Getting into engineering - mechanical and materials

What types of jobs can I do?

Engineering is developing rapidly, reflected by the growth of new job roles and interdisciplinary fields such as medical and environmental engineering. This is due to significant scientific and technological advances plus as global challenges such as climate change, health, population and the availability of food, water, and energy.

A vast range of jobs are available in many different branches of engineering, so considering the type of work you are interested in will help you know what you are looking for when job-hunting. Examples include:

**Research, Design and Development:** aims to develop new products or improve the efficiency and performance of existing designs. Computer Aided Design (CAD) is used to develop both new products and production systems by producing technical plans and prototypes. R&D departments are generally found within many forward-looking, innovative engineering and technology organisations.

**Academia:** academics conduct and analyse experiments to develop new and better technologies, processes and applications. Universities and other higher education institutions employ researchers to undertake teaching, and research, for example working on cutting-edge areas such as Nanotechnology or Tribology; which have the potential to help reduce energy consumption and CO2 emissions of machines.

**Manufacturing and technical services:** engineers in this type of job plan, design, install, modify and monitor manufacturing and technical processes to produce cost-effective, high quality products and systems. A typical role would be working within control and instrumentation or maintenance departments maintaining equipment used to monitor and control engineering systems, machinery and processes e.g. vehicles, aircrafts, satellites, production systems, energy plants and much more.

**Management:** project management involves managing and overseeing the delivery of projects on time and within budget, assigning tasks to the technical engineering team and ensuring client satisfaction. Operations management puts effective methods into place so that the company’s day-to-day operations run smoothly. For example, the main responsibilities of an operations manager include handling logistics, preparing budgets and stock, and the supervision of employees.

**Regulatory affairs:** is made up of the following areas: Quality assurance engineers monitor and improve the quality of the company’s products and minimise production costs by enhancing productivity and efficiency in the manufacturing process. Health and Safety/Inspection jobs are found mainly within industrial and systems engineering, and focus on ensuring that machinery and systems behave in line with safety regulations even when their component parts malfunction or fail. Test engineers are responsible for verifying that products meet the correct specifications. They determine the best way a test can be performed using different processes.

**Technical sales and procurement:** Sales engineers provide pre- and post-sales technical advice and support. Engineers working in procurement focus on the acquisition of goods, services or works from an external source. The aim in both jobs is for the materials and products to be sold or procured at the best possible cost to meet the needs of the company in terms of quality, quantity, profit, time, and location.

In each of these roles it is possible to work ‘in-house’ for an organisation, or as a consultant, providing technical expertise to clients.

The Prospects website [www.prospects.ac.uk](http://www.prospects.ac.uk) has information about different industries and job profiles, such as Engineering and Manufacturing: [www.prospects.ac.uk/engineering_manufacturing_sector.htm](http://www.prospects.ac.uk/engineering_manufacturing_sector.htm)

Find out how graduates from the University of London got into these types of careers, their employers, salary, and job title at: [http://wlgd.thecareersgroup.co.uk](http://wlgd.thecareersgroup.co.uk).

See also our ‘Getting into...’ industry guides on related areas such as the enviroment, biotechnology, business services and data science for more detailed information about opportunities and job hunting in these fields.
Another point to consider is the area or branch of engineering in which you would like to work, such as aerospace, transport and logistics or manufacturing. Engineering graduates typically start in technical roles learning about the different disciplines within the company, before moving into a more senior engineer post. Job titles are not fixed, so remember to use broad search terms to avoid missing out on vacancies e.g. Trainee Applications Engineer and Graduate Technical Engineer are 2 ways of describing what could be a very similar role.

**Automotive:** involved in the design, production and operation of vehicles, such as motorcycles, cars and buses.
- Stress engineer
- Hybrid systems engineer
- Aerodynamics engineer

**Manufacturing & Production:** the efficient production of high quality goods using the most cost-effective methods and with the aim of reducing the impact of production on the environment.
- Manufacturing engineer
- Quality assurance engineer
- 3D printing engineer

**Medical & Dental:** engineering focused on medical sciences to produce devices for diagnosis, treatment or rehabilitation.
- Biomaterials engineer
- Medical field service engineer

**Aerospace & Defence:** concerned with the research, design, development, construction and testing of aircraft and spacecraft.
- Composite research engineer
- Graduate aerodynamicist
- Manufacturing engineer

**Examples of opportunities for Mechanical and Materials graduates**

**Metals, minerals & materials:** exploration, extraction & processing of raw materials, or investigation into behaviour of materials to improve their performance e.g. durability.
- Metallurgist
- Mineral surveyor
- Materials technologist

**Energy:** production and sale of energy (petroleum, gas, electrical power, nuclear power and renewable energy) including fuel extraction, manufacturing, refining & distribution.
- Nuclear design engineer
- Micro renewable technical specialist
- Wind turbine engineer

**Civil:** design, construction and maintenance of the physical and naturally built environment e.g. buildings, roads, bridges, canals and dams. Sub-branches include transportation engineering, urban engineering and water resources engineering. Roles are open to graduates from non civil engineering degrees e.g. mechanical engineering, maths, geography with relevant postgraduate qualifications.
- Building services engineer
- Water engineer

**Chemical:** includes molecular, materials and process engineering. Jobs exist in the pharmaceutical, Fast Moving Consumer Goods (FMCG), energy, cosmetics, nanotechnology, and medical industries. To become a chartered engineer in this field, check your degree is accredited by the Institution of Chemical Engineers.
- Food process engineer
- Nanotechnology engineer

In certain engineering branches such as civil, chemical and naval architecture, specific degrees in the subject area may be preferred by recruiters. However, these career areas are still accessible to other graduates who have shown a committed interest and / or completed relevant postgraduate study. When considering further study make sure the course is accredited by the relevant professional association e.g. The Institution of Chemical Engineers (IChemE).

**Where can I work?**

It is also important to think of the **location** and **type** of organisation you would like to work for, as well as your work lifestyle. Opportunities in engineering exist throughout the UK and internationally. Some organisations may base their work entirely abroad, possibly requiring lengthy field trips away from home. Willingness to work outdoors and in different climates may be required, particularly for offshore oil jobs. For most jobs you will be working indoors - in offices, laboratories, industrial plants or production sites. The hours can be long and unsociable and the job may be stressful on occasions. It is important to take account of these different factors when you are deciding where to apply.
Engineers work across all sectors including small, medium and large companies and corporations in the private sector. This could include working in industry - manufacturing, energy and construction companies in the UK and internationally. Alternatively, a role in the company’s headquarters might involve more office based functions such as writing project reports, undertaking consultancy, management tasks etc.

Opportunities also exist in the public sector, typically working for the national and local government or the armed forces. Engineers in the civil service provide expertise for technical policy formulation or implementation for example, or in areas such as education, construction, and healthcare services. A clinical engineering technologist for the NHS is responsible for the servicing, repair and maintenance of medical equipment. Other public sector agencies such as universities and research institutes also employ engineers for teaching and/or research.

Engineers can also work in the “third sector” (charities and non-governmental organisations e.g. RedR or Télécoms Sans Frontières) using their technical skills to create better living conditions for communities across the globe.

What skills do I need?

“Soft” skills such as communication, creativity, and commercial awareness are just as important as technical expertise. These are often developed through work experience and involvement in projects/group work. Finding opportunities to develop and practise these skills, and explaining them on your CV/application, shows employers that you can work alongside colleagues smoothly and effectively in a variety of social and professional situations.

Knowing the skills required for a role can help you decide whether this is something you will enjoy or if it is right for you. Reading different job descriptions will give you an idea of what employers in this industry are looking for. Recruiters will want to see evidence of these skills on your application (from your work experience, degree and extra-curricular activities), so understanding what they want will allow you to promote yourself effectively. QM Careers Consultants can help you to identify the skills required and to match your CV/application to each vacancy.

In this industry, employers are likely to be looking for candidates with:

**Effective communication skills:** These are required to draft reports, give technical instructions, share ideas and make presentations. Listening skills are just as essential; engineers need to hear what their colleagues, customers, clients or project partners are saying and build on this to communicate with different audiences.

**Analytical, critical thinking, problem-solving skills:** Engineers consider various ways of approaching and resolving problems in order to create feasible solutions. The ability to make professional judgements is essential: this means analysing/interpreting data and assessing/managing risks while balancing issues such as costs, benefits, quality, health and safety.

**Planning and organisational skills:** Projects require thorough planning and prioritisation to ensure deadlines are met. Understanding the scope of a project and how individual elements operate as part of the overall scheme is crucial.

**Creativity:** This is particularly important in design and R&D roles, where thinking innovatively and laterally can help formulate break-through designs and ingenious solutions.

**Commercial awareness:** Keeping up to date with technological advances is vital in order to demonstrate your interest and enthusiasm to employers. Understanding business and economic matters, as well as the impact of engineering on society and the environment, will provide engineers with a ‘bigger picture’ view and an ability to make informed decisions.

**Team working, management and leadership:** Engineering often involves working in large teams with different backgrounds and skill sets, including non engineers, so team work is essential. Engineers who are also project managers must know how to build a team, taking into account items such as goal setting, communication and collaboration.

**Attention to detail:** An engineer must pay meticulous attention to detail. The slightest error can cause an entire structure to fail, so every aspect must be reviewed thoroughly and continually during the course of completing a project.

If there are any skills that you feel you need to develop, try to gain some work experience or volunteering where you can use that skill so you can add it to your CV.
Finding work experience and graduate jobs

For most roles, work experience is highly valued, if not essential. It builds your skills and convinces future employers of your abilities and commitment to the job. It will give you a better understanding of the industry and of different job roles, develop your commercial awareness and strengthen future job applications, giving you an advantage over other candidates. It is also an opportunity to build a contacts network, which is valuable when looking for further work experience or graduate jobs. If you want to work in industry also consider business work experience such as a first year insight week.

Speculative Applications

Work experience can also be gained through internships, Summer placements and more informal work experience or work shadowing. As well as searching for jobs online, improve your chances by making speculative applications. This is where you contact companies you are interested in directly to ask whether they have any placements or work shadowing opportunities. This is a common method of finding opportunities and can be very effective, as many of these roles will not be advertised. Look for companies that fit your skills and interests, e.g. work in the area you studied for your final project. You are more likely to be successful if you make your application specific to the organisation and demonstrate your suitability and interest in that particular employer. Although you may see yourself working in a large company, the greatest number of jobs are actually in small and medium sized companies. Smaller organisations are often more flexible with their recruitment and are more likely to consider work experience positions.

Most professional bodies and trade associations have online directories of companies that you could send speculative applications to (see websites listed later in this handout). Also keep in mind ‘spin-out’ companies (normally a company that has developed out of a university or a research project) which are likely to have opportunities which are not advertised but found through networking and speculative applications.

Networking

Attending employer and careers events is another way to find out about companies and get advice from their employees. Build your network by attending talks, insight days, conferences and by being a member of a relevant university student society. Consider becoming a member of a professional body or engineering society to take advantage of their networking opportunities. Twitter, LinkedIn and Facebook can be valuable tools for keeping up-to-date with careers information, events, news and jobs. Create/update your LinkedIn profile and find interesting LinkedIn groups to join and like relevant pages on Facebook.

Industrial placements

The school of Engineering and Materials Science offers optional industrial experience. A placement is typically 10-12 months working for a company in a paid role. It is fantastic experience for your CV and can count towards the requirements to be a chartered engineer. Sometimes employers hire students who perform well on their placements. Contact the Placement and Careers team in SEMS for further information and see www.sems.qmul.ac.uk/placementsandcareers/

Plan from your first year – most large engineering businesses advertise placements a year in advance. It is important to plan ahead to find the area[s] and companies that interest you, so you don’t miss deadlines. Placements are competitive and recruiters will look for a combination of good academic results with evidence of career commitment and work experience. Many employers take applications from students at the start of their 2nd year, so you need to have relevant experiences in your 1st year to include e.g. industrial visits, work shadowing and non-engineering experience like being a Student Ambassador.

Other ways to gain experience

Volunteering, extra-curricular activities and part time work are also valuable opportunities to develop your skills. Any experience that enhances your communication skills, requires you to work in a team or demonstrates accountability or initiative, for example, will enhance your CV. Employers recognise this as evidence that you have developed your soft skills and have applied knowledge in a professional environment. Having a range of interests and experience will give you lots to talk about at interview and shows you are somebody who is enthusiastic, motivated and gets involved so likely to be an asset in the workplace.
Opportunities at QM

There are a number of things you can do at Queen Mary to gain experience and skills relevant to an engineering career. This offers another way of getting experience and building your CV.

- **QRecruit** – [www.careers.qmul.ac.uk/qrecruit](http://www.careers.qmul.ac.uk/qrecruit) is our work experience hub for Queen Mary students. You can browse through available internships or temp work, or upload your CV to get informed of new opportunities. Don’t forget you can always get your CV checked at Careers before you upload it.
- **QProjects** is a local work experience scheme run by QM Careers, linking students to interesting projects in local charities. Many projects provide the opportunity to use numerical, analytical and client facing skills in a professional environment. Hours are flexible and require only a day a week of your time: [www.careers.qmul.ac.uk/qmprojects](http://www.careers.qmul.ac.uk/qmprojects)
- You could get involved with the engineering, business or environment society relevant to what you want to do in the future. There are national student competitions that societies can enter, which can build your skills and boosts your CV. Find a list of student societies here: [www.qmsu.org/societies/](http://www.qmsu.org/societies/).
- **QMSU Volunteering** work with local organisations to offer opportunities to QM students, including business, health and conservation which can help to develop leadership and project management skills: [www.qmsu.org/volunteering/](http://www.qmsu.org/volunteering/)

### Job boards and employer sites

Once you have found vacancy websites you like, add them to your favourites and check them regularly for updates. NB: Be aware when searching online that job titles may differ for similar job roles; additionally remember the same job titles can be used for very different roles, so read the job description and person specification for fuller information.

**QM JobOnline:** [www.careers.qmul.ac.uk/jobs](http://www.careers.qmul.ac.uk/jobs)
- A range of roles across all industries. Remember data and analysis vacancies will exist across all sectors.

**Civil Service:** [www.civilservice.gov.uk/recruitment/entry](http://www.civilservice.gov.uk/recruitment/entry)
- Vacancies, work experience opportunities and list of departments eg Defence Science and Technology Laboratory

**Earthworks:** [www.earthworks-jobs.com/](http://www.earthworks-jobs.com/)
- Vacancies include renewable energy, environmental engineering, oil and gas

**Engineer Board:** [www.engineerboard.co.uk/](http://www.engineerboard.co.uk/)
- Opportunities in all branches of engineering plus, Fast Moving Consumer Goods (FMCG), utilities, energy and water.

**Jobs.ac.uk:** [www.jobs.ac.uk](http://www.jobs.ac.uk)
- Academic, research and support positions in all fields

**Just Engineers:** [www.justengineers.net/](http://www.justengineers.net/)
- UK and Worldwide jobs including mechanical, structural, electrical, gas, oil and more. Browse jobs by sector or location.

**NHS Careers:** [www.nhscareers.nhs.uk](http://www.nhscareers.nhs.uk)
- Job profiles, training programmes and job listings

**Target Jobs:** [http://targetjobs.co.uk](http://targetjobs.co.uk)
- A range of graduate jobs, schemes and internships advertised. Careers and application advice.

**Fish4jobs (previously The Career Engineer):** [www.fish4.co.uk/jobs/uk/engineer](http://www.fish4.co.uk/jobs/uk/engineer)
- Vacancies in a range of industries with a range of graduate jobs available.
How can I find employers to apply to?

Professional bodies, trade associations & directories

Every branch of engineering has its own professional body or learned society. Many advertise work experience placements and jobs, and have directories of their members which you can contact directly for work opportunities. Some are listed below, but a Google search of your branch of engineering with ‘institute’, ‘society’ or ‘association’ will provide further organisations e.g. Royal Aeronautical Society. Some resources are only available to members, but often reduced student rates are available. Information about courses, training and news is also usually available and networking and educational events are often organised: these activities are useful for keeping up to date with industry developments (commercial awareness) and developing skills as well as making contacts.

The Institute of Mechanical Engineering (I MechE): www.imeche.org/
- Provides news, events and detailed industry information: www.imeche.org/knowledge/industries

The Institute of Materials, Minerals and Mining: www.iom3.org
- Provides news, publications, grants and networking opportunities with advice on how to find work experience.

Institute of Chemical Engineers: http://cms.icheime.org
- News, events and resources plus placement opportunities. See careers video: www.rsc.org/careers-jobs

Aerospace Defence Security Group: www.adsgroup.org.uk
- Trade association for the aerospace, defence and security industries, with company directories for each category.

Association of Consultancy and Engineering: www.acenet.co.uk
- Excellent jobs board, news and resources plus undergraduate research bursaries (apply via School)

Association of British Healthcare Industries: www.abhi.org.uk
- Medical technology sector news, resources and member directory: www.abhi.org.uk/productsearch/memberlist.aspx

UK Science Park Association: www.if-jobs.com
- Advertises vacancies in UK science parks. For a directory of members see: www.ukspa.org.uk/science_parks/

Institute of Physics and Engineering in Medicine: www.ipem.ac.uk
- Provides sector news and information, links to related societies and a job board.

Institute of Energy: www.energyinst.org/
- Careers information plus search members directory: www.energyinst.org/membership/company-membership/CompanyMembersDirectory

Royal Academy of Engineering: www.raeng.org.uk/
- Academic community of engineers. Includes the latest news and events to advance and promote engineering.

The Engineer: www.theengineer.co.uk/
- Provides industry news, product news, video, blogs, podcasts, webinars and forthcoming events.

Engineering Council: www.engan.org.uk/
- Regulatory body for the engineering profession which maintains internationally recognised standards of professional competence and ethics. The website includes industry news and details of course accreditations.

A google search using key words like ‘Engineering consultancies near London’ can bring up other useful resources and company listings. You can also find potential employers through LinkedIn. Use the companies tab to search by keyword, then filter by location and industry sector. Learn how to use LinkedIn to find companies and people - videos available at http://university.linkedin.com/index.html
The following general business directories are another way of finding small and medium sized companies:

**Kompass International business directory:** [gb.kompass.com](http://gb.kompass.com/) [search by supplier sector]

**Federation of small business UK directory of small businesses:** [www.fsbonline.co.uk](http://www.fsbonline.co.uk/)

**Yell.com:** [www.yell.com](http://www.yell.com/)

**Applegate:** [www.applegate.co.uk](http://www.applegate.co.uk/)

**UK Small Business Directory:** [www.uksmallbusinessdirectory.co.uk](http://www.uksmallbusinessdirectory.co.uk/)

**London Directory:** [www.londondirectory.co.uk](http://www.londondirectory.co.uk/)

### Recruitment agencies

Temping (a series of temporary jobs in various organisations through an agency) is an excellent way of building your skills and experience. It is also a way to try different roles and organisations to help you decide which area you want to follow.

Search the Employment and Recruitment Confederation website [https://www.rec.uk.com/help-and-advice/jobseekers](https://www.rec.uk.com/help-and-advice/jobseekers) for specialist engineering recruitment agencies. It is helpful to know the type of work or organisation you are interested in before you contact an agency, so you can be specific about what it is you are looking for. Some agencies may require previous work experience.

Examples include [www.gradcracker.com](http://www.gradcracker.com/), [www.matchtech.com](http://www.matchtech.com/), and [www.beechwoodrecruit.com](http://www.beechwoodrecruit.com/)

### Further study

A postgraduate qualification is not usually essential for entry into an engineering or manufacturing job, but it can speed progress to the next level. For certain roles it is mandatory for employees to obtain professional accreditation or qualifications. See the relevant professional body for information on qualifications required, and lists of accredited courses.

Read job adverts and person specifications for the roles you are looking to apply for in the future to identify exactly what level and type of qualification they require. Employers often encourage professional development, and some may cover tuition fees and grant study leave. For further details see:

**FindaMasters:** [www.findamasters.com](http://www.findamasters.com/)

**FindaPHD:** [www.findaphd.com](http://www.findaphd.com)

**Jobs.ac.uk:** [www.jobs.ac.uk](http://www.jobs.ac.uk)

**PostgraduateStudentships:** [www.postgraduatestudentships.co.uk](http://www.postgraduatestudentships.co.uk)

### Case studies

Learn about what a job entails or how to get into the sector from people who already work there.

Prospects has case studies on a number of engineering roles: [www.prospects.ac.uk/types_of_jobs_engineering.htm](http://www.prospects.ac.uk/types_of_jobs_engineering.htm)

The following websites have video case-studies on a range of engineering related jobs:

**www.careersbox.co.uk** (select ‘energy and engineering’ from the categories on the left)

**www.careerplayer.com** (select ‘engineering and manufacturing’ in the video quick jump)

**icould.com** (select ‘career videos’ and search under by job type under ‘chemicals’, ‘environment, animals and plants’, ‘engineering’, or ‘manufacturing and production’)

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