

## Engineering:

You can enter engineering at a range of levels, so there are opportunities for people who have a few GCSEs right up to postgraduate-level qualifications. This leaflet looks at the various routes into engineering. To find out about the different branches of engineering, see the et Engineering - areas of work.

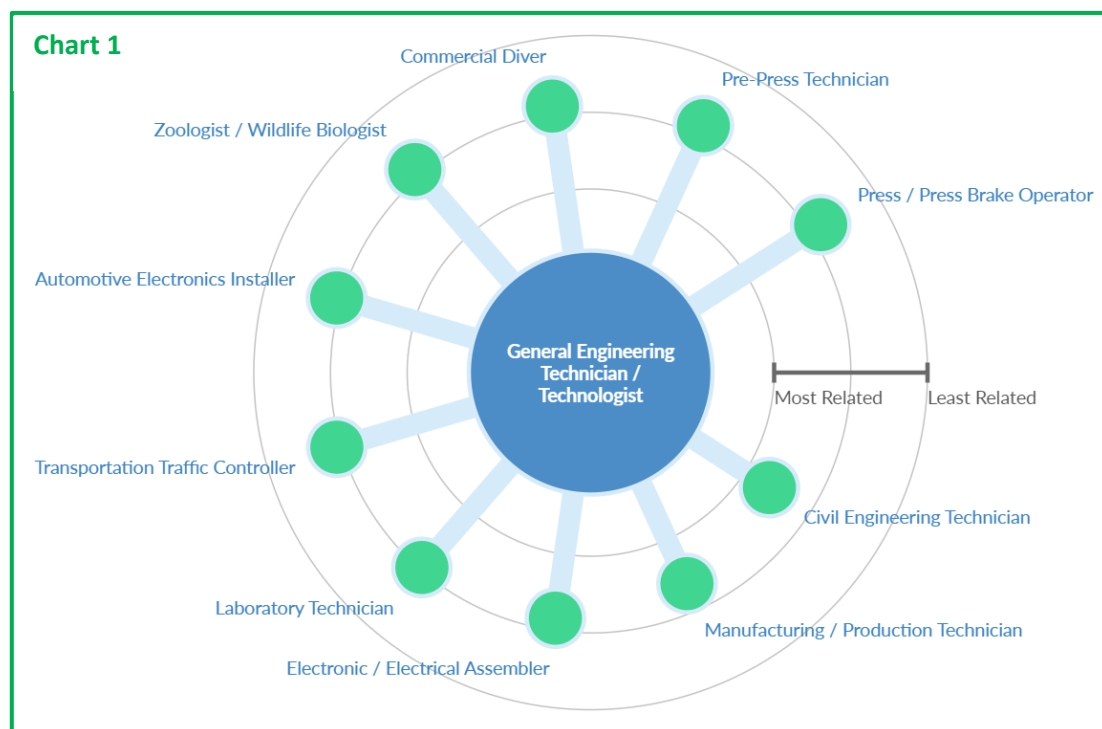
### What it takes:

At any level of entry, if you are considering engineering you need to be:

- interested in maths, science, computing, and design and technology
- keen to understand how things work and to keep up with new developments
- a practical and creative person who enjoys solving problems
- good at working in a team and communicating with others
- able to prioritise tasks and manage your time.

Higher-level positions usually call for management and leadership skills. For some jobs, employers may check that your colour vision is adequate for the tasks involved.

**Chart 1 shows different starting roles in General Engineering/ Technologist:**



### Operatives:

Operatives, or operators, may work on an assembly line putting components together with hand tools, operate machinery, or work in quality assurance, packing or scheduled maintenance (under supervision). Many of the tasks are simple and repetitive, but sometimes an operative has just one complex task that takes practice to learn. Initial training on the job may last from a few days to a few weeks. Some employers encourage their operatives to learn to do several tasks, as this provides

flexibility and makes the work more interesting. It may be possible to work towards a relevant qualification through part-time study or in the workplace. Apprenticeship Level 2 (see above).

### **Craftspeople:**

Craftspeople have high levels of skills in specific tasks or working with equipment. They might, for example, follow technical drawings to set up a computer-operated lathe or undertake installations. Relevant qualifications can be gained through part-time study or in the workplace. Level 3 Apprenticeships (see above) are the main training route into skilled craft-level work.

### **Technicians:**

Technicians do a wide variety of technical and supervisory jobs. They may help with design and development, producing prototypes, testing, quality control, maintenance etc. Training is mainly offered through level 3 Apprenticeships. After completing an Apprenticeship at this level, it's possible to progress to a Higher or Degree Apprenticeship or continue with part-time study to achieve an HNC/D, foundation degree or a level 4 competence-based qualification. It is possible to achieve professional registration as an Engineering Technician (EngTech) - see below.

### **Engineers:**

As well as work-based routes (e.g. Degree Apprenticeships) potential engineers may start by taking a relevant full-time higher education course. Just a few examples of available BEng and MEng (integrated masters) subjects include aerospace, automotive, chemical, civil, electrical and electronic, and mechanical engineering. Alternatively, there are a few general engineering degree courses, in which you specialise during the latter part of the course. Once working, you will specialise further. Any experience gained in the workplace is useful. Certain degree courses are offered on a sandwich basis, where you spend a year on placement in industry.

Many large engineering companies offer internships for students (e.g. in the summer vacations); you can find out more on some of the websites listed under Further Information. It may be possible to get sponsorship (or a scholarship) from an employer (including the Armed Forces) or another organisation - this can include financial support for all or part of your degree and paid industrial experience.

Ask course admissions tutors if they are aware of possible sources of funding and look on the websites of major employers. You can find out more in general, in the leaflet on Sponsorship, scholarships and charitable trusts. Entry to an engineering degree requires A levels or equivalent qualifications. Maths is normally required; physics or another related scientific/technological subject (such as chemistry, for chemical engineering) is often also required or preferred.

An alternative level 3 qualification, such as a relevant T level or BTEC Level 3 National (possibly with another qualification alongside, e.g. A level maths) may be acceptable for entry. Higher grades/UCAS Tariff points may be required for direct entry to an integrated MEng degree course. People without relevant entry qualifications may be able to take a foundation year to prepare them for an engineering degree. Check course entry requirements carefully, as they do vary. See higher education directories and websites, and the UCAS website - [www.ucas.com](http://www.ucas.com).

HNC/D courses and foundation degrees are also available. These work-related qualifications take two years to complete on a full-time basis but may also be taken part time over a longer period (often while in relevant employment). Further study can usually lead to an honour's degree. Adults: Course entry requirements may be relaxed for students with appropriate experience. An Access to Higher Education Diploma in engineering can provide an alternative entry route into higher education. Skills Bootcamps are free, flexible courses designed for those aged 19+ and may provide a route into engineering for those without much prior experience.

To prepare potential engineers for industry, there are a few alternative ways to study. A few examples are given below.

The Dyson Institute of Engineering & Technology - [www.dysoninstitute.com](http://www.dysoninstitute.com) - offers a four-year residential programme in Wiltshire. Participants work on real-life projects whilst also studying for BEng/MEng degree.

As mentioned earlier, it's also possible to gain a degree through a Degree Apprenticeship. These are available for training in various areas of engineering including aerospace, manufacturing and systems engineering. Depending on the Apprenticeship, they may lead to initial registration as an EngTech, Incorporated Engineer (IEng) or Chartered Engineer (CEng) - see below. Incorporated Engineers use knowledge and practical methods to design, develop, manufacture, operate and maintain engineering processes and products. They manage the technology used to deliver these processes. They are often team leaders, managing and developing other staff and have some involvement in project management and financial planning. Chartered Engineers generally have the most creative and innovative jobs, often developing solutions to complex engineering problems. They work at the highest level of research and development, planning, designing and managing major engineering projects. They manage, mentor and coach professional staff.

### Getting started:

If you are still in full-time education, maths and science are particularly important subjects. Design and technology, and computer science are also relevant. There are courses where you can learn about engineering before entering the workplace or committing to further study. However, it is not essential to have followed one of these courses to enter engineering as a career. Depending on the stage you are at in your studies, the engineering (and related) qualifications at levels 1 to 3 that may be available to you locally include:

- GCSE engineering or electronics, or AS/A level in electronics
- BTEC Level 1/Level 2 Tech Award in engineering
- BTEC Level 1/Level 2 First qualifications in engineering
- BTEC Level 3 National qualifications in engineering or in certain aspects of engineering, such as aeronautical, mechanical or electrical and electronic engineering
- OCR Level 1/2 Cambridge National qualifications in engineering design, engineering manufacture or engineering programmable systems
- OCR Level 2 and Level 3 Cambridge Technical qualifications in engineering; there are specialist pathways in certain areas of engineering within the larger sized qualifications
- WJEC Level 1/2 Vocational Award in engineering
- T level qualifications are available in certain schools and colleges in England; they can lead to skilled employment or higher education. Relevant T levels are: building services engineering for construction
- design and development for engineering and manufacturing
- engineering, manufacturing, processing and control
- maintenance installation and repair for engineering and manufacture
- design, surveying and planning for construction (this has a specialism in civil engineering)
- agriculture, land management and production (the specialism in land-based engineering).

Programmes differ in their content, focus and assessment, so research courses carefully to find out which would suit you best.

## Apprenticeships:

Apprenticeships offer structured training in the workplace and can provide a route into engineering at various levels. Depending on the level, they can take anything from one to five years (or longer) to complete. Training involves both experiences gained in the workplace and learning at a college, training centre, or university. Apprenticeships either lead to industry-recognised qualifications or standards. Progression may be possible from one level of Apprenticeship to the next. Employers set their own entry requirements, so these vary. They will want to make sure that you have the right attitude and can cope with the level of study involved. Some companies and training providers use assessment tests to help choose the most suitable applicants. The following will give you an idea of what is expected at different levels.

**Level 2 Apprenticeships** - employers often look for GCSE passes in subjects such as English and maths (and possibly science or other subjects) or equivalent qualifications. Some employers ask for a specific number of GCSEs and/or certain GCSE grades.

**Level 3 Apprenticeships** - as a minimum you are likely to need GCSEs at grades 9-4/A\*-C in English and maths, although many employers ask for four or five GCSEs at grades 9-4/A\*-C, including English, maths and science or another relevant subject. Higher grades, especially in maths, may be required. There can be a lot of competition for Apprenticeship opportunities at this level and some candidates have A level or equivalent qualifications.

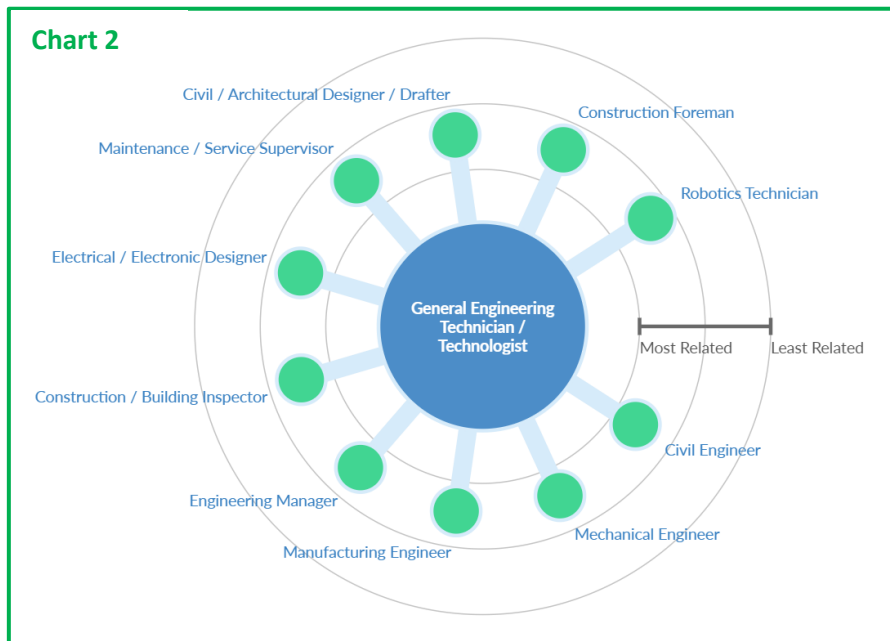
**Higher Apprenticeships** - combine study for qualifications/standards at level 4 or above, with learning in the workplace, and Degree Apprenticeships involve university study for a degree (level 6), master's degree (level 7) or equivalent. Entry can be particularly competitive, and requirements vary. You generally need relevant qualifications at level 3 or above for an Apprenticeship at levels 4-6, and there may be specific subject and grade requirements.

For more details on Apprenticeships and to search for vacancies, see: [www.apprenticeships.gov.uk](http://www.apprenticeships.gov.uk)

## Higher Technical Qualifications (HTQs):

In England, these are level 4 and 5 qualifications such as foundation degrees, HNC/Ds and Higher Apprenticeships, in technical subjects that have been quality marked by the Institute for Apprenticeships and Technical Education as being aligned to employer-led occupational standards. HTQs in engineering will start to become available from September 2024. Some are offered through Institutes of Technology (groups of colleges, universities and employers). For information, see: <https://institutesoftechnology.org.uk>.

Chart 2 below demonstrates progression opportunities from the roles in chart 1, when working in Engineering:



### Prospects and pay:

There are job opportunities in many areas in both the public and private sectors, and in the Armed Forces. It's possible to work your way up to engineer from craft or technician level. As their careers progress, engineers will find themselves more involved in project management and leading teams of engineers and technicians. Many engineers move into general management. Teaching in further and higher education is also possible. Some engineers spend time working overseas. Salaries vary widely depending on the area of engineering, location, employer and exact job role. As a guide, operatives can earn in the region of £16-25,000, crafts people up to around £33,000 and technicians with experience up to £45,000. The average starting salary for engineering graduates is almost £30,000, but this can rise rapidly. According to a 2023 salary survey by The Engineer magazine, the average pay for an engineer is £57,300; in certain areas of work and for the most senior roles salaries can be much higher.

