

Tomorrow's Engineers

Make a difference to the world



**Engineering at
university**

Why study engineering?

Engineering is creative. It's practical. It's innovative. It's about making a difference to the world.

Engineering can be found in every aspect of our daily lives – from the devices we use and the buildings we live in to the power we consume and the food we eat. Engineers use their skills to improve the design, performance and efficiency of just about everything we use today and to develop the products and processes of the future.

If you can see yourself working with others to tackle some of the world's most pressing challenges – from cyber security to maintaining clean water – or designing innovative products such as driverless cars and surgical robots, engineering could be the career for you.



3 reasons to choose engineering

- Engineers are in demand and they earn good money
- Engineers make a difference to the world
- Like doctors and lawyers, professionally registered engineers are well respected

Great prospects

Engineering skills are in high demand, so if you're looking for a job with real earning potential, career progression and scope for moving across different industries and sectors, an engineering degree could be the perfect launch pad.

Salaries are very competitive:

- Starting salaries for engineering and technology graduates are almost 20% higher than the average graduate starting salary.
- Engineering graduates can expect to earn significantly more in their lifetime than most other graduates.
- Professional engineers earn between 20% and 70% more than the national average salary.

If you have engineering qualifications and experience you are not limited to working within the field of your degree. The ability to solve practical problems by applying mathematical, scientific, design and computing skills, along with the ability to project manage, work in teams and communicate your ideas makes you highly employable in a wide range of careers.

Like other professions, engineering provides many opportunities for career development. As an engineering graduate, you could become eligible for professional registration as an Incorporated Engineer or Chartered Engineer, once you have built up skills and competence in the work place.

Data is taken from EngineeringUK 2018: The State of Engineering

Graduate Engineer

“Engineering is a very diverse subject that allows you to understand the world in which we live and equips you with the skills required to make a difference in the future. There is a strong emphasis on teamwork and communication; transferable skills that are important in any career path.”

Luke, Doctoral Researcher,
University of Birmingham

MEng (Hons) Chemical Engineering and Applied Chemistry,
Aston University

See more engineering case studies:
tomorrowsengineers.org.uk/real-jobs



What are the different engineering disciplines?

There are lots of different types of engineering and a wide range of engineering degrees on offer. Many of the principles and skills used in engineering are common across disciplines, meaning engineers often move between different fields during their careers and tend to work in teams alongside other professionals.

Some of the different fields you could be working in as an engineer include:

Advanced Manufacturing

Developing the systems and equipment necessary to make the products we couldn't live without, whilst improving efficiency, reliability and cost. Engineers who work in this industry include:

- Materials Engineers
- Manufacturing Systems Engineers
- Process Engineers



Aerospace

Designing aviation systems, developing cutting edge defence technology and contributing to the next era of space exploration. Engineers who work in this industry include:

- Aerospace Engineers
- Mechanical Engineers
- Materials Engineers



Automotive and Transport

Designing the next generation of cars, trains, aircraft and ships, powered in new and efficient ways. Engineers who work in this industry include:

- Rail Engineers
- Automotive Engineers
- Marine Engineers



Built Environment

Creating new buildings; equipping buildings with the power and communications systems they need in order to become habitable. Engineers who work in this industry include:

- Building Services Engineers
- Civil and Structural Engineers
- Electrical Engineers



Computing

Designing and creating search-engines, social networking applications and software applications used in various sectors, including finance and medicine. Engineers who work in this industry include:

- Software Engineers
- Design Engineers
- Electronics Engineers



Design and Consultancy

Working in multi-disciplinary teams on the technical, practical and design aspects of large-scale projects. Engineers who work in this industry include:

- Design Engineers
- Civil Engineers
- Mechanical Engineers





Digital and Creative

Devising new equipment for enhanced image or audio capture; programming the next generation of computer games or special effects for films. Engineers who work in this industry include:

- Software Engineers
- Electronics Engineers
- Acoustics Engineers

Energy

Finding new ways to generate sustainable energy and evolving energy efficient devices to reduce demand for power – such as intelligent lighting. Engineers who work in this industry include:

- Renewable Energy Engineers
- Nuclear Engineers
- Electrical Engineers



Food and Drink

Ensuring the safety and efficiency of food production; developing and designing the processes and equipment used in making ingredients; packaging and distributing food and drink. Engineers who work in this industry include:

- Process Engineers
- Chemical Engineers
- Agricultural Engineers

Health and Life Sciences

Transforming and saving lives by evolving equipment and drugs for use by healthcare professionals – for example, robotic surgical instruments, artificial limbs and cancer-fighting treatments. Engineers who work in this industry include:

- Biomedical Engineers
- Clinical Engineers
- Chemical Engineers



Infrastructure

Creating transmission systems for gas, water or electricity; building roads, bridges, rail tracks, tram lines and tunnels in order to make our daily lives run smoothly. Engineers who work in this industry include:

- Civil and Structural Engineers
- Water and Environmental Engineers
- Mechanical Engineers



Engineers are also needed in the education sector

to inspire the next generation of engineers and technologists in schools, colleges, universities and the workplace. Engineers from every discipline are involved in education.

Which type of engineering should I choose?

The engineering discipline that will suit you best will be the one you're most interested in. It may also help you to consider:

- current demand for engineers in particular disciplines
- where in the UK or the rest of the world you want to work and the industries that are prominent in those areas
- potential salary
- long-term prospects
- the skills/competence you will gain
- whether the degree is accredited



Find out more about the different types of engineering:

www.tomorrowsengineers.org.uk/ideatocareer

What qualifications do I need to get onto an engineering degree?

Engineering degrees normally require A-level/T-level/Higher/HL mathematics or equivalent and physics (or chemistry, depending on the nature of the degree), or an appropriate BTEC Level 3 in engineering or construction and the built environment.

Other useful subjects include design and technology and computing. NVQs, SVQs, Advanced Apprenticeships and other equivalent qualifications may also be accepted.

The requirements will vary depending on the degree and the university so double-check the UCAS website and the university prospectuses, or have a chat with university admissions departments.

How do I stand out?

To make your application stand out, find ways to demonstrate your genuine passion for the subject – for instance, work experience, placements, extended projects, competitions, in-school challenges and awards can enhance your personal statement.



If you are in full time training or education in the UK, you could enter a project into The Big Bang Competition and enhance your university application while furthering your career prospects.

www.thebigbangfair.co.uk/competition

What if I haven't got the right qualifications?

If you haven't studied the right subjects or achieved the required grades for your chosen degree, you could consider related degrees or foundation courses. These normally last for one year and lead directly onto the first year of a degree programme.

Graduate Engineer

During year 11 I took part in a team event called 'Engineering Education Scheme'. I got to work with someone from the Royal Navy to come up with a solution to a real life problem – we developed a power supply for emergency radios on the life rafts that utilised the abundance of salt water. I also took part in a week long 'Headstart' course where I stayed in halls of residence at Bristol University and got to try out different disciplines of engineering and find out which area interested me most. It was also a great way to try out a university!

Philippa, Assistant Engineer and Project Manager, Amey
MEng (Hons) Civil Engineering with Industrial Experience, University of Birmingham

Working towards becoming a Chartered Engineer (CEng)



See more engineering case studies:
tomorrowsengineers.org.uk/real-jobs



Which degree is for me?

There are a variety of degrees to choose from. Universities offer Foundation degrees; Bachelor of Science (BSc) or Bachelor of Engineering (BEng); BSc or BEng with Honours (Hons); and Master of Engineering (MEng). Some degrees are offered with a year in industry or abroad.

Though universities offer degrees in general engineering, most are in specific engineering disciplines such as civil engineering, electrical engineering or mechanical engineering, to provide the specialist knowledge relevant to that field.

Foundation degree

- Usually involves studying for two years
- Involves work based learning/ Higher Apprenticeship
- Provides solid training in a particular field of engineering for careers in that sector

BEng/BSc

- Usually involves studying for three years (four in Scotland)
- Provides solid training in general engineering or a particular field of engineering for careers in that sector

MEng

- Usually involves studying for four years (five in Scotland)
- Provides a more in-depth study than a BEng/BSc and usually involves a significant research project
- Offers a greater number of opportunities to develop skills that appeal to the engineering sector
- Provides a good basis for a research-based career or PhD/Engineering Doctorate (EngD)

Accredited degrees

Many engineering degree programmes are accredited by the Engineering Council – this means they meet the standards set out by the engineering profession. Accreditation is based on the quality of the degree programme and whether it provides the knowledge and understanding needed for professional registration as Incorporated Engineer (IEng) or Chartered Engineer (CEng). Visit the Engineering Council's website to search for accredited degree programmes: www.engc.org.uk/courses



Graduate Engineer

"I completed two summer placements with employers in the renewable energy sector whilst at university. It was great to experience being in a work environment and working as part of a team before my first graduate job. These placements were extremely valuable in helping me to decide what kind of job I wanted to do after completing my degree and helped to shape my career path. They also gave me great background knowledge into a number of subjects including different sustainable technologies and the UK energy market, which I was able to call on in my interview for my graduate job."

Sally, Graduate Mechanical Engineer, Arup
MEng (Hons) Mechanical Engineering with Sustainability,
University of Warwick

Working towards becoming a Chartered Engineer (CEng)



Engineering with industrial experience

- Usually involves studying for four years (five in Scotland)
- Provides a more in-depth study than a BEng/BSc and usually involves a significant research project
- Offers a greater number of opportunities to develop skills that appeal to the engineering sector
- Provides a good basis for a research-based career or PhD/Engineering Doctorate (EngD) Engineering with industrial experience
- Allows you to apply your learning and practice/improve your skills in a real work environment
- Gives you the opportunity to see if a career in that field is right for you
- May allow you to earn while you learn
- Could lead to employment following your degree
- Can provide opportunities to develop competence for professional registration as Engineering Technician (EngTech),

Engineering and...

These degrees involve spending around 50% of your time studying your chosen field of engineering and the other 50% on your other chosen subject.

Incorporated Engineer (IEng) or Chartered Engineer (CEng)

- Enhances your CV – helpful for recent graduates

Engineering with a year abroad

There are many degrees available with a year overseas in Europe, North America, Australia or Asia. The first and final years of the degree usually follow the standard degree offered by your university. One of the other years will be spent at the overseas university, studying and being assessed on its syllabus. Students often value the experience of living and working in an environment very different from home as well as the contacts and friends they make.

Engineering with...

These degrees normally involve spending 70% of your time studying your chosen field of engineering and the remainder studying another subject.

How to choose your university

National and international rankings

Universities are ranked by various organisations which look at different aspects such as quality of teaching or student experience. Several websites – such as www.unistats.com – and newspapers – such as the Times Good University Guide – publish their rankings annually.

Links between employers and universities

Engineering is one of the few degree subjects that has a significant link with industry. If you are keen to work for a particular organisation or within a particular field of engineering, find out which (if any) universities the companies are associated with.

Degree structure

You may also want to consider questions such as:

- How the degree is taught (seminars, lectures, workshops, lab sessions)
- Whether there is a significant practical element to the degree
- Whether the degree involves project work
- The opportunities to apply knowledge, through industry visits or work experience
- Whether the degree is accredited by the Engineering Council

Employer



“ Graduates who have had some industrial experience, particularly those who have worked in our industry, stand out in our selection process. They understand how the business operates and this accelerates the impact they can make with their new employer. ”

Richard Martin, Chief Engineer,
Nestlé (UK & Ireland)

Is university right for me? Alternatives to a full-time degree

An increasing number of employers are offering high quality apprenticeships that offer practical, work-based learning, recognised qualifications and a weekly training wage. You can apply for a Higher or Degree Apprenticeship after your A-levels/ T-levels/Advanced Highers/BTEC or equivalent.

More information on Apprenticeships can be found at:

www.getingofar.gov.uk
If you live in England

www.apprenticeships.scot
If you live in Scotland

<https://ams.careerswales.com>
If you live in Wales

www.nidirect.gov.uk/apprenticeships
If you live in Northern Ireland

There are also other work-based degrees, such as 'Engineering Gateways' that will allow you to gain a professionally recognised degree whilst working. You can find more about Engineering Gateways at: www.engineeringgateways.co.uk

Download

the Tomorrow's Engineers booklet about vocational and apprenticeship routes into engineering:

www.tomorrowsengineers.org.uk/apprenticeships





Financial Support

Certain employers offer bursaries that provide financial support throughout your degree, as well as internships, work experience, mentoring and often a job on graduation. Information on some of the grants and awards available can be found on the 'students' section of the Tomorrow's Engineers website: www.tomorrowsengineers.org.uk

Graduate Engineer

“Make sure you can prove that you get on with people and you work well in a team; all of my work is done as part of a team and it's very important for engineers to be good at communicating with each other. Anything from team sports to group projects at school can show this. As part of my degree I spent a year studying in Malaysia which showed that I can work in different environments and get on with others.”

Yasmin, Operations Engineer –
E.ON Exploration and Production
MEng (Hons) Chemical Engineering,
University of Nottingham

Working towards becoming a Chartered Engineer (CEng)



See more engineering case studies:
tomorrowsengineers.org.uk/real-jobs

After your degree

Some people choose to continue on to study a Master's qualification, PhD, or EngD if they have sufficiently good grades and the support to continue. Each year, universities, research councils and other organisations such as charitable trusts, will pay for a number of research studentships and bursaries.

Professional Engineering Institutions and Professional Registration

While you are studying, you can become a student member of a Professional Engineering Institution (PEI) that relates to your field. Many of the PEIs offer free student membership and you can apply to join more than one. The PEIs – of which there are over 30 – support the engineering community by assessing members for professional registration, providing industry updates and in many cases offering training, networking opportunities and much more. After graduating from an accredited degree and gaining relevant experience by working in engineering, you could become a graduate member of the PEI.

PEIs also offer the opportunity to gain professional registration as Engineering or ICT Technician (EngTech or ICTech), Incorporated Engineer (IEng) or Chartered Engineer (CEng). Professional registration is recognised around the world. The letters after your name demonstrate academic ability, expertise, competence developed by work place experience and commitment to your chosen career.

Universities generally host careers fairs at which employers promote their job opportunities and graduate schemes.



Jaz MBE
Chartered Energy Manager MEI
Senior Manager of Energy &
Initiatives, Starbucks

See more engineering case studies:
tomorrowsengineers.org.uk/real-jobs

**You can find out more
about professional registration
and PEIs on the Engineering
Council's website:
www.engc.org.uk**

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'Engineering at University' was produced by EngineeringUK, The Institution of Civil Engineers, The Institution of Engineering and Technology and The Institution of Mechanical Engineers, with advice from the Institute of Physics and the Engineering Council.

These organisations work in collaboration (with support from the Royal Academy of Engineering), to develop engineering careers materials for the Tomorrow's Engineers programme, which exists to inspire young people to consider engineering careers.



IOP Institute of Physics

To order more copies of this booklet or for further information, please visit the Tomorrow's Engineers website:

www.tomorrowsengineers.org.uk



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