicle testing course at the Motor Industry Research Association (MIRA) proving ground. You'll take part in several hands-on experiments analysing vehicle aerodynamics, performance and handling.

Course overview

As well as studying the traditional core subjects involved in the mechanical engineering sciences, there is a significant proportion of automotive design and related theoretical analysis throughout. You'll focus on vehicle design, development and manufacturing and use automotive examples to illustrate core principles of engineering science, such as fluid mechanics, statics and dynamics. Throughout the course there is extensive group and individual project work, including supporting the design and build of the University's Formula Student car. To support your studies you’ll have access to our outstanding facilities; these include wind tunnels, a vehicle simulator, an acoustics and vibration lab, numerous instrumented test vehicles, an electric vehicle research lab, airflow laboratory equipped with laser systems, a powertrain lab and much more.

Year 1

This year begins with an insight into Vehicle Systems and Design, as well as Computing and Risk Analysis. It also covers Mathematics modules, providing you with a foundation on which to build your theoretical skills.

Year 2

In year two, studies focus on a structural design project and look at more in-depth engineering concepts such as Electrotechnology, Machine Elements and Automotive Materials, Ground Vehicle Dynamics, and Control Engineering.

Optional placement year/study abroad

BEng final year or MEng year 3

This year sees the introduction of optional modules, allowing you to specialise in your preferred areas of automotive engineering. If you’re studying the BEng option, you’ll also be preparing and completing your individual project.

Optional modules typically cover more specific topics such as Crashworthiness, Vehicle Engine Analysis, and an Introduction to Computational Fluid Dynamics.

MEng final year

Much of this year is spent on your individual project, but you will also work towards a business model and will get the chance to study further optional modules, including Autonomous Vehicles and Vehicle Handling.

Typical offers

A level: A*AA (MEng) including Maths and Physics, with A* in Maths or Physics / AAB (BEng) including Maths and Physics, with A in Maths
IB: 38 (7,6,6 HL) (MEng) including Maths and Physics, with 7 in HL Maths or Physics / 35 (6,6,5 HL) (BEng) including Maths and Physics, with 6 in HL Maths
BTEC Level 3 National Extended Diploma: DDD in relevant subjects plus A level Maths grade A

* Diploma in International/Professional Studies

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Please note that optional modules are subject to availability and timetable permitting.
"I chose to come to Loughborough because of the state-of-the-art facilities and the outstanding campus. I fell in love with Loughborough as soon as I arrived for a visit day. The University was also one of the top 10 universities in the UK, and one of the pioneers of engineering. The course offered great job prospects after graduating, and the staff were friendly, engaging and helpful."

If you don’t have the usual scientific or mathematic background for an engineering degree, then a foundation degree is an excellent option to provide a solid grounding of knowledge of engineering, scientific and mathematical principles.

Our Foundation Studies course is primarily for those who wish to embark on an exciting career in aeronautical or automotive engineering but are missing prerequisite subjects required or whose existing qualifications are not usually considered directly relevant for entry onto the core degree.

Our International Foundation course is designed for high-calibre international students who have successfully completed 12 years of education but need an extra year of study to apply for a UK undergraduate degree.

Loughborough also offers an Elite Athletes pathway for students who perform at a very high standard in their chosen sport and wish to study at Loughborough, but do not have the required qualifications due to sporting commitments.

About the course
If this is your situation, then one of our Foundation Studies courses could be what you require to bridge the gap in your studies and provide the platform for successful progression onto our Aeronautical or Automotive Engineering courses.

Completing your foundation year will enable you to progress onto the first year of a course within the department, provided the relevant progression criteria are met.

You will be taught by University staff, including specialist Foundation Studies teaching staff. You will be a full member of the Loughborough family, with the same access to the Students’ Union, clubs, societies, sports facilities and support.

Completing a foundation year can be a real asset to your overall degree success. It not only opens doors to courses that may have previously looked closed, but also provides a sound base on which to establish a successful academic career. Many who have completed the foundation year also said how beneficial it was, supporting their transition into University life.

Module overview
The Foundation Studies programme provides a background of mathematical and physical sciences, along with other essential subjects in Aeronautical and Automotive Engineering, designed to prepare you for successful progression onto the first year of your chosen degree programme.
General enquiries
Aeronautical and Automotive Engineering
Loughborough University
Leicestershire LE11 3TU UK
T: +44 (0)1509 227200
E: aae.ug@lboro.ac.uk
lboro.ac.uk/aae

This brochure was written several months in advance of the academic year to which it applies (2021). Every effort has been made to ensure that the information contained within is accurate at the time of publishing, but updates (for example to course content) are likely to occur due to the time between publication and the course start date. It is therefore important to visit our online prospectus at www.lboro.ac.uk/study before applying to check for any updates, as this will be the most up-to-date repository of information.