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The Different Types of Engineering (And Their Career Paths) Explained





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The Different Types of Engineering (And Their Career Paths) Explained

Being an engineer doesn't just encompass one job. In fact, engineering is a large family of careers. Whilst all engineering careers share a number of core general skills, they quickly branch out into different specialisms that require very different skillsets.

Before thinking about which pathway you want to take into engineering - e.g. academic or vocational - it's important to have a good grasp of what type of engineering you want to specialise in. This will, after all, affect some of your really crucial decisions; e.g. what qualifications you decide to study or what company/organisation you ultimately find yourself working for.

It's worth noting that there are a number of overlaps between different types of engineering, and some types of engineering would require you to have similar passions and skills.

Whilst there are a wide range of engineering specialisms to choose from, it might be useful to look at some of the more general engineering fields first.

Civil engineering - the study and construction of infrastructure, such as roads, bridges, buildings and utilities. Within civil engineering sit specialism like structural engineering and mechanical engineering.

Mechanical engineering - simply put, mechanical engineering is the study of machines and mechanical systems. Within the field of mechanical engineering are specialisms such

as aeronautical engineering, automotive engineering and biomedical engineering.

Electrical and electronic engineering - engineering that specialises on electrical and electronic equipment, interfaces and communications. Electrical engineering tends to focus on larger scale electrical equipment and power, whilst electronic engineering is more focused on smaller electronic devices and electronic circuits.

Chemical engineering - this engineering field is concerned with how biological and chemical processes can be used to develop new materials and substances. This is a very broad and multi-disciplinary family of engineering disciplines, encompassing life sciences, experimental sciences, environmental sciences, as well as aspects of mathematics and economics.

So let's dig deeper into each of these four engineering fields, the specialisms within each one, and the skills you'll need to succeed in a future career.

Civil Engineering

Civil engineering involves the planning, design, construction and maintenance of infrastructures of all shapes and sizes. As well as encompassing a wider range of civil and structural engineering disciplines, civil engineering also exists as a discipline and career path in its own right.

Civil engineering covers all aspects of planning, designing and maintaining structures on both a large and small scale. A civil engineer could be working to design a building, or working on

the development of an entire transport system.

Civil engineers must always be mindful of real world concerns and considerations. This means that civil engineering also intersects with environmental, financial, legal and ethical issues. It's a form of engineering where you will always [be mixing theoretical problem solving with practical, real-world application](#), influenced by the needs of communities and wider society.

How will I know if civil engineering is right for me?

If you're someone who likes designing and building things, then civil engineering might be for you. A civil engineer will be required to combine mathematical problem solving skills with design, IT and technology skills.

Other skills and competencies that a successful civil engineer will be required to have include:

- **Good communication skills:-** civil engineers will be required to work alongside other stakeholders on a project, like construction managers, architects and even investors. Communication is key!
- **The ability to lead and project manage:-** civil engineers work on large projects and sometimes very long-term projects, with multiple stakeholders and potentially large budgets. A civil engineer will be required to manage people, budgets, deadlines and resources effectively!

What sort of work does a civil engineer do?

The work of a civil engineer is rich and varied (hence why you need to combine technical skills with softer personal skills such

as management, communication and teamwork). A career as a civil engineering may see you doing any of the following:

- Creating and developing designs with the aid of software.
- Resolving design and development issues.
- Managing budgets and resources.
- Undertaking feasibility studies and assessing the sustainability and environmental impact of projects.
- Ensuring that projects comply with legal, health and safety requirements.
- Ensuring that projects are completed on schedule and within budget.
-

What kind of companies/industries could I work for as a civil engineer?

Civil engineers [work in a wide range of industries](#) and in with a wide range of companies and organisations. Below are some examples of some of the civil engineering project/areas you could find yourself working in.

- **Water and public health** - a civil engineer might be working on creating sustainable water drainage systems or improving infrastructure to prevent urban flooding.
- **Rail** - a civil engineer might work on projects like improving a railway system's infrastructure, such as tracks, power, earthworks and drainage.
- **Tunnelling** - this would require more specialist structural engineering knowledge, including working with rock tunnelling, shafts, underground caverns. It would also require health and safety knowledge and an awareness of wider environmental considerations.
- **Energy and power** - Civil engineers could work to design and build infrastructure for the creation of energy, such as the design of an offshore wind farm or the maintenance of an oil platform.

- **Highways** - a civil engineer might be working on ways to ease traffic congestion, improve road safety and improve the environmental impact of highways.
- **Geotechnical** - a specialist area where a civil engineer would be responsible for the foundation of structures. This type of civil engineering specialises in the completion of site investigations, designing foundations and overseeing on-site construction work.



Civil engineering specialisms

Within the field of civil engineering there are a number of specialisms that you may wish to consider.

Structural engineering

This is a sub-discipline of civil engineering that involves

the design of man-made structures. You can expect to work alongside architects and other types of engineers [to design a whole range of buildings and structures](#), from hospitals to houses, office blocks to oil rigs. The basic responsibilities and competencies of a structural engineer include:

- Analyse the configuration of the basic components of a structure.
- Assess how the inclusion of different materials (e.g timber, concrete, brick) will affect the overall structural design.
- Calculate the stresses or strains that each component will experience from other parts of a structure due to (for example) human use or environmental pressures.
- Design specifications and computer models for other contractors.
- Evaluate structures that may at risk of collapse and make recommendations on improving their structural integrity.

As with civil engineering, structural engineering offers a range of employment opportunities, and examples of areas where a structural engineer's skills would be required include:

- Aircraft manufacturers
- Local authorities
- Railway companies.

Architectural engineering

Architectural engineers design the mechanical and structural system of a building, such as structures, acoustics, electrical, ventilation and lighting systems. (it's worth noting that architectural engineers are very different from architects, but will often work alongside them).



What pathways are there into a civil engineering degree?

There are a number of ways you can work towards a civil engineering qualification - be they academic, vocational or apprenticeship qualifications. A few examples of the routes into a civil engineering are listed below.

The academic route



The academic route into civil engineering will most likely involve taking the necessary A-levels or IB qualifications to gain entry onto a Civil Engineering degree at university; your academic options at university include either a Bachelor of Engineering (BEng) or a Masters of Engineering (MEng) qualification.

In order to take the academic route into civil engineering, there are certain A-levels that universities are looking for. These include:

- **Maths** (and possibly Further Maths)
- **Physics** - this can help a civil engineer understand concepts such as force, energy and motion.
- **Geography and geology** - this can help to give civil engineers an important understanding of the physical world.
- **Information and communication technology** - using computer programmes

and applications will be highly sought after skills in the course of a civil engineering career

Other helpful A-level or IB related subjects if you're thinking of becoming a civil engineer include

- **Modern languages** - (e.g. French, Spanish, German) these can be helpful, as civil engineering is increasingly an international profession, where you'll be working with clients and companies from all over the world.
- **Art or design based courses** - civil engineering is a career that involves a lot of creative problem solving, and art and design-based subjects can provide you with useful soft skills.

The apprenticeship route

There are a range of advanced (or Level 3) apprenticeships or degree level apprenticeships that allow you to earn while you train to be a civil engineer. More specifically.

Advanced Apprenticeships - civil engineering apprentices can get paid whilst working towards civil engineering related BTEC or NVQ qualifications through a local college.

Degree level apprenticeships - these are civil engineering qualifications equivalent to doing an HNC, HND or bachelors degree.

The Institute for Civil Engineering [lists a number of relevant civil engineering apprenticeships](#).

The vocational route

There are a number of vocational civil engineering qualifications that will allow you to combine classroom based learning with

on-the-job training. Types of qualification include NVQs, SVQs, BTECs and City and Guild Qualifications.

If you're looking at a vocational route into civil engineering, then, according to the Institute for Civil Engineering, three qualifications you may wish to research further include:

- The BTEC Diploma in Construction & The Built Environment - Civil Engineering
- The BTEC Extended Diploma in Construction and The Built Environment - Civil Engineering.
- The Higher National Certificate in Civil Engineering (this is a Scottish qualification).

Electric and electronic engineering

Both these forms of engineering are essentially focussed on the application of electrical power.

Whilst electrical engineering is more concerned with the production and supply of electrical power, electronic engineering is concerned with smaller electronic components, such as those used in computers.

If you want some examples of just how much electronic and electrical engineering impacts the world around us, consider that its led to the invention of universal electrical power, radio, television or medical imaging technology!

As with civil engineering, electrical/electronic engineers will need to combine technical skills with project management skills and (probably) commercial awareness, as you can expect to be working with other stakeholders and engineering professionals

on large projects.

How will I know if electrical/electronic engineering is right for me?

Electrical engineers are often great problem solvers and innovators. So electrical/electronic engineering might be the right path for you if you enjoy studying mathematics or physics, or if you just enjoy understanding how electrical devices and systems work.



In addition, if you're interested in technological innovations, or

shaping future developments in electrical/electronic power and production, then this could be the right type of engineering for you.

Electrical and electronic engineering require a range of skills and competencies, including:

- Analytical and problem solving skills
- Attention to detail.
- Commercial awareness of the electrical/electronic sector
- Project management and planning skills
- Oral and written communication skills to help translate complex ideas and technical concepts into easy-to-understand information (e.g. for other stakeholders who don't have an engineering background)
- Knowledge of coding and programming languages

What sort of work does an electrical/electronic engineer do?

Electrical engineering

Electrical engineers can expect to work in the design and manufacture of electrical systems across a range of industries, including

- The building and construction industry; e.g. the electrical systems behind lighting, heating and ventilation.
- Transportation infrastructure and networks.
- The production and distribution of power/electricity.

An electrical engineer can expect to be involved in a project from conception to final implementation and testing. Some of the specific jobs that an electrical engineer could expect to do include:

- Identify customer requirements and discuss proposals with clients.
- Design electrical systems and products.
- Service and maintain electrical equipment.
- Design and conduct tests on/with electrical equipment.
- Record, analyse and interpret test data.

Electronic engineering

An electronic engineer will work with electronic components, equipment and devices, from initial conception to final manufacture and implementation. The types of industry/ specialisms that an electronic engineer can work in is:

- Working with medical instruments
- Mobile phones and mobile telecommunications
- Radio and satellite communications
- Satellite technology
- Nanotechnology
- Robotics

The responsibilities will be similar that of an electrical engineer, and your day-to-day job may include:

- Discussing proposals with clients.
- Designing new systems, circuits and devices.

- Improve the design of a piece of electronic equipment.
- Ensure safety regulations are met in the design process.
- Create user friendly interfaces for electronic devices and equipment.

What kind of companies & organisations could I work for as an electrical/electronic engineer?

As either an electronic or electrical engineer, you can expect to work for a range of private and public sector organisations all round the world. Let's look at some of them in more detail.

Electrical engineering employers

Electrical engineers could be employed by any of the following organisations:

- Energy and renewable energy companies.
- Manufacturing and industrial production companies.
- Specialist engineering and consultancy firms.
- Research and development companies in the defence sector.
- The armed forces (e.g. the army, the navy, the Royal Air Force)
- Telecommunications industries.

Electronic engineering employers

As a qualified electronic engineer, you could expect to work in a broad range of fields or with the following companies

- Digital technology firms.
- Electronic equipment manufacturers
- Utility companies.
- Robotics
- Nanotechnology.
- Research establishments and institutions.
- The defence sector.

Electronic/electrical engineering specialisms

We've already touched on a number of the specialisms within the field of electric/electronic engineering. But it's worth digging a bit deeper into some of the career paths you could follow with your qualification.

Computer Engineering

This specialisation combines electronic engineering with computer science. As a computer engineer, you might work with artificial intelligence, computer systems and their architecture. You could find yourself working with building or improving computer hardware or software systems.

Further specialisations for a computer engineer could include working with:

- Cryptography (creating rules & protocols that help to keep people's data private and secure).
- Computer chip, circuit & system designs
- CCTV surveillance
- Network communications



Robotic engineering

This specialisation would allow you to work in the design, development and production of robots and automated systems. You could get practical experience of robotic programming and the repair and maintenance of robotic machinery.

And some other specialisations...

- **Communications & the media** - you could use your electrical/electronic engineering skills to work in the media, including satellite technology, fiber-optic communications and wireless networks. You could go work in television/radio broadcasting or internet services.
- **Power generation and supply** - the need for power generation and distribution will mean that your skills as an electrical engineer would be in

high demand. You could be responsible for designing energy generation and conversion facilities, and managing the supply of energy to individuals and organisations.

What are the pathways into electrical/electronic engineering?

Like civil engineering, you've got three main pathways into electronic/electrical engineering - academic qualifications, vocational qualifications or an apprenticeship.

The academic route

If you want to take the A-level/Scottish Higher/International Baccalaureate route into electrical engineering and eventually study towards an academic degree, then you'll need to have good grades in qualifications including:

- Maths
- Physics
- Computer Science.

The apprenticeship route

There are a range of advanced (or Level 3) apprenticeships or degree level apprenticeships that allow you to earn while you are training to be an electrical or electronic engineer. More specifically.

Advanced Apprenticeships - electrical/electronic engineering apprentices can get paid whilst working towards electronic/electrical engineering related BTEC or NVQ qualifications through a local college.

Degree level apprenticeships - electrical/electronic engineering qualifications equivalent to doing an HNC, HND or bachelors degree.

There are a number of companies offering great opportunities for electrical/electronic engineering apprentices. Companies and organisations like Laing O'Rourke, the RAF, BT and Virgin Media offer on the job training in a range of electronic engineering specialisations.

The vocational route

There are a number of vocational electronic/electrical engineering qualifications that will allow you to combine classroom based learning with on-the-job training. There are a number of notable vocational electrical/electronic engineering qualifications worth looking into.

- The BTEC Level 3 Diploma in Electronic/Electrical Engineering
- The BTEC HNC Diploma in Electrical Engineering.

There are also a number of specialist NVQ qualifications for electrical/electronic engineers who want to take the vocational route. A few include:

- Controlling Printed Circuit and Allied Circuit Assembly (NVQ)
- Manufacturing Electronic Motors and Generators (NVQ)

- Leading Electronic Components and Manufacture (NVQ)

Chemical engineering

Put simply, chemical engineering concerns the use of chemical and biological processes to produce new and useful materials. The field of chemical engineering combines chemistry and physics along with life sciences such as biology, microbiology and biochemistry. It's also a field of engineering that requires some knowledge of maths and economics.

As with the other fields of engineering we've covered so far, chemical engineering encompasses a wide range of career paths, competencies and skill sets. But, broadly speaking, a chemical engineer is responsible for designing, developing, producing and managing the industrial processes that turn raw materials into useful products. A chemical engineering career will see you work in a range of industries and sectors, such as food and drink, pharmaceuticals, plastics and the energy sector.

Chemical engineering has a number of entry routes - you can take more of a natural sciences route or more of a mathematical/computer science into chemical engineering.

How will I know if chemical engineering is right for me?

Chemical engineering might be the right pathway for you if you're interested in chemistry and/or biology, or if you've just got an interest in the [industrial and chemical processes that go into making everyday items and products](#).

You may also want to think about chemical engineering if you're a strong maths or economics student, as a chemical engineer will

need to have a strong commercial awareness, as well as being versed in health and safety considerations when working with chemical/industrial processes.

Some of the specific skills and competencies required of a chemical engineer include:

- A good chemistry/biology/life sciences background.
- Commercial and business awareness.
- Resource management and project management skills.
- Analytical and problem solving abilities.
- Good oral and written communication skills.

What sort of work does a chemical engineer do?

Chemical engineers will work in the research, design, development, operation and modification of industrial and chemical processes that produce a wide range of items. You can expect to be working with teams of other chemical engineers and chemical engineering technicians.

More specifically, a chemical engineer could expect to do any of the following jobs.

- Researching new products from initial trial and testing, right through to bringing them to market.
- Working on the design, installation and commission of new production plants.
- Modifying existing processing plants.
- Developing improvements to product lines.
- Optimising and improving production processes.



- Resolving safety issues in the production process, including environmental and health & safety considerations.

Depending on the sector you work in, you could find yourself working in a lab, an office or a processing plant, or you could work across all three.

Working towards as a chemical engineering qualification o

What companies & organisations could I work for as an electrical engineer?

We've already briefly touched on the range of industries and careers that are open to you as a chemical engineer. Below is a more extensive list of some of the industries where your skills could be in demand. If you're interested in becoming a chemical engineer, it's worth looking into apprenticeships or [graduate schemes with companies](#) in any of the following sectors!

- Alternative energy
- Cosmetics
- Consumer goods
- Nuclear energy
- The oil and gas industry.
- Pharmaceuticals
- Plastics and polymers.
- Textiles.
- Waste management.

Chemical engineers could also find themselves working in the other fields of engineering, such as civil engineering or electronic engineering (or at least projects or sectors that intersect with them).

Chemical engineering specialisms

Should you wish to specialise within the field of chemical engineering, there are plenty of opportunities to do so! After all, it's arguably one of the broadest engineering fields out there, requiring knowledge of a whole range of scientific disciplines.

Environmental engineering

Environmental engineering involves finding solutions that to improving and maintaining the quality of the environment and natural ecosystems. An environmental engineer could find themselves working to design, maintain and improve water and waste management systems, solutions for air pollution control.

It's also worth noting that some university courses also offer environmental engineering specialisations as part of civil engineering and mechanical engineering (see above).

Agricultural engineering

Agricultural engineers develop and design biofuels and food processing methods, as well as develop sustainable farming technologies and renewable energy sources. Agricultural engineering is a highly specialised field, and courses for this branch of engineering might be harder to find.

Chemical reaction engineering

This specialisation deals with chemical reactors, specifically within industrial plants. Chemical reaction engineering involves the management of industrial reactors and process plants.

Process engineering

A process engineer works to optimise the design, operation and control of chemical, physical and biological processes to turn raw materials into everyday products. Like chemical engineering, process engineering encompasses a range of industries, including agriculture, the automotive sector, food materials, the petrochemical industry and the pharmaceutical industry. Another career path that opens up a lot of doors!

Process design

Process design is a highly specialised and challenging job within the field of chemical engineering. It involves the design of an individual unit process (or step) within a larger chemical engineering process. A process designer would be responsible for devising, operating and improving these unit processes.

What pathways are there into chemical engineering?

The academic route

The academic route into chemical engineering is arguably the most common in the UK. In order to become a chemical engineer, it helps if you do an engineering degree that is accredited by either the Institute for Chemical Engineers or the Institution of Engineering and Technology.

If you're at school and you think you want to take the academic

route into chemical engineering, then you'll need an A* or A grade in maths and chemistry. You'll also need to take A-levels in other sciences such as biology and physics. Subjects like Economics or Geography might also be useful.

It's also worth noting that, if you want to go on to be a chemical engineer, you don't necessarily have to study a chemical engineering degree. Other university degrees that might provide a path into a chemical engineering career include the following. You can still become a chartered chemical engineer if you study any of the following relevant degrees subjects

- Applied chemistry
- Chemistry
- Biochemical/process engineering
- Biomedical engineering
- Environmental engineering
- Nuclear engineering

The apprenticeship route

There are some chemical engineering related apprenticeships with UK companies, as well as Product Technician and Process Operations apprenticeships that can allow you to work towards a chemical engineering qualification.

However, it's worth noting that chemical engineering apprenticeships are a bit more rare and those that do exist will be quite competitive. Universities and industry are working to develop and offer more chemical engineering apprenticeships.

The vocational route

A number of universities around the country offered BTEC Higher National Diplomas (HNDs) in Chemical Engineering for students wishing to take the vocational route into this sector.

Many university degrees will accept BTEC Nationals (Level 3) in Engineering or Applied Science for entrance onto a chemical engineering degree. For more information on vocational route is available into a chemical engineering degree, it's worth visiting the websites of individual universities, or searching chemical engineering degrees on UCAS.

Mechanical engineering

Mechanical engineering is the design, manufacture and maintenance of mechanical systems. If you're thinking about going into the field of mechanical engineering, it's another very broad and diverse field that offers a lot of career options.

As a mechanical engineer you'll work with a wide range of mechanical processes and products, ranging from small component designs to extremely large plants, machinery or vehicles.

How will I know if mechanical engineering is right for me?

If you're interested in machines or mechanical systems and how they work, then this is the right form of engineering for you. Mechanical engineering might be a good fit for you if you're also interested in computing, data analysis and designing/developing new mechanical processes and products.

In terms of overall skills required by mechanical engineers, you will need to demonstrate:

- Creativity
- Technical expertise
- Practical problem solving skills.
- Good maths and numeracy skills.
- Strong IT skills (skills in computer aided design are also useful)
- Oral and written communication skills.
- Strong organisational skills.

What sort of work does a mechanical engineer do?

Because of the range of industries and sectors where a mechanical engineer's skills are in demand, you could find yourself doing any of the following types of jobs.

- Research and develop mechanical products.
- Develop new materials and technologies.
- Develop and testing theoretical designs.
- Make sure that products will work properly in specific operating environments.
- Design equipment modifications to improve the safety and reliability of a mechanical process or product.
- Work with, and manage other professionals, both inside and outside the engineering sector.

As you advance in your career, you might be able to move into more senior engineering roles, or move into the business functions like sales/marketing or procurement.

What companies and organisations can I work for as a mechanical engineer?

Mechanical engineering is another field that shapes a lot of the products and services we all use and rely on. Like some of the other engineering sectors we've covered, mechanical engineering is a career full of possibilities! Examples include:

- The aerospace and automotive industries.
- The armed forces and defence industries
- The construction/building industry.
- Engineering consultancies.
- Manufacturing industries
- Medical industries.
- Oil and gas industries.
- The pharmaceutical industry.
- Transport, e.g. road and rail engineering.

The work of a mechanical engineer will differ slightly depending on the industry you're working in. Let's look at a few examples.

- **Transportation:** designing and improving road, rail and air transportation systems.
- **Manufacturing:** a mechanical engineer would be involved in the design and development of machinery used in different production processes.
- **Nanotechnology:** this is an exciting new field for mechanical engineers! You could put your skills to use in sectors such as molecular biology, quantum computing and nanoelectronics.
- **Robotics:** a specialism in this area could lead to a mechanical engineer career specialising in areas such as the development of artificial intelligence or virtual reality.

If you take the academic route into mechanical engineering and you can work towards Chartered Engineer status, which can help to give you higher earning potential and improved career prospects.

Mechanical engineering specialisms

There are a range of specialisms within mechanical engineering, and indeed some of these are completely different engineering fields in their own right. It's worth bearing this in mind as you consider your mechanical engineering options and interests.

Aerospace/aeronautical engineering

Aerospace/aeronautical engineering is sometimes grouped within the field of mechanical engineering and there is a lot of crossover between the two; however it's also a fairly broad engineering field in its own right.

Aeronautical engineering might be for you if you're interested in the history and methodology of aircraft, or if you're interested in the theories and mechanics of propulsion and flight. Studying aeronautical engineering could lead to you becoming an aeronautical engineer or an aeronautical designer, among other things.

Some of the further specialisms within aerospace engineering include:

- **Aerodynamics:** the study of how objects in motion interact with the atmosphere.
- **Avionics:** working on the electronics used on aircraft, satellites and spacecraft; this includes flight instrumentation, cockpit displays, navigation

equipment, communication and air traffic control equipment.

- **Propulsion:** the development, production and assembly of aircraft engines.
- **Structures and materials:** working with the structures of aircraft and the structural behaviors of aircraft under load.

Again, studying aeronautical engineering will require a strong maths and physics background, and an interest in research methodology, experiments and data collection & analysis are all important.

Automotive engineering

Automotive engineering is concerned with the design and operation of ground vehicles, and their engineering systems. An automotive engineer would find themselves designing automotive products and vehicles, e.g. cars, buses and trucks.

In automotive engineering, you could find yourself specialising in things such as structural design, exhaust systems or engines. Some examples of an automotive engineer's job include:

- Building prototypes of automotive components and testing their performance.
- Solve automotive engineering problems using mechanical, electrical, hydraulic and thermodynamic principles.
- Decide on the most appropriate materials for component production.

As with many other fields, an automotive engineer will need to have [good commercial and business awareness as well as engineering skills](#). For example, when developing new designs or manufacturing procedures, an automotive engineer would need good knowledge of customer needs, environmental regulations and supply chain management.

Biomedical engineering

Biomedical engineering involves applying engineering principles to the field of healthcare. It involves designing, developing and medical equipment and products. A biomedical engineer could work in industries such as health services, medical equipment manufacturing or in the field of biomedical research.

Examples of the kinds of products that a biomedical engineer would help to develop include robotic surgical instruments or joint replacements. A few examples of your responsibilities as a biomedical engineer include:

- Conduct research to solve clinical problems.
- Use computer software or mathematical models to design devices or equipment.
- Working closely with other medical professionals, as well as patients and their carers.
- Arranging clinical trials of medical products.
- Liaising with technicians and manufacturers to assess the feasibility of a product.

Biomedical jobs are available [both in the NHS and the private sector](#). You can also expect to be attending a lot of conferences and exhibitions. You don't need to take a degree in biomedical engineering to qualify; you can also qualify through a degree in electrical engineering, mechanical engineering or even studying physics.

What pathways are there into mechanical engineering and its associated fields?

As we've seen, mechanical engineering is a pretty large field, encompassing some major sub-disciplines. There are a lot of career routes and options within the field of mechanical engineering. Let's break down a few of them:



The academic route

If you're an A-level/IB or Scottish Highers student, then [you'll need good grades in maths or physics](#) to work in mechanical engineering, as well as some of the associated fields such as aeronautical engineering. Other sciences such as chemistry and biology might also be useful, especially if you're interested in

something like biomedical engineering.

The apprenticeship route

Many companies in the UK offer apprenticeships [in the field of mechanical engineering](#) and its various branches and specialisations.

If you want to work in the more specialised fields of mechanical engineering we've covered, such as the aeronautic or automotive sectors, then there are a number of apprenticeships on offer from businesses and companies in this sector.

For example, companies like Jaguar Landrover, Toyota Manufacturing and BMW Group UK and Vauxhall Motors all offer automotive engineering apprenticeships at various levels. Likewise, airline companies such as Easyjet and Monarch are just a few examples of some of where you could find an apprenticeship in aeronautical or avionics engineering.

The vocational route

There are a number of vocational qualifications that will allow you into the various fields of mechanical engineering. A few examples include:

BTEC National Diploma in Mechanical Engineering

This vocational qualification offers students an introduction to the basic principles of mechanical engineering, including mechanical principles, mathematics for engineering technicians and health and safety in the workplace; optional modules include teaching students about some of the business and commercial aspects of mechanical engineering.

NVQ competency-based qualifications

There are a number of NVQ qualifications that might be relevant to you if you want to get into the field of mechanical engineering. For example:

- Students could take a [number of different specialised courses](#) in Mechanical Manufacturing Engineering.
- There are two courses worth looking into if you're interested in aeronautical engineering, including Aeronautic Engineering, Aerospace & Aviation Engineering and Aviation Operations on the Ground
- NVQs in Automotive Engineering and Automotive Management & Leadership.

City & Guilds qualifications

City and Guilds also offer a number of work-based, vocational qualifications in the field of mechanical engineering. These include:

- Mechanical Manufacturing Engineering.
- Aeronautical Engineering & Maintenance.
- Motor Vehicle Engineering.

Other engineering specialisations

It probably won't surprise you to know that there are many more engineering specialisations out there. Here's a quick rundown

Geological Engineering

Geological engineering is a specialism that involves dealing

with soil, rock and groundwater conditions and other geological factors that may affect construction projects. In order to specialise in geological engineering, it's helpful for you to have studied sciences or geography.

Marine Engineering

Marine engineering is a specialised form of engineering that involves the design and development of boats, ships, underwater craft, as well as equipment used at sea (e.g. drilling equipment). Again, this is a heavily specialised area of engineering.

Nuclear Engineering

There are a range of specialisms within the field of nuclear engineering, which broadly encompasses the design, construction and maintenance of nuclear power plants. Specialisms include quality control, health and safety, instrumentation and control engineering. You can also enter nuclear engineering from a chemical engineering and electrical engineering background.

Petroleum engineering

Engineering related to the extraction and production of crude oil and petroleum. In order to qualify as a petroleum engineer, it's necessary to have studied physics, or already possess a grounding in chemical engineering.

Engineering Management

If you're interested in learning the business side of engineering, then this specialisation might be for you. As you may have guessed, this qualification will prepare for you a management

role within the engineering sector.

At university, you may find that engineering management degrees are a part of a business faculty, as opposed to the engineering faculty.

As we said at the beginning, engineering encompasses a large family of degrees and career paths. All of these paths will lead to a career path where your skills will be in-demand. If you're still at school, and you're thinking about which engineering specialisation is right for you, ask yourself these questions:

What is it that interests you about your engineering specialism and why?

Are you interested in electrical systems and how they work? Do you see yourself managing major infrastructure projects? Ask yourself why this field of engineering interests you, and what contribution you see yourself over the course of your career.

What conditions will you be working in?

It's important you take this into account. Do you see yourself working in a factory, in a lab or in an office? Will your engineering specialism lead to you doing a lot of travelling with your job? You need to think about how you work best and what kind of working environment makes you happy.

What qualifications will you need to succeed in your engineering specialism?

As we've seen, some engineering fields have multiple routes of entry - be they vocational, academic or via an apprenticeship. But if you know that you want to go into a very specific field of



engineering, then you need to think about what skill-sets you need, and consider which qualifications will get you there.

For example, if you want to go into something specialist like petroleum engineering, it may be helpful to have a grounding in chemical engineering more generally (whether you take an academic degree or a higher level vocational qualification/apprenticeship)

If you want to know more about the process of researching and honing the right engineering pathway, check out some of our other resources.

About this Resource

This resource was created by the Born to Engineer team.

Born to Engineers mission is to drive community-engaged learning, promote engineering and support the UKs next generation of engineers.

Who Are And What Do We Do?

The ‘Born to Engineer’ campaign was created by the ERA Foundation to consolidate its outreach work. The ERA Foundation uses ‘Born to Engineer’ to support a wide range of Engineering and STEM scholarships and attempts to raising the profile of the engineering and manufacturing industry through supporting lectures, seminars and conferences, as well funding the “Born to Engineer” website and series of short films.

About the Author

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