

# Engineering

## Essentials

### What engineering degrees are there?

#### MEng degrees

Automotive Engineering  
Computer Engineering  
Electrical and Electronic Engineering  
Electronic Engineering  
Mechanical Engineering

#### BEng degrees

Automotive Engineering  
Computer Engineering  
Electrical and Electronic Engineering  
Electronic Engineering  
Mechanical Engineering  
Engineering degrees (with a Foundation Year)

#### See also

Computing (p48), Product design (p113)

### What A levels/IB scores do I need?

(For other qualifications information, refer to pages 125-129)

Typical offer range AAB-BBB

A levels (or equivalent) must include Mathematics

Direct entry to Year 2 of a BEng or MEng programme is possible for highly qualified applicants offering evidence of appropriate studies elsewhere

Typical IB diploma offer range: 32-36 points including 5 or 6 in Higher Level Mathematics

For the Engineering degrees (with a Foundation Year), qualifications are flexible, particularly for mature students. The standard A level offer is CC in science-based A levels and BCC in purely arts subjects

#### Fees

Refer to pages 137-138 for information on fees

### What scholarships are there?

An unlimited number of scholarships of £1,000 are available. These will be awarded on entry to students who firmly accept our offer of a place by the UCAS deadline and achieve three A grades at A level, excluding General Studies. We also award generous prizes for outstanding performance in each year of study

### English language requirements

IELTS 6.0, with 6.0 in each of the four components. Internet-based TOEFL with 80 overall, including at least 22 in Speaking and 24 in Writing. For alternative English language requirements, refer to page 130

### Foundation year for UK and EU students

Refer to Engineering degrees (with a Foundation Year) on page 66

### Foundation year for non-EU students

If your qualifications (including English language) do not yet meet our entry requirements for admission direct to the first year of these degree programmes, we offer an international foundation year entry route. Refer to pages 26 and 131 for details

### How do I find out more?

For more information, contact:

**E** ug.admissions@engineering.sussex.ac.uk

**T** +44 (0)1273 678743

**F** +44 (0)1273 678399

School of Engineering and Design,  
University of Sussex, Falmer, Brighton BN1 9QT, UK

**www.sussex.ac.uk/engineering**

### When can I visit?

All applicants who are made an offer of a place are invited to one of our admissions days from December to April

Our Open Day dates for 2011 are 11 June and 8 October. We also run regular campus tours.

Please book online at [www.sussex.ac.uk/visitors](http://www.sussex.ac.uk/visitors) or call 01273 876787

### Why engineering?

Electrical, electronic and computer engineers create the technology demanded by society to cater for everything from the fun (games, robot toys and entertainment) to the vital (health-care systems and food production). What is more, electrical, electronic and computer systems are embedded in almost any device you can imagine.

Mechanical and automotive engineering is a diverse, wide-ranging profession and interesting for you because you like to know how things work and you want to make them work better – faster, more quietly, more cleanly, more efficiently. You like the challenge of real, practical problems and finding new and innovative solutions to them.

### Why engineering at Sussex?

- The School of Engineering and Design offers degrees in automotive, computer, electrical, electronic and mechanical engineering, reflecting the diverse range of opportunities engineering has to offer.
- Rated 14th in the UK for 'General Engineering and Mineral and Mining Engineering' research in the 2008 Research Assessment Exercise (RAE). 95 per cent of our research was rated as recognised internationally or higher, and 60 per cent rated as internationally excellent or higher.
- Engineering and technology at Sussex scored 91 per cent in the student satisfaction category of the 2010 National Student Survey (NSS). Mechanical engineering ranked 2nd in the UK for student feedback and assessment.
- Mechanical engineering at Sussex is ranked in the top 25 in the UK in *The Guardian University Guide 2011* and *The Complete University Guide 2010-11*.
- All our electrical, electronic and computer engineering programmes are accredited by the professional Institution of Engineering and Technology (IET). All our mechanical and automotive engineering programmes are accredited by the professional Institution of Mechanical Engineering (IMechE).
- Over £1-million investment in a newly equipped undergraduate laboratory building provides project labs, and test, measurement and manufacture facilities with disabled access and technician support.
- Opportunity for our students to participate in design competitions including the Formula Student competition – a unique experience bringing together a team of specialists in all engineering disciplines.
- Emphasis on career development, transferable skills and professional business management.

## Gloria's perspective

'I chose to study Electrical and Electronic Engineering at Sussex because of the quality of teaching and Sussex's reputation for being one of the top universities in the UK. Being an international student isn't always easy, but here I found the support I needed not only with my studies but also with adjusting to my new life.'

'At first I was nervous, especially with the lab sessions, but I now feel more at ease with the course material and really enjoy putting into practice all the theory I've learnt in lectures. It's just great discovering how things work and are made.'

'After graduating, I would love to go back to my country and contribute what I've learnt to its development – qualified people can really make a difference.'

Gloria Naid  
BEng in Electrical and Electronic Engineering





Second-year students explore the use of a linear induction motor system

A laboratory demonstrator helps a first-year student make fine adjustments to an embedded-applications line-follower robot



Accredited Scheme®

#### MEng or BEng?

All electrical, electronic and computer engineering programmes are accredited by the professional Institution of Engineering and Technology (IET). Completion of an MEng programme ensures that you have met the full educational requirements for chartered engineer status. For more information, visit [www.theiet.org](http://www.theiet.org)



IMECHE

All mechanical and automotive engineering programmes are accredited by the professional Institution of Mechanical Engineering (IMECHE). Completion of an MEng programme ensures that you have met the full educational requirements for chartered engineer status. For more information, visit [www.imeche.org](http://www.imeche.org)

The fourth year of the MEng programmes has specialist technical courses that reach a higher level than the final year of the three-year BEng, and also includes business and management courses. The MEng is for those who wish to become chartered engineers and to aim for leadership positions as early as possible in their careers.

The three-year BEng programmes are for those more enthusiastic about the technical courses than the business aspects (though they will still cover the essential basics) and who either want to get into industry quickly or to take a more technical approach in Year 4 with a specialist MSc programme – which can also lead to chartered engineer status.

If you are not yet sure which type of programme you wish to follow, do not worry because you may not have to make a final decision until the end of Year 2.

#### What sort of career could I have?

The career of an engineer is richly rewarding in terms of personal satisfaction, status and salary. According to the Association of Graduate Recruiters, engineers are now among the top earners of the graduate population and are one of the most likely groups to fast track into management positions. Career opportunities include:

- employment in sectors such as communications, aerospace, transport, marine or space exploration, environment, marketing, the supply chain, robotics, security and defence, power industry, health and medicine
- automotive systems development engineer
- design, technical support or installation engineer
- graduate engineer with international corporation
- telecom systems engineer
- government agency project officer
- business development manager
- engineering management
- postgraduate study or research.

Employers of our graduates include: Amplicon, Cable and Wireless, Cummins, Doosan Babcock, Ericsson, Ford, Mott MacDonald, National Grid, Ricardo, Rolls-Royce, Siemens, Thales, Transport for London, and engineering consultancies.

#### How will I learn?

Engineering at Sussex is based on strength in the practical application of engineering principles. The School has been congratulated by external reviewers on the quality of its education in design and the use of team-based project work.

There are many ways to acquire skills – from taught sessions (such as lectures and workshops) and laboratory assignments to independent and computer-based learning. In addition, the first-year and foundation-year timetables include one-hour small-group tutorials.

Individual topics are offered for third-year projects, arising from the extensive industrial and scientific research in the School, from industrial contracts, and from student suggestions. National businesses sponsor prizes for the best projects each year.

Final-year MEng students work in an interdisciplinary team on a group project often linked with an industrial organisation.

#### What will I achieve?

If you work hard, you will earn a well-respected degree, opening the door to the career you want and equipping you to succeed in it. In particular, you will acquire:

- a thorough understanding of, and the ability to apply, the mathematical and scientific concepts required to become an engineer
- the ability to analyse and design conceptual and practical solutions to engineering problems
- an understanding of business management skills and techniques required to manage projects and balance risks, costs, reliability and environmental impact
- research skills that provide a framework for innovative and creative thinking in order to generate and test systems and designs. You should be able to analyse resulting data and determine their validity using computational tools and packages.
- interpersonal and teamworking skills and the business and management techniques you will need as you progress along your chosen career path.

## Degrees

### Automotive Engineering MEng, 4 years UCAS Code: H330 BEng, 3 years UCAS Code: H331

In the automotive industry, intense competition – together with sophisticated customer demands and challenging environmental requirements – means that technical innovation, leadership and performance are critical to success. Engineering designs must operate in the harshest of environments and provide unparalleled levels of reliability and function.

The interdisciplinary needs of automotive engineering are reflected in our curriculum. You will study the essential principles of mechanical engineering and design in Years 1 and 2, alongside introductory courses in electronics and control. Year 3 includes a course in Dynamics of Machines and Vehicles, as well as an interdisciplinary group project, such as the design and construction of a vehicle to be entered for competition.

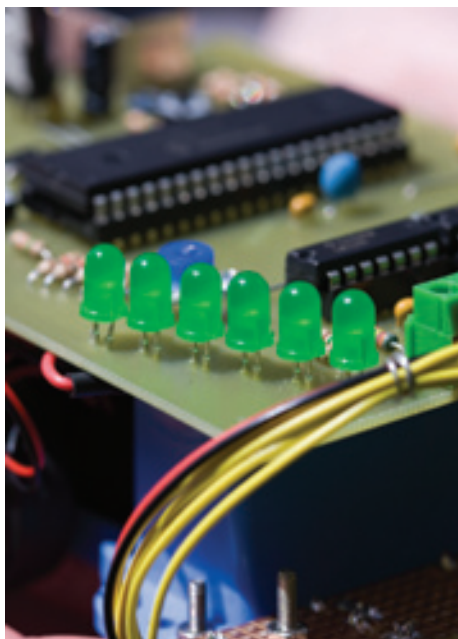
For the MEng degree, Year 4 includes advanced studies in the design, modelling and manufacture of automotive systems, as well as an interdisciplinary group project such as Formula Student.

### Computer Engineering MEng (Hons), 4 years UCAS Code: GH4P BEng (Hons), 3 years UCAS Code: HG66

Computers are everywhere in modern life. They are most common in embedded systems where the computer is hidden alongside other electronics in electronic appliances, mobile phones, home entertainment systems and industrial products. Computer engineers need to be familiar with software programming techniques and with computer architectures and hardware. They must know how to take a creative approach to the design of a new product. To support design they must possess good analytical skills with a broad background in electronic engineering.

These programmes aim to give you a combination of expertise from computer engineering, software engineering, and the design and manufacture of electronic systems. The hardware aspects of computer systems focus on circuit design, digital systems and computer architecture. A distinctive feature of this degree is the use of industry-standard CAD software for the design and simulation of electronic systems.

In addition to the basic skills provided by the BEng degree, students taking the MEng programme develop greater expertise in advanced technical topics and further breadth in essential professional areas such as management and law.



### Electrical and Electronic Engineering MEng (Hons), 4 years UCAS Code: H600 BEng (Hons), 3 years UCAS Code: H606

Every aspect of modern life depends on electrical power systems, and manufacturing industry relies on electric motors and other electromechanical devices. In these applications of electrical power, computer-based electronic control is crucial.

These programmes cover the areas of electrical machines and power systems and will help you gain a sound understanding of electronic devices and the analogue and digital circuits in which they are used. Power electronics is given particular attention. Modern semiconductor switching devices are capable of handling enormous currents, which makes them suitable for controlling large electrical and electromechanical systems. These power electronics switching devices are likely to be under microprocessor or computer control so digital electronics and computer systems makes up a substantial part of these degrees.

Electromechanical devices are introduced in the first year, with practical work in a modern laboratory using the latest equipment. In a second-year project you will design a device using industry-standard electromagnetic simulation software. In the third year, you take courses in electrical power systems, electrical machines and power electronics.

An essential part of the learning experience is the use of industry-standard CAD software, with the intention that you will be equipped in your subsequent career to improve the design, efficiency and performance of modern electrical systems.

### Electronic Engineering MEng (Hons), 4 years UCAS Code: H613 BEng (Hons), 3 years UCAS Code: H610

The extraordinary explosion in information technology has been made possible only through the expansion in communication systems and the ability to produce ever more sophisticated circuits in cheaper and more compact forms. Most of the building blocks of electronic systems are fabricated and interconnected on minute chips of silicon. Billions of the resulting integrated circuits are used in computers, communication systems and transportation systems and in the entertainment industry.

In these programmes, you will gain an appreciation of the properties of integrated circuits and a sound understanding of the basic electronic components of which they are made and the state-of-the-art systems that use these devices. There is a strong practical component to the programmes, including laboratory exercises and group and individual projects. You will acquire the skills to specify and design the next generation of electronic technology. Extensive use is made of industry-standard CAD software to enable you to develop these skills.

In Year 4 of the MEng, the courses become more specialised, with additional emphasis on communications engineering. Through the project work, you benefit from the Sussex research programmes, including the design of personal and mobile communication systems, unique systems for non-invasive sensing, and innovative approaches to cardiac and ophthalmic instrumentation.

**Programming of IC controller chips is an important skill for electrical and electronic engineering**

## Core courses

### Courses currently include:

#### Foundation Year

**Circuits • Electricity and Magnetism • Foundation Mathematics • Heat and Energy • Mechanics • Principles of Design**

#### Electrical, electronic and computer engineering Year 1

**Analogue and Digital Circuits • Electronics Group Project • Engineering Maths • Materials and Technical Communication Skills • Software and Embedded Systems Programming**

#### Year 2

**Digital Systems Design • Feedback Control • Group Projects • Signal Processing • Solid-State Electronics**

#### Year 3

**Electrical Machines • Individual Project • Neural Networks • Radio Communication • Robotics**

#### Mechanical and automotive engineering Year 1

**Analogue and Digital Circuits • Electromechanics • Energy and Power • Engineering Design • Engineering Maths • Materials • Mechanics • Technical Communication Skills**

#### Year 2

**Feedback Control • Fluid Mechanics • Group Design and Manufacture Projects • Power Cycles • Structural Mechanics**

#### Year 3

**Design and Manufacture • Dynamics of Machines and Vehicles • Engine Technology • Fluid Flow and Heat Transfer • Individual Project**

#### All engineering students

##### Year 4

**In the final year of the MEng, the range of specialist options is increased and you join an interdisciplinary team of students to undertake a project modelled on those common in industry. You will develop commercial skills and an enhanced understanding of engineering design and development**



#### First-year students take part in a keenly contested bridge-building competition

**Mechanical Engineering**  
**MEng, 4 years UCAS Code: H301**  
**BEng, 3 years UCAS Code: H300**

Mechanical engineering is one of the broadest of all engineering disciplines. It is concerned with the design and manufacture of products and with the conversion, control, transmission and storage of energy in machinery and power plants. There is a huge demand for mechanical engineers from the automotive, transport, marine, construction and aerospace industries, as well as a vast number of other enterprises. A mechanical engineer's work will often be supported by computer techniques for design, drawing, modelling and simulation. Our curriculum therefore draws on industry-standard software so you can develop your skills in this area. Typical examples of coursework exercises include the use of a computer simulation to analyse the stresses and strains in a given structure, or the production of a 3D-rendered image of a design for the purposes of modelling and manufacture.

The structure of each course reflects the need for broad-based knowledge as well as in-depth skills. Design is an essential component of all of these courses and spans specification, conceptual development, design embodiment, final design, manufacture, marketing and sales. All these factors are brought into play through group projects, in which students are expected to function as design teams, capable of interacting with 'clients' and presenting their work to a professional audience.

Many mechanical systems are now controlled by, or interfaced with, electronic systems. There is an increasing demand for engineers who understand enough of both disciplines to design hybrid systems, for instance a car with an electronic engine management system. The mechanical engineering programmes provide both the specialist mechanical courses and the fundamental electronic and computing knowledge that will enable you to lead multidisciplinary teams in the future.

**Engineering degrees (with a Foundation Year)**  
**BEng (Hons), 4 years UCAS Code: H100**

Our foundation year enables a wide range of people to undertake a degree in engineering. This initial year provides an introduction to engineering as well as the necessary background knowledge in science and mathematics needed to succeed in Year 1 and further. It is sufficiently broad and wide-ranging for you to progress on to any of the MEng or BEng degree programmes offered in the School of Engineering and Design.

You will be well supported throughout and your progress will be closely monitored to help you achieve your full potential. The assessment for the foundation year consists of worksheets and laboratory assignment contributions combined with examination marks. Provided you satisfy the requirements, you can proceed into Year 1 of the MEng or BEng engineering degree programme of your choice.

This foundation year is different from the International Foundation Year that is offered by the International Study Centre at Sussex (refer to pages 26 and 131). This degree is entirely equivalent to a standard degree and assumes fluency in English. If you would like to enhance your English language skills as well as your scientific abilities, you could choose to follow the engineering and physics stream of the International Foundation Year.



#### Josh's career perspective

'Just three months after graduating from Sussex, I became the director of my own limited company, developing an award-winning product I had designed, intended to reduce CO<sub>2</sub> emissions from appliances left on standby. I was also fortunate to gain a place as an NCGE-Kauffman Fellow on a five-month training and mentoring scheme in the USA.

'None of this would have happened without the diverse range of courses and people, extracurricular activities, and social events that Sussex offered during my degree.

'My passion for the environment was enlivened through debates and discussions with fellow students;

I acquired technical knowledge from studying; and gained commercial insight from extracurricular seminars and workshops based around entrepreneurship.

'These, to me, highlight the rounded experience you can expect to gain from the University of Sussex.'

Josh Seal  
 Engineering graduate



**A proud Formula Student team present their vehicle at the Goodwood Festival of Speed**