

YOU

AND ENGINEERING: the routes to your engineering career

Do you love **creating** and **making things**? Do you like **problem solving**? Have you ever wondered **how things work**? If so, **engineering could be the career for you.**

Engineering is the application of maths and science to solve problems and bring ideas to life. Engineering makes things happen.

There are lots of different engineering jobs for you to choose from. You can be an electrical or electronic engineer, a marine engineer, power engineer, mechanical engineer, a transport engineer, a broadcasting engineer, a leisure planning engineer to name but a few of the **many engineering careers you can choose from!** You can work to create medical devices, impact on environmental issues, or alleviate poverty.

You don't need to be Einstein or a mathematical genius to be an engineer. You just need to be curious, like problem solving, and be prepared to work hard. In return you can earn good money, travel the world and enjoy variety at work. Engineers are always in demand.

What's not to like about choosing engineering as a career?

This wall chart will tell you about some of the different types of engineering and possible routes into this fascinating career.

Have a look. Think about it.

Change perceptions, change the world and always find excitement in this rewarding career.



Photographs from The IET Young Woman Engineer of the Year Awards 2018

IET INITIATIVES/PROJECTS:

The IET Women's Network is a cool place for engineers to virtually hang out, watch videos, share stories, ask questions and rate discussions. There is lots going so why not take a look? www.theiet.org/women

Every year, the Institution of Engineering and Technology recognises the achievements of young women engineers by hosting the IET Young Woman Engineer of the Year Awards. www.theiet.org/ywe



IET Faraday Challenge Days
Every year the IET holds an engineering based competition for school children across the UK. Teams must race against the clock to solve a real-life engineering problem, putting their engineering and technology knowledge and skills to the test.

The IET offers a number of **scholarships** should you choose engineering. The IET Power Academy Scholarships offer mentoring, paid summer placements, and money to spend on books. www.theiet.org/poweracademy or you could apply for the E3 scholarship which gets a company sponsor, bursary money, and a possible job with sponsoring company after graduation. www.E3Academy.org

The Women's Engineering Society promotes women and girls in engineering and is able to provide advice and support. We work closely with the IET, and co-ordinate events including National Women in Engineering Day on 23 June and the annual student conference for women engineers. www.wes.org.uk

The IET also offers **prizes** for those who really apply themselves to their studies (Manufacturing Engineering Student Prize) and provides you with over 100 local networks that can initiate prizes in your University or college (ICT Local Network Prizes). <http://bit.ly/1zKXK10>

THE IET WOMENS NETWORK

@IETWOMENNWORK

LEARN MORE ABOUT BECOMING...

...AN ELECTRONICS ENGINEER

Electronics Engineering is a sub-field within electrical engineering. Responsibilities include: designing new electronics, testing circuits, quality assurance, and project management. They are fully certified engineers who have completed a degree in electronics engineering. They can work in broadcasting, telecommunications, construction, mobile technologies and manufacturing industries.

...AN ELECTRICAL ENGINEER

Electrical engineers focus on the maintenance, design and improvement of products that are powered by or produce electricity. You might wire light aircrafts, automobiles, buildings, produce portable music products or GPS devices. You can be the person responsible for the electrical power of the phone in everybody's pocket, medical equipment a skyscraper or a robot!

...AN AERONAUTICAL ENGINEER

From building space vehicles to weapons systems, missiles and satellites, or ensuring that the aircraft plane is strong and safe. Not to mention the travel opportunities. You can even work on the different components that make up these aircrafts. Some professionals design jetliners while others draw up plans for passenger planes and new helicopters. An Aeronautical engineer is responsible for improving flight safety, fuel efficiency and much more.

...A STRUCTURAL ENGINEER

A structural engineer uses maths and science to shape the world that we live in. They design, create and solve problems. There are lots of areas to choose from: civil engineer (how building will impact the environment); structural engineer (will it stay together, hold up?) to building services (is the building comfortable, warm and liveable!).

...A MECHANICAL ENGINEER

As a mechanical engineer you could develop processes and products from the tiny (small component design) to large (large plant, machinery), finding efficient solutions to various problems as they come up. This field of engineering is considered as one of the most varied forms. You could find yourself working in any number of fields; medical, power and construction to name but a few.

...A SOFTWARE ENGINEER

As a software engineer you could work on systems as varied as Facebook or WhatsApp. Could you invent the new Playstation game or smart phone app that changes the world? There is a shortage in this area so loads of support is available if you choose this career. You could create, test, develop, and maintain all the computer software that you and millions of people use daily. Computer programs and applications are specially designed by application software engineers.

...A MECHATRONICS/ROBOTICS ENGINEER

A mechatronics/robotics engineer combines electronic and mechanical engineering. You could be designing, re-designing, constructing, testing, programming or operating intelligent products and systems. By mixing hardware and software, you would be producing the machinery/robots of the future which can be used for underwater exploration or improving production. You could be creating the next generation of robots!

...AN ENVIRONMENTAL ENGINEER

Environmental engineers investigate the quality of land, air and water in order to look for contaminants. Environmental engineers determine which contaminants are harmful. They produce purification systems for people in developing countries to provide them with improved water sources. So, the next time you brush your teeth, drink a glass of water or even take a bath, think of the environmental engineers who have enabled you to do so.

...A DESIGN ENGINEER

Design engineers help put together lots of different things, including any themed attractions that you may have visited. Fancy creating a game changing attraction and maybe seeing the world? This is a great career for creative people who are interested in engineering, physics and entertainment. A rollercoaster design team may include an electrical engineer, mechanical engineer, drafting and structural engineers.

...A BROADCASTING ENGINEER

The next time you watch a clip on YouTube or Instagram; remember an engineer made that happen. Broadcast and sound engineers operate, test, repair and install electronic equipment. This equipment is used to transmit radio, cable programmes and television. Did you know that they can also produce soundtracks for motion pictures and operate sound for concerts and live events?

...A MARINE ENGINEER

Marine engineering covers a broad spectrum: development and construction of new marine vessels and their component parts. These vessels could be anything from sailboats to military battleships and aircraft carriers. You may also get the opportunity to design engines, create blueprints, and experiment with propulsion devices!

OTHER TYPES OF ENGINEERING

Transport engineering, biomedical engineering, medical engineering, process engineering, nuclear engineering, drafting and design engineering, environmental engineering, vehicle engineering mining and geological engineering, thermal engineering. There are many roles to choose from!

Structural engineers make sure that buildings and bridges stand up. **It's a creative and exciting job!** You use some of the maths and physics you learn at school to solve problems, you work with architects and other engineers to design buildings and bridges which people use every day. The best part about it is watching your designs being built, and once it's built, you can point to it and say **"I made that!"**

ROMA AGRAWAL worked for six years on getting *The Shard*, the largest building in Western Europe, built. She is a founder of the *YourLife* campaign, and she previously featured in a campaign of *Leading Ladies* for M&S, alongside Rita Ora amongst other women of substance. www.romatheengineer.com

Here are some great examples of women who have been rewarded for their achievements in engineering.

IET YOUNG WOMAN ENGINEER OF THE YEAR AWARD WINNERS

The Young Woman Engineer (YWE) of the Year Awards was launched in 1978 by the Institution of Electrical and Electronic Engineers. It recognises the achievements of young women who are doing great things in engineering. Who knows, you could win this award one day!

- 2018 **SOPHIE HARKER**,
Aerodynamics and Performance Engineer for BAE Systems
- 2017 **DR OZAK ESU**,
Technical Lead at BRE
- 2016 **JENNI SIDEY**, Canadian
Space Agency Astronaut
- 2015 **ORLA MURPHY**,
Audio Engineer at Jaguar Land Rover



Above: winners and finalists of The IET Young Woman Engineer of the Year Awards 2018

"I was watching a TV show on how to build Jumbo Jet, which caught my attention... I thought, **why not, I'll give that a go!**"

SARA UNDERWOOD Rolls Royce Higher Apprentice

"It's about being able to **translate an idea to a finished product**, getting it registered, patented, installed **then used every day**"

YEWANDE AKINOLA Design Engineer

FEMALE ENGINEERS TODAY

GREAT FEMALE ENGINEERS

CAROLINE HASLETT Pioneer & Advocate of Women Engineers

Dame Caroline Haslett was the first secretary of the Women's Engineering Society (WES). Interested in engineering from an early age, Haslett had been taught to use tools by her railway fitter father. After WW1 she joined the Women's Engineering Society. She helped promote the study and practice of engineering among women and promoted the use of electrical appliances in the household. She was awarded a Damehood in 1947.



ADA LOVELACE The Mother of all Computers

Ada Lovelace created the mathematics that helped make computers possible. She showed great promise from an early age. Charles Babbage, the father of the modern computer, acknowledged that he relied upon Ada's mathematical contribution. A century later Alan Turing used her notes to create the first modern computer. Her genius is annually recognised on Ada Lovelace day: www.findingada.com



DELIA DERBYSHIRE Sound engineer, Dr Who theme creator

Born of a working class background, Delia Derbyshire was accepted at both Oxford and Cambridge universities. In her early career companies refused her employment simply because she was a woman. She persevered, joining the BBC's radio-phonetic workshop. Paul McCartney visited her in the 1960's. She created one of the first songs to be entirely made up of electronic music, the Dr Who theme.



VICTORIA DRUMMOND Sea Going Engineer and Trailblazer

Born in Scotland to a seafaring family, Victoria Drummond (1894-1978) would be a trailblazer in a number of ways. She received many awards in World War Two for bravery in combat. In 1920, she completed her apprenticeship. Apart from being the first woman marine engineer in the UK, she went on to be the first female member of the Institute of Marine Engineers. She made 49 ocean-going voyages in her career.



ALICE PERRY First Qualified Engineer in the British Isles

Born in Galway, Ireland, Alice Perry (1885- 1969) came from a strong engineering family. She graduated with a first class degree in civil engineering in 1906. She is generally considered the first woman to graduate as an engineer in the British Isles.



www.theiet.org/women

The IET is a world leading professional organisation sharing and advancing knowledge to promote science, engineering and technology across the world. The Institution of Engineering and Technology is registered as a Charity in England & Wales (no 211014) and Scotland (no SC038698).

References and Acknowledgements
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theiet.org/womens-network; educatingengineers.com/career-specialties; wes.org.uk; seavision.org.uk; telegraph.co.uk.
With thanks to the Drummond family & the Library of Scotland.

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General routes into ENGINEERING

- 1. & 3. & 4. → 5.
- 1. & 2. & 4. → 5.
- 1. & 2. → 5.

1. SCHOOL



Subjects to study...
Science, Physics, Maths, Design and Technology, Computing, Chemistry

2. APPRENTICESHIP



Intermediate/Advanced / Higher
or
Earn while you learn - NVQ/SVQ/BTEC

3. SIXTH FORM / COLLEGE



A levels/IB/Highers (or equivalent)
or
BTEC/HND/HNC
or
Foundation degree

4. UNIVERSITY / DEGREE



Bachelors (BEng)
or
Masters (MEng)

5. WORK



See types of engineering on this wall chart.