Getting into engineering - electrical and electronic

What types of jobs can I do?

New job roles and specialisms are developing in this field, chiefly due to technological advancements characterised by trends in automation, miniaturisation, nanotechnology and digitalisation. These developments are impacting every industry and have sparked a growth of new markets and novel application fields. As a result industries are merging - for example health and electronics are becoming increasingly linked, as the use of robotics and complex diagnostic and monitoring devices are being used within medicine.

Complex technology and systems are required to support the increasing virtualisation of our communication and work habits - partly due to the growth of outsourcing, virtual collaboration and remote working. Opportunities also exist in supporting the growing digital (internet) economy, facilitating the expansion of ‘big data’ and supplying the increasing demand for hi-tech goods.

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 discover and create new knowledge and to develop new innovations and/or improve the efficiency and performance of existing products, methods and services. Opportunities can be found in industry or within Academia – at universities and research intuitions.

Manufacturing and technical services: here engineers design, install, modify and monitor manufacturing and technical processes. Production and processes are becoming increasingly digitised e.g. smart factories and 3D printing. Control and instrumentation engineers maintain equipment used to monitor and control engineering systems for machinery.

Management: project management staff oversee workers, budgets and resources to ensure projects are delivered on time and on budget. Operations management aims for production to be as efficient and profitable as possible e.g. processes are in place to ensure equipment is working and that stock and resources are monitored to ensure minimum waste and maximum output.

Regulatory affairs: consists of quality assurance, where the quality of products are monitored to prevent defects, test engineers design and conduct testing within manufacturing to ensure products meet company specifications and Health and Safety/Inspection engineers focus on ensuring equipment and processes function according to regulations.

Technical sales and procurement: Sales engineers provide technical sales advice and support for company products, while engineers in procurement purchase goods and/or services from external organisations considering cost, quantity, quality 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. Remember there are also general technology jobs and graduate schemes for which engineering, computer science and physics students can apply. These types of jobs are usually found in financial services, retail, and the public sector.

The Prospects website 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 and IT and Information Services: www.prospects.ac.uk/IT_and_information_services_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.

See also our ‘Getting into...’ industry guides on related areas such as the environment, biotechnology, business services and data science for more detailed information about opportunities and job hunting in these fields.

www.careers.qmul.ac.uk
Another point to consider is the area or branch of engineering you would like to work in. Graduates typically start in technical roles learning about the different disciplines within the company, before moving into a more senior role as leadership, project management and people management skills are gained. Being flexible and adaptable are important - not only to meet the changing needs of industry, but it is also common to work in different sub-sectors (see diagram below).

Most job titles will be trainee/junior engineer (or scientist), graduate analyst or development engineer, for example. 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 two ways of describing what could be a very similar role.

**Automotive & Aeronautical:**
electronics is an important part of this industry, that could involve dealing with engine control units, safety systems, in-vehicle and electric car systems.

**Medical & Dental:** producing and maintaining medical devices for diagnosis, treatment and rehabilitation. Developing areas include robotics, bionics, imaging equipment and devices for self-diagnosis.

**Defence & (national/personal) security:** development and maintainance of security equipment and systems. Developing areas include biometric security e.g. retina scanning, cyber security, robotics and advanced satellite systems.

**Examples of opportunities in Electrical and Electronic Engineering**

**Examples of opportunities in Electrical and Electronic Engineering**

**Construction services:** engineers design and oversee the installation and maintainance of increasingly sophisticated power, lighting, fire systems and security systems. Home automation is a key growth area.

**IT industry:** includes the development of software, hardware and computer network infrastructure. This area is growing rapidly with emerging markets in cloud computing and web-based industries.

**Electronics industry:** research & development, design, manufacture and testing of electronic devices such as smart phones, computers, security systems etc. Demand from consumers for hi-tech goods and ‘the latest gadget’ is increasing.

**Transport and logistics:** the design, maintenance and monitoring of signalling and railway control systems. Electrical engineers maintain power distribution and energy management for railway networks.

**Telecommunication:** the design and installation of telecommunication devices, equipment and network systems for telephone, broadcast, communication satellites and internet connections.

**Defence & (national/personal) security:** development and maintainance of security equipment and systems.

**Energy:** involves the operation of power distribution systems and providing technical assurance and support for all energy plants. ‘Green’ jobs making energy production cleaner or in renewable energy (e.g. using solar nano materials for power generation) continue to grow.

**Defence & (national/personal) security:** development and maintainance of security equipment and systems.

Where can I work?

Although vacancies in electronic and electrical engineering can be found throughout the UK and internationally, many will be outside of London – especially in business parks which are often located outside cities. The opportunities that are based in London will tend to be in start-ups (new business in the early stage of operating). Often programming skills such as c++ are required as being a small business they recruit multi-skilled staff who can take on a variety of tasks. Browse start up opportunities at [http://workinstartups.com](http://workinstartups.com) and [https://enternships.com/](https://enternships.com/).
As well as working for commercial organisations, opportunities also exist in the public sector, typically working for the national and local government or the armed forces and defence. Keep in mind that for roles in defence such as Ministry of Defence (MoD) and the Defence Engineering and Science Group (DESG) you will need to check your eligibility regarding nationality requirements for security clearance. 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:

**Technical skills:** Requirements will vary according to the role, but could be a programming language (commonly Java Script, C++ and CSS) or particular software. This knowledge can be gained from your degree, work experience and own study, and due to the fast paced nature of technological change in this industry will need continuous updating to stay current.

**Effective communication skills:** are required to draft reports, give technical instructions, share ideas and make presentations. Listening skills are just as essential, to hear what colleagues and clients need in order to understand the brief and achieve results.

**Analytical & 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.

**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/finance work experience e.g. 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 Electronic Engineering and Computer 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 Industrial Placement Manager in EECS for details and see: www.eecs.qmul.ac.uk/undergraduates/degrees-with-industrial-experience

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 - 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
- You could get involved with the engineering, business or computer 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/.
- 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/

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
  - A range of roles across all industries. Remember data and analysis vacancies will exist across all sectors.

Gradcracker: www.gradcracker.com/
  - A range of jobs, placements and internships advertised. Includes careers and application advice plus case studies.

Target Jobs: http://targetjobs.co.uk
  - A range of graduate jobs, schemes and internships advertised. Also contains careers and application advice.

Just Engineers: www.justengineers.net/
  - UK and Worldwide jobs. Browse jobs by sector or location.

Engineer Board: www.engineerboard.co.uk/
  - Opportunities in all branches of engineering

Fish4jobs (previously The Career Engineer): www.fish4.co.uk/jobs/uk/engineer
  - Vacancies in a range of industries with a range of graduate jobs available.

Computer Weekly: www.computerweekly.com/jobs
  - IT jobs plus industry specific and technology specific news

CW jobs: www.cwjobs.co.uk
  - IT jobs plus careers advice

IT jobs Watch: www.itjobswatch.co.uk/find/IT-jobs-in-London
  - IT jobs plus information on trends such as salary, popular job areas and particular skills demanded by employers etc

Techno Jobs: www.technojobs.co.uk
  - A range of IT and technical jobs
Contractor UK: www.contractoruk.com
- IT contracting website with vacancies, information on setting up and working as a contractor and a forum

NHS Careers: www.nhs-careers.nhs.uk
- Job profiles, training programmes and job listings for medical technology and bioinformatics roles.

Jobs.ac.uk: www.jobs.ac.uk
- Academic, research and support positions in all fields

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 Electrical and Electronic Engineers (IEE): http://careers.ieee.org/
- Job listing site with links to the main site that contains industry information and news: www.ieee.org

Institution of Engineering and Technology (IET): www.theiet.org/
- Provides news, publications, grants, networking opportunities and advice on how to find work experience. See also separate jobs at http://engineering-jobs.theiet.org

British Computer Society: www.bcs.org/
- 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 & 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/

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

Institute of Energy: www.energyinst.org/
- Careers information plus searchable members directory to find potential employers: www.energyinst.org/membership/company-membership/CompanyMembersDirectory

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

Engineering Council: www.Engc.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 ‘IT 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/ (search by supplier sector)
Federation of small business: www.fsbonline.co.uk/
Yell.com: www.yell.com/
Applegate: www.applegate.co.uk/
UK Small Business Directory: www.uksmallbusinessdirectory.co.uk/
London Directory: 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 Recruitment and Employment Confederation website 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.connectusnow.com, and 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/
FindaPHD: www.findaphd.com
Jobs.ac.uk: www.jobs.ac.uk
PostgraduateStudentships: www.postgraduatetestudentships.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 jobs from various industries: www.prospects.ac.uk/case_studies.htm

The following websites have video case studies on a range of engineering and IT related jobs:
www.gradcracker.com/gctv (search by industry, company or employee profiles)
www.careersbox.co.uk (select ‘energy and engineering’ or ‘office, IT and telecoms’ from the categories on the left)
www.careerplayer.com (select ‘engineering and manufacturing’ or ‘IT and telecoms’ 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’)
www.10minuteswith.com/interviews (search by industry or function)

This handout was produced with the support of the alumni fund.

© QM Careers Centre
July 2014