



Loughborough
University

Aeronautical and Automotive Engineering

School of Aeronautical, Automotive,
Chemical and Materials Engineering

TOP
10

IN THE UK
FOR GRADUATE
PROSPECTS

THE TIMES AND SUNDAY
TIMES GOOD UNIVERSITY
GUIDE 2022

TOP
10

FOR AERONAUTICAL
AND AEROSPACE
ENGINEERING

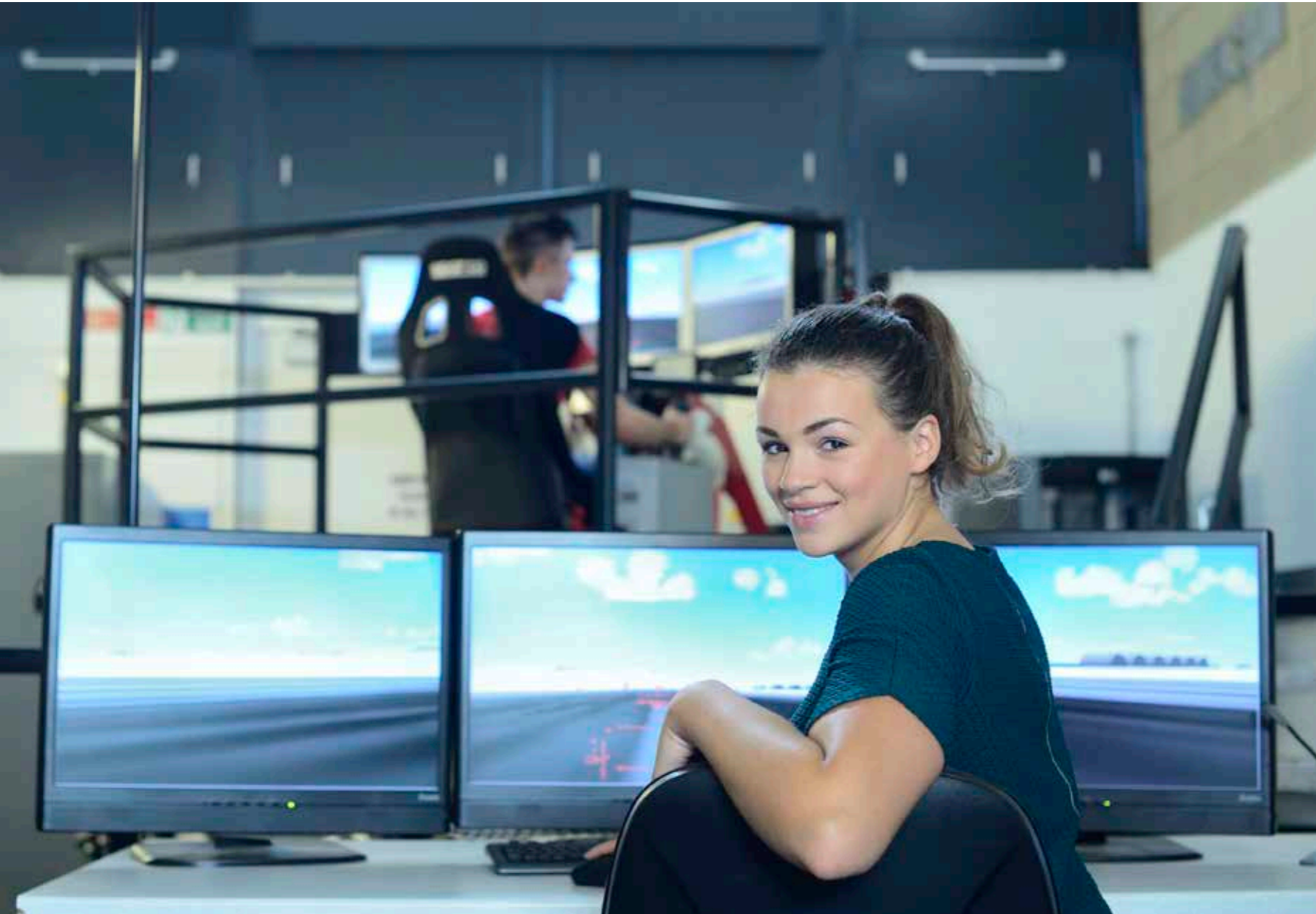
THE COMPLETE
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TOP
100

FOR MECHANICAL
AERONAUTICAL AND
MANUFACTURING
ENGINEERING

QS WORLD RANKINGS 2022





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Welcome

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 history.

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, 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.

Dr Georgios Mavros

Head of Aeronautical and Automotive Engineering



Why study Aeronautical Engineering at Loughborough?

By studying Aeronautical Engineering at Loughborough, you will be able to specialise in subjects that will be vital to the future of aviation from day one. You will see that these go far beyond traditional passenger transport aircraft.

There are many exciting challenges facing the sector, from finding environmentally sustainable methods of propulsion, to increasing automation that allows unmanned aircraft to complete an ever-increasing range of tasks. Our course will prepare you for a career tackling the challenges facing aviation today, and well into the future.

Flight test course

As part of the BEng and MEng Aeronautical Engineering course, you will take part in flight testing. 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.

Student projects

In your final year you will complete your own individual research project working with one of our academic staff. The topics of these projects reflect the challenges facing aviation now and in the future.

Recent examples include:

- Noise Characteristics of Rotating Wheels Upon Landing
- CFD Simulation of Drone Based Pesticide Systems
- Artificial Neural Network for Predicting Aerodynamic Force Coefficients on Aerofoils
- Metamaterials for the Acoustic Reduction in Aircraft
- Meteor Detection
- Fluid Mechanics of Competitive Rowing
- Development of a Hydrogen Powered Fixed Wing Unmanned Aerial Vehicle (UAV)

Links with industry

Our teaching staff collaborate with industry in exciting research into air and ground transport which ensures our courses are relevant and up-to-date, with a real-world focus. We are home to the National Centre for Combustion Aerothermal Technology and have long term research relationships with companies such as Rolls-Royce.

Naomi Aeronautical Engineering MEng

"Completing the flight test week at Cranfield as part of the course was an exciting opportunity, as I have never flown in such a small aircraft before, and I ended up being sat directly behind the pilots!"

During my degree, I completed three summer placements at James Fisher Nuclear Ltd. as a Mechanical Design Engineer and a 15-month internship at Rolls-Royce within the defence area of the company.

These experiences were invaluable in terms of the amount of knowledge I have gained; as well as allowing me to apply the principles I have learnt during my degree and create a wide and varied network, which is incredibly beneficial at the start of your career."



**IN THE UK FOR
AERONAUTICAL AND
MANUFACTURING
ENGINEERING**

THE TIMES AND SUNDAY TIMES
GOOD UNIVERSITY GUIDE 2022



**FOR OVERALL
SATISFACTION
IN AERONAUTICAL AND
AEROSPACE ENGINEERING**

NSS 2021



Why study Automotive Engineering at Loughborough?

Our course prepares you for a career in the automotive and motorsport industries of the future, with a focus on electrification, autonomous control and hybrid powertrains.

From day one, you will study specialised subjects such as vehicle systems and design, alongside engineering fundamentals, allowing you to move onto study significant topics of future importance, such as battery or fuel cell technology and machine learning.

Professional level vehicle testing

Our Automotive Engineering students 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 braking, handling 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 testing of a racing car. It allows you to put the knowledge of, for example, vehicle handling,

aerodynamics and powertrains gained in your degree into practice. 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.

Excellent career prospects

Our course is highly respected in industry, with many of our graduates going on to successful careers in motorsport, engineering, development and design, project management and many other engineering roles.

Student projects

A major part of your final year will be your individual research project. The projects reflect the range of challenges facing the Automotive Industry in the future, as well as the skills and knowledge this degree gives you to tackle them. Recent examples include electrification and autonomy as well as motorsport:

- Drag Reduction for Electric Vehicles
- Racing Line Optimisation
- Eco-Driving of Connected and Autonomous Vehicles
- Formula Student Suspension Modelling and Testing
- Simulating Autonomous and Standard Motorway Driving/Interactions



Max Automotive Engineering MEng Experimental Specialist, Mercedes AMG F1

"From my experience in the full-scale wind tunnel at MIRA, I knew I wanted to pursue experimental aerodynamics as I enjoyed the practical side of engineering. I knew that the supervisor of this project was the only one offering automotive experimental aerodynamics and this was the area that I wanted to pursue; I chose the supervisor first, then the project. This project was also 100% experimental, supported by a PhD student looking to make his mark in this area of research and an industrial sponsor offering help where they could."

"I'm now working at Mercedes AMG Petronas F1 as an Experimental Specialist in the Aerodynamics Department in Northamptonshire. I'm responsible for the day to day running, maintenance and upgrades to the Particle Image Velocimetry system at the Wind Tunnel 2 facility in Brackley."



FOR MECHANICAL
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IN UK FOR OVERALL
SATISFACTION IN
PRODUCTION AND
MANUFACTURING
ENGINEERING
NSS 2021

5th IN THE UK FOR
CAREER PROSPECTS
 WHATUNI STUDENT CHOICE
 AWARDS 2022

“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



Engineer your career

If you are looking for hands-on industry experience with some of the world's top companies, our department 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 will contextualise your academic studies, allowing you to experience industry first hand, as well as developing your professional skills. It will give you a distinct advantage in the job market upon graduation.

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.
- **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
- BAE
- Bentley
- Cummins
- Ford
- General Motors
- Jaguar Land Rover
- JCB
- Lockheed Martin
- Lotus
- Marshall Aerospace
- McLaren
- Mercedes-AMG Petronas
- Red Bull Racing
- Rolls-Royce
- Toyota
- Triumph
- Williams Racing

We also offer a variety of postgraduate degrees in the Department of Aeronautical and Automotive Engineering.

lboro.ac.uk/aae

£ ALL PLACEMENTS ARE FULLY SALARIED BETWEEN £15,000-£20,000

UNDERTAKE A YEAR IN INDUSTRY AND GAIN AN ADDITIONAL AWARD OF DIPLOMA IN INDUSTRIAL STUDIES (DIS)

1st IN THE UK FOR EMPLOYER-STUDENT CONNECTIONS QS GRADUATE EMPLOYABILITY RANKINGS 2022



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 their 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.

lboro.ac.uk/services/careers

£ **£29,000 AVERAGE STARTING SALARY FOR AERONAUTICAL AND MANUFACTURING ENGINEERING GRADUATE OUTCOMES SURVEY, 2019-20 GRADUATES***

NO.1 IN THE UK FOR EMPLOYER-STUDENT CONNECTIONS
QS GRADUATE EMPLOYABILITY RANKINGS 2022

**Average salary 15 months post-graduation - UK domiciled*



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."

Recent graduate destinations include:



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 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 and an F1 racing car.

The Eccleston Student Engineering Centre

Home to our Formula Student team, Loughborough Unmanned Aerial Vehicle (UAV), and the Space Society and is equipped for students to work on individual and group projects, as well as extra-curricular activities.

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

Our facilities include:

- A chassis dynamometer
- 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



£17M
STEMLAB TEACHING
FACILITIES

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 to 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.

lboro.ac.uk/engineering/engineering-centenary



Seyi

Aeronautical Engineering MEng

“The flight test course in third year was a great experience, especially getting to feel all the different flight dynamic modes. It provided valuable opportunities for other students and I to see the practical aspect of what we’d been taught in lectures.”



Aeronautical Engineering

MEng/BEng

MEng (Hons) DIS/DIntS/DPS*: 5 years full-time with placement year
UCAS code: H402

MEng (Hons): 4 years full-time
UCAS code: H403

BEng (Hons) DIS/DIntS*: 4 years full-time with placement year
UCAS code: H401

BEng (Hons): 3 years full-time
UCAS code: H410

Typical offers

A level: A*AA (MEng) including Maths and Physics, with A* in Maths or Physics / AAB (BEng) including Maths and Physics

IB: 38 (7,6,6 HL) (MEng) including Maths and Physics, with 7 in HL Maths or Physics plus English / 35 (6,6,5 HL) (BEng) including Maths and Physics, with 6 in HL Maths, plus English

BTEC Level 3 National Extended Diploma: (BEng only) DDD in relevant subjects plus A level Maths grade B



*Diploma in Industrial/International/Professional Studies

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.

This course is designed to prepare you for a career in the aerospace industry, allowing you to study specialist subjects alongside fundamental engineering principles. It will prepare you for a career tackling the exciting challenges facing the sector today, and well into the future.

Course overview

By specialising in Aeronautical Engineering from the start of the degree, you will be able to study advanced topics in greater depth later in the course. We are always looking to make sure our course remains relevant to the challenges facing industry, which is why we have recently introduced modules such as Sensor Fusion and Machine Intelligence to add to our existing modules, covering topics such as aerodynamics, propulsion, structures and control.

Throughout the course there is extensive group and individual project work, including aircraft and jet engine design projects, which draw on the departments strong links with industry. You'll have access to our outstanding facilities, which include wind tunnels, a flight simulator and an instrumented turbojet engine.

All students on this course take part in flight testing 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

From the first term you will start to study Aircraft Systems and Performance and Introduction to Aircraft Design. As well as this you will learn engineering fundamentals such as thermodynamics, mechanics, materials and manufacturing. Computing is vital in all areas of engineering and this is also covered.

Year 2

You will start to go into more depth in key aeronautical subjects such as Fixed and Rotary Wing Aircraft Performance, Low Speed and High-Speed Aerodynamics, Turbomachinery, Control Engineering, Electrotechnology, Structural Design and Reliability Assessment.

Optional placement year/study abroad

BEng final year or MEng year 3

Aircraft and Gas Turbine Design modules allow you to start putting theory into practice. You can now start to choose specialist modules such as Sensor Fusion, Spacecraft Engineering and Computational Fluid Dynamics. If you're studying the BEng option, you'll also be carrying out your individual project.

MEng final year

You will carry out a major individual project working on a real-world engineering challenge. You will also work as part of a Group Design Project to design an aircraft of the future and can study further specialist topics such as Autonomous Vehicles or Experimental Fluid Mechanics.

Accredited by:



Ant

Automotive Engineering MEng

“The course really prepares you for a career in the automotive industry by covering many of the aspects you would expect to find in industry with the addition of business knowledge, team working skills and interpersonal skills. The course opens up many career opportunities such as in engineering, finance, teaching and business, demonstrating the value of engineering graduates.”



Automotive Engineering

MEng/BEng

MEng (Hons) DIS/DIntS/DPS*: 5 years full-time with placement year
UCAS code: H342

MEng (Hons): 4 years full-time
UCAS code: H343

BEng (Hons) DIS/DIntS*: 4 years full-time with placement year
UCAS code: H341

BEng (Hons): 3 years full-time
UCAS code: H330

Typical offers

A level: A*AA (MEng) including Maths and Physics, with A* in Maths or Physics / (BEng) AAB including Maths and Physics

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: (BEng only) DDD in relevant subjects plus A level Maths grade B



*Diploma in Industrial/International/Professional Studies

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.

Whether it is improving performance in motorsport or designing the next generation of autonomous cars, Automotive Engineering is a fascinating and specialised subject. 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.

Course overview

As well as studying the traditional core subjects involved in the mechanical engineering sciences, you will study the fundamentals of Vehicle Systems and Design from the first year. This will allow you to study advanced topics later in the course. Recent additions to the course include Battery Technology, Fuel Cell Technology, Electric Motor Design and Machine Intelligence which sit alongside subjects such as Vehicle Dynamics and Simulations and Crashworthiness to ensure that you are equipped to tackle the challenges facing transport in the future.

Throughout the course there is extensive group and individual project work, which benefit from our strong links with industry. To support your studies you will have access to our outstanding facilities; these include wind tunnels, a vehicle simulator, an acoustics and vibration laboratory, numerous instrumented test vehicles, an electric vehicle research lab, airflow laboratory equipped with laser systems, a powertrain lab and much more.

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 will take part in several hands-on experiments, analysing vehicle powertrain losses, performance, legal certification and handling.

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 opportunity for further specialisation and are also exposed to several management topics.

Year 1

From the first term you will start to study Vehicle Design and Development. You will also learn engineering fundamentals such as thermodynamics, mechanics, materials and manufacturing.

Year 2

You will start to go into more depth in key automotive subjects such as Vehicle Loading Suspension, Advanced Powertrain Systems (hybrid design), Ground Vehicle Aerodynamics, Electrotechnology, Control Engineering, Machine Elements and Automotive Materials and Systems Reliability Assessment.

Optional placement year/study abroad

BEng final year or MEng year 3

The Vehicle Design module allows you to start putting theory into practice. You can now start to choose specialist modules such as Sensor Fusion, Vehicle Dynamics and Simulation, Battery Technology and Computational Fluid Dynamics. BEng students will undertake their individual project.

MEng final year

You will carry out a major individual project working on a real world engineering challenge. You will also work as part of an Automotive Group Project to design a vehicle (including the Formula Student Racecar) and have the opportunity to study some more specialist topics such as Autonomous Vehicles or Vehicle Handling.

Accredited by:



Ken

Aeronautical Engineering BEng

“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.”



Foundation Studies

Aeronautical Engineering

UCAS code

UK/EU entry: H411

International entry: H4FY

Automotive Engineering

UCAS code

UK/EU entry: H33A

International entry: H3YF

Typical offers

A level: BBB. This must include Maths or Physics A level

GCSE: A minimum of 5 GCSEs grades A to C (7-4) are normally required. Minimum grade A/7 in Maths and B/6 in Physics/Science

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 attribute 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.

TOP IN EVERY UK
10 UNIVERSITY
LEAGUE TABLE

Aeronautical and Automotive Engineering
Loughborough University
Leicestershire LE11 3TU UK

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This brochure was written several months in advance of the academic year to which it applies (2023). 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.

