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Brilliant Inspiration

# What is engineering?



# Exciting jobs that make a difference

**Engineers transform the lives of billions of people. They are creative and hands-on. They solve problems, design and create things.**

## What subjects are useful for engineering?

Engineering uses **maths, science** - especially **physics** - and subjects such as **D&T, computing, electronics** and **construction**, to improve the world around us. One or more of these subjects will usually be required to study engineering at university.

Other GCSE (and equivalent) subjects are also useful to some types of engineering - for example, geography for civil and environmental engineering, chemistry for chemical and biomedical engineering, art and design for product design and design engineering and psychology for helping engineers understand how people think and feel about the world around them. Engineers often work on global projects - and so languages can also be an advantage.

## Engineering is for everyone

The UK needs lots of different types of people to follow their passion (whether that's music or the environment, sports or computer games) and use their unique, creative minds to improve people's lives through engineering and technology. You don't have to be top of the class in maths and science - if you like to think up solutions or you enjoy designing,

fixing and modifying things, or coming up with new inventions, - engineering could definitely be for you. There are many types of engineering to choose from - almost anything you can think of has engineering behind it. Engineers get to work with interesting people, do lots of different things at work, earn good money, help the planet and transform the way we live.



## Engineers improve the way we live

As an engineer, you could help solve some of the world's biggest challenges - from tackling climate change (developing more renewable power and finding sustainable ways to grow food, build houses and travel) to dealing with cyber security and maintaining clean water supplies for everyone.

You could be working with new materials, chemicals and technology to design sports clothing, develop cancer treatments or improve wind turbines. Or you might be part of a team that designs electric planes, surgical robots or earthquake detection systems.

# What's in it for you?

**Engineers have the potential to earn a great wage and have a fantastic career, doing what they love.**

## **Earn good money**

Engineering employers tend to pay more than the national minimum apprentice wage. People who graduate with engineering and technology degrees can expect to earn significantly more over their lifetime than graduates from most other subjects.\*

## **Enjoy a bright future**

The chances of finding and staying in employment are really good. Growing industries like space and satellite technology, medical engineering, advanced manufacturing and design consultancy along with 'green' jobs in renewable power,

electric vehicles, energy efficient products and new nuclear energy mean the future is bright for engineers.

## **Be in demand**

The ability to think creatively and solve practical problems – along with other skills such as team-work, managing budgets, project management and communication – makes engineers highly employable across lots of industries, and means that engineers can easily progress and experience different job roles throughout their working lives.

\*Graduate outcomes (LEO 2021): [www.gov.uk/government/collections/statistics-higher-education-graduate-employment-and-earnings](http://www.gov.uk/government/collections/statistics-higher-education-graduate-employment-and-earnings)

## **Meet the engineers**



### **Hiba, Civil Engineer**

Keeps people's homes safe from flooding and erosion.

“ It was important to me to feel like I'm part of something that's working towards the greater good, and I really feel like that in engineering.”

[www.neonfutures.org.uk/hiba](http://www.neonfutures.org.uk/hiba)



### **Ainsley, Rollercoaster Engineer**

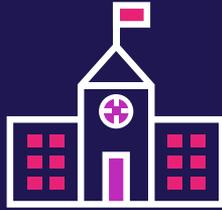
Puts the thrills and chills into your favourite rollercoasters!

“ Engineering involves finding solutions to problems or tasks. When a problem is fixed and the results are noticed, it gives me a great sense of achievement. ”

[neonfutures.org.uk/case-study/ainsley](http://neonfutures.org.uk/case-study/ainsley)



# Getting into engineering



## School

Useful subjects include: science (especially physics), maths, D&T, computing



## Sixth Form/FE

A levels / T levels /  
Highers / IB / TechBacc  
/HNC /HND /  
Foundation Degree



## University Degree

Bachelors (BEng / BSc)  
Masters (MEng)

On-the-job  
training



## Apprenticeships

At all levels, including Degree/  
Graduate Apprenticeship  
**Earn while you learn**



## Work

Professional registration  
(optional)



# Routes into engineering

## 11 to 16

### At school

**Studying science – especially physics – and maths at school will get you off to a great start. Design & technology, computing and other subjects such as electronics, construction, geography, art, psychology and languages can also be relevant.**

These subjects give you some of the skills engineers use and keep your options open for many different career pathways, including engineering. They could lead onto apprenticeships, college courses, university degrees and jobs.

## 16+

**There are several different routes into engineering; choose the path that's best for you.**

- Apprenticeships
- A Levels
- T levels
- Highers
- IB
- TechBacc
- Vocational qualifications
- University

Have a look at **UCAS** to find out more about post-16 options and qualifications

**[www.ucas.com/further-education/post-16-qualifications](http://www.ucas.com/further-education/post-16-qualifications)**

# Apprenticeships

**Apprenticeships allow you to earn money, combining on-the-job training with study.**

Apprenticeships are available at different levels – the higher and degree level apprenticeships tend to incorporate university degrees and can lead on to professional registration. The combination of qualifications and skills gained at work makes apprentices an attractive option for employers looking to recruit people with proven practical skills.

You'll generally need a minimum of five GCSEs (or equivalent), including English, mathematics and science or technology subjects, often at grades 9 to 4 (A\* to C) due to competition for places.

Many different types of apprenticeships exist in engineering, construction, manufacturing and technology, leading to jobs in a variety of industries, including transport, health, food, digital technology, aerospace, sustainability, design and power.

A huge number of new roles for apprentices, technicians, engineers and scientists are being created as a result of the UK's Net Zero target, requiring skilled workers to innovate solutions in areas such as power (e.g. wind and tidal power), transport (e.g. low-carbon air travel and improved cycle networks) and building (e.g. retrofitting and climate adaptation).

**You can find out more about apprenticeships here:**

- If you live in England [www.apprenticeships.gov.uk](http://www.apprenticeships.gov.uk)
- If you live in Scotland [www.apprenticeships.scot](http://www.apprenticeships.scot)
- If you live in Wales [www.careerswales.gov.wales/apprenticeships](http://www.careerswales.gov.wales/apprenticeships)
- If you live in Northern Ireland [www.nidirect.gov.uk/apprenticeships](http://www.nidirect.gov.uk/apprenticeships)

## What are T Levels?

**There are different qualifications available when you leave school, including T levels, A levels, Highers, IB, TechBacc and apprenticeships.**

T Levels are qualifications designed by employers, made up of 80% classroom learning and 20% work placement. They take 2 years to complete. T Levels are roughly equivalent to 3 A Levels and they can lead on to university, a higher or degree apprenticeship or a job.

There are several T Levels on offer, including:

- Design & Development for Engineering and Manufacturing
- Maintenance, Installation and Repair for Engineering and Manufacturing
- Building Services Engineering for Onsite Construction
- Science
- Digital Production, Design & Development
- Design, Surveying and Planning for Construction.

For a full list and to search for T Levels near you, visit: [www.tlevels.gov.uk/students](http://www.tlevels.gov.uk/students)

# University

**Eventually you might decide you want to do a degree in an engineering or related subject.**

Degree courses (BEng) normally last for 3 or 4 years whilst Masters courses (MEng) last for 4 or 5 years. Some courses involve a year working in industry, or a year abroad.

You could take a 'general engineering' degree or you might decide on a particular type of engineering, for example aerospace, biomedical, chemical, civil, electrical, electronic, materials, mechanical, software or one of the many other types of engineering!

You normally need to have studied maths and physics (or chemistry for chemical and biomedical engineering), or a relevant T Level or other vocational course to Level 3, in order to apply for engineering degrees at university.

**“ I enjoy working on real projects around the world which have a direct impact on people’s lives and society as a whole.”**

**Joshua, Research Engineer**  
Disaster response - earthquakes and tsunamis



# Beyond study

Whichever route you take into engineering, once you have the necessary qualifications and skills developed in the workplace you can apply to become professionally registered with a professional engineering institution. Like doctors and lawyers, professionally registered engineers are well respected.

Once registered, you can use letters after your name (such as CEng, meaning Chartered Engineer) so employers and customers all over the world can see that you've achieved a high standard of engineering professionalism.





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## Find out more

**There are plenty of opportunities to get involved in engineering, whatever stage you're at!**

From science and engineering clubs, fairs and attractions around the UK, to listening to podcasts, trying experiments at home, or entering competitions, take a look at our handy guide for students ([www.neonfutures.org.uk/student-guide](http://www.neonfutures.org.uk/student-guide)).

You can also find case studies, blogs, activities, careers resources, quizzes and more information about careers in engineering and technology, all on the Neon website - your teacher or careers adviser can explore this with you.

[www.neonfutures.org.uk](http://www.neonfutures.org.uk)

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Take the **Meet the future you quiz** to find out how your strengths and passions could lead to a career in engineering



[www.mtfy.org.uk](http://www.mtfy.org.uk)



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