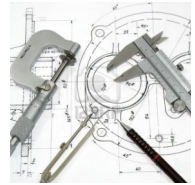
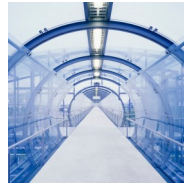
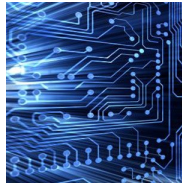
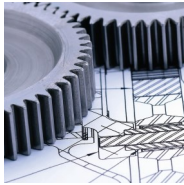


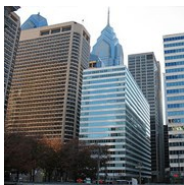


REIGATE GRAMMAR SCHOOL



RGS Careers

Route to Studying Engineering 2015-2016



www.reigategrammar.org

RGS GUIDE TO ENGINEERING

So you are interested in engineering?

Did you know that there are several different engineering courses? To begin, perhaps it would be helpful to give a very brief overview of what these are. I have used the COA Careers Directory, which Fifth Form students who take the Preview careers profiling test receive, as well as the National Careers Service website—www.nationalcareersservice.direct.gov.uk—as my main sources for this. This is not an exhaustive list.

CONTENTS

- ◆ Job Profiles
- ◆ Related Areas
- ◆ Entry Requirements
- ◆ Routes into Engineering
- ◆ Person Specification
- ◆ What is RGS doing to Help?
- ◆ Useful Websites

RGS GUIDE TO ENGINEERING

There are, of course, many types of Engineering, so perhaps it is helpful to give a very brief overview of what some of these are. I have used the COA Careers Directory, which Fifth Form students who take the Preview careers profiling test receive, as my main source for this. This is not an exhaustive list:

Aeronautical/Aerospace Engineering

You could be involved with almost any aspect of making things fly or keeping them flying, from missiles through to passenger or military aeroplanes, or even rockets. You could be developing new technology or be part of a team that plans, designs or tests aircraft. You might end up specialising in specific areas such as the design of the wings of an aircraft or in on-board computer systems.

Agricultural/Land-based Engineer

You would be working as a specialist in technology related to the land, for example agriculture, forestry, food engineering, renewable energy or other environmental areas. You would be involved in the design, maintenance and development of machinery and equipment such as that required for animal welfare, irrigation and drainage schemes or fish farming, as well as tractors, harvesting equipment and horticultural machines. As an industry that is heavily linked to the ever changing environment, this is an area that is going through considerable change at the moment.

Automotive Engineer

This is an area of **Mechanical Engineering**, which deals with all aspects of design, development and maintenance of motor vehicles and their components. You could be involved with designing new cars, or with developing specific parts of vehicle such the transmission system.

Biomedical Engineer

This involves helping with the treatment and rehabilitation of patients with serious diseases or disabilities. For example, you might be involved with the design of new equipment for use in keyhole surgery or for joint replacement or in the development of instruments for use in diagnosing or monitoring patients.

Building Services Engineer

The development and design of all aspects related to the requirements for modern buildings. For example, you could be involved in the design of energy efficient buildings, with renewable energy or in areas such as ventilation, lighting, acoustics or in environmental pollution control.

Chemical Engineer

You could be involved in the production and control of the chemical plant and machinery needed to manufacture chemicals, plastics, pharmaceuticals, or petrol, as well as some food and drink products. It is a highly skilled job, and your role could include turning small-scale laboratory work into large-scale, safe, economically sound industrial processes.

Civil Engineer

This involves designing and managing the construction of bridges, roads, pipelines, sewage plants, railways, power stations and major buildings. You could be involved with major areas of national infrastructure, such as transport systems, as well as energy and water supply systems.

Electrical Engineer

This area of engineering is largely involved with the generation and supply of electrical power. You might spend your time researching more efficient power generation, developing alternative energy sources or planning the future development of the electricity supply network.

Electronic(s) Engineer

This involves designing or making equipment that uses low power electric current. The fields that you might work in could range from communications satellites through to the digital cameras. You could be involved in exploring new possibilities in robotics or artificial intelligence, or you could specialise in areas such as communications, computing, software or manufacturing.

Manufacturing Engineer

A **manufacturing engineer** is concerned with all stages of the conversion of raw materials into usable products for the general public or for industry. There is a lot of overlap with **mechanical engineering**. You may work in any aspect of the production processes and systems involved in any sort of manufactured goods. Your job might involve designing and maintaining complex machinery or the design and layout of the plant in a factory.

Marine Engineer

This might involve, among other things, the design, management and maintenance of systems and equipment used in Ocean Engineering, Offshore Engineering or Seagoing Engineering. Ocean Engineering involves the exploration and extraction of oil, gas and minerals found under the seabed; it also entails the development of new energy sources. Offshore Engineering concerns the design, construction and commissioning of offshore platforms, and looking to overcome the problems presented by winds, waves and currents, while also dealing with high temperatures and corrosive fluids and gases. Sea-going Engineering involves ensuring the safe and efficient operation of seagoing vessels.

Materials Engineer

A **materials engineer** specialises in the physical and chemical properties of materials used to manufacture products. You would be trying to ensure the highest possible standards of performance and reliability. For example, you might be involved in finding the best combination of materials for a mobile phone or in a replacement hip joint, or you might be looking into developing high temperature alloys for airframes.

Mechanical Engineer

This is largely concerned with machines and their components, right from the largest manufacturing equipment to the smallest pieces used in construction.

Mining Engineer

Broadly speaking, the role of a Mining Engineer is to ensure the safe and financially viable development of mines, as well as other surface and underground operations. The key role is to find the best ways to extract raw materials from the ground.

Petroleum Engineer

This is a specialism within **mining engineering**, which is concerned with finding reservoirs of oil and gas in the earth.

Software Engineer

This involves creating the original programs that are required to enable computers to carry out the functions required of them. You could be engaged in fields ranging from robotics to the creation of packages for accounting. Your role might involve writing software, ensuring that it works, overseeing its installation and testing it.

Structural Engineer

This is a specialist discipline within **civil engineering**. Essentially the **structural engineer** has the job of ensuring that the architect's design does not fall down! You would work on building projects, ensuring that the buildings are structurally sound.

Clearly there are considerable over-laps between some of these types of engineer, and they also often work alongside each other as well as architects.

A LEVEL CHOICES

For most courses you will need to take Maths and Physics to A2 Level. For **Chemical Engineering** you will need to take Chemistry and Maths, but Physics is also recommended and will maximize your options. Further Maths is recommended at a small number of universities (check individual university websites for detail), but you can certainly get into very good Engineering courses without it. For example, Cambridge University states that, if your school offers Further Maths, and you do not take it, you will be disadvantaged, while Imperial say that it is desirable to have Further Maths.

NB: As always, my advice is that you should pick the A Levels that you enjoy most and think that you will do best at. This course of action is likely to give you the best options, because it is likely to yield the best grades. Remember that you have to spend an enormous amount of time studying these subjects, so you **MUST** want to take them. It is likely that, if you do not want to take Maths and Physics, Engineering is not the right choice for you.

ROUTES INTO ENGINEERING

In order to be an engineer, most people do an engineering degree (although it is possible to qualify on the job). You can either do a degree in one of these specific areas or you could do a **General Engineering** degree and specialise later. The best website to help you to be completely clear about the various routes into Engineering is: www.engc.org.uk.

The usual way to qualify as an Engineer is to take an Engineering degree that is accredited by the Engineering Council. This means that it satisfies the education requirement to allow you to register as an Incorporated (IEng) or Chartered (CEng) Engineer. All honours degrees that meet the requirements for CEng registration should now meet the requirements for IEng. To check that the course that you are interested in is accredited, visit: <http://www.engc.org.uk/courses>.

The individual university websites should tell you this information as well.

Advice: Go for courses that meet the education requirements for CEng registration. It is very hard to meet the requirements to become a Chartered Engineer without a Masters in Engineering. This does not necessarily mean that you have to apply for a Masters degree; you could switch onto one at the end of your first degree. Further detail on how to register as a Chartered Engineer is available on: <http://www.engc.org.uk/media/121107/ceng%20ebook3%20v1.pdf>.

Post-degree routes to gain the full Chartered Engineering status vary slightly between areas of Engineering, but, for example, to become a full member of the Institution of Civil Engineers (ICE) after gaining a Masters degree, the normal route is to be put onto a 'training agreement' by your employer for a minimum three-year period. There you will have an assigned training advisor who signs off attainment; or you would prepare for the Member Professional Review, which requires

- ◆ the preparation of report that set out how you have achieved your training objectives (1500 words);
- ◆ A report (3000 words) which puts the case for why you should be considered to be a Chartered Engineer;
- ◆ A short presentation;
- ◆ an interview with two reviewers;
- ◆ an essay on a chosen subject by the reviewers under exam conditions.

This is all set out in the *Routes to Membership* which is readily available on the ICE website. It generally takes between four to seven years post-graduation to gain chartered status. This does not mean that you are not earning a living during this period! Further information is available at <http://www.ice.org.uk/What-is-civil> and [engineering/Teachingresources/Civil-engineer-qualifications](http://www.ice.org.uk/engineering/Teachingresources/Civil-engineer-qualifications).

PERSON SPECIFICATION

Different strands of Engineering will require different characteristics. However, in general, an Engineer needs to have the following skills and personality traits:

- ◆ practical and good at problem-solving;
- ◆ creative (although the extent of this does vary between types of Engineering);
- ◆ a good team player;
- ◆ leadership and team-working skills are important;
- ◆ good communication skills are important, as you are likely to need to explain technical issues to people who do not have your level of expertise;

- ◆ posses an interest in science and how things work; and
- ◆ Business skills can also be very useful, as you are often involved in cost management

IMPORTANT REQUIREMENTS FOR A SUCCESSFUL ENGINEERING APPLICATION AND ADVICE FROM RGS

1. As you have not studied Engineering at A Level, it is crucial that you show the admissions department that you are well aware of what an engineer does, that you are fully informed about what is involved in an Engineering degree (whether it is a General Engineering degree or in a specific area of Engineering) and that you have the enthusiasm and capability to take up the challenge. You will also need to be able to say what sparked your interest in Engineering. Consequently:
 - ◆ Try to find some work experience. This can help you to understand the role of an engineer, to be clearer about whether this is what you want to do and whether there are any particular areas of Engineering that appeal to you. Reflect upon this work experience in your personal statement, and make sure that you refer to anything specific that you achieved while on work experience.
 - ◆ Do some wider reading. This link provides useful books that you might try: <http://www3.eng.cam.ac.uk/admissionsinformation/reading.html>.
 - ◆ Make sure that you have been on at least one course. There are many free one day courses at London universities which are open for booking from 11.00am on 8 January. Lower Sixth Form students may book themselves onto these through the website www.london.ac.uk/tasters. Be aware that these will book up fast. Students should seek permission from Mr Jones if they need to miss a day of school. Headstart Courses are longer and more expensive, but I have consistently received good feedback from students about how they have clarified their thinking and helped them to make strong applications. These can be booked via <http://www.etrust.org.uk/headstart>. Again, they book up fast from the start of the year, so don't wait!
 - ◆ Finally, the Careers Department put information about courses that we hear about on the 'Taster Course' via on www.rgsinfo.net.
 - ◆ Go to any Engineering talks that are put on.
 - ◆ Talk to any engineers that you know. Find out what they enjoy about the job, and what they consider the main challenges to be.
2. Any evidence of scientific or mathematical interest is useful. Include:
 - ◆ detail of any scientific or Mathematical projects that you have undertaken, especially if they have any slant towards Engineering.

- ◆ Go to TSI Friday and other science talks or discussion groups.
 - ◆ Success in Maths or Science competitions can be useful; e.g. Maths Challenge.
 - ◆ Read science journals such as ‘New Scientist’ and refer to specific articles that have interested you in your personal statement.
3. Show that you have a realistic understanding of what Engineering entails. Some TV shows can make it seem a little too immediate and exciting. You probably won’t be building rockets from day one! There will be quite a lot of theory and principles to learn, so show that you are ready for this.
 4. Engineers often work in teams and they need to be good communicators. Try to provide evidence of your effective communication, such as feedback received or an outcome that resulted from your communication.

Evidence of teamwork is also very important. Examples must be given and it is a good idea to stress what effect your contribution to the team had.

Examples to support these areas could come from sport, Drama, Music, Duke of Edinburgh, lessons or from anything else that you can think of. They do not have to come from work experience in Engineering.

5. Most admissions tutors want to see that you are well-rounded so do refer to extra-curricular activities, but make sure that you don’t just give a list. State what you have learnt from them.
6. Make sure that you show that you realise that Engineering is a challenging career, but that you are equipped and motivated to take up that challenge.
7. Research the web-sites of the individual universities that you are applying to to see what they are looking for in an applicant. By all means ring up admissions tutors to find out what they are looking for. You need to make sure that you are the font of all knowledge on Engineering courses!
8. If you plan to take a Gap Year, this is no problem. Indeed some universities are very encouraging of this for engineers, as long as a large part of the year is taken up with relevant industrial placements. One useful company for getting industrial placements is ‘Year in Industry (YINI), which you can find out more about via <http://www.etrust.org.uk/the-year-in-industry>. There is also useful information on the Cambridge University website via <http://to.eng.cam.ac.uk/teaching/indexp/ProspectiveStudents11.html>.

WHAT IS RGS DOING TO HELP?

Mr Saunders is the Engineering contact, so do contact him or the Careers Department with any concerns about Engineering applications. There is normally an Engineering Evening during the autumn term for students in the Third to Upper Sixth Form (and their parents). This is an opportunity to hear from, and talk to, Engineering students, recent graduates and Career Engineers in a variety of fields. The Careers Convention on 2 February will provide an opportunity for students and their parents to talk to engineers on a one-to-one basis.

TSI Friday, which is held every other Friday in S3, offers a wealth of enriching science presentations on a wide range of topics. Through **Network Reigation** we can put you in touch with former students, who are studying Engineering, so that you can find out from them first-hand about their course.

Contact Mr Buzzacott.

After AS exams, we put on UCAS Days to help students to prepare their UCAS applications. As part of this we will invite some former students in to take your questions about university life in general. We are gathering a database of work experience offers, so we will help with placements if we can.

Contact Mr Buzzacott or Mr Nicholson

USEFUL WEBSITES

- ◆ www.ucas.ac.uk for details on all Engineering courses and links to individual university websites
- ◆ www.unistats.com to help you to compare courses based on data such as student satisfaction, cost of living, contact time and employability prospects
- ◆ <http://www.theguardian.com/education/universityguide> for league tables and comparisons between courses
- ◆ www.engc.org.uk Engineering Council UK provides help with routes into Engineering
- ◆ www.engineeringuk.com Engineering UK
- ◆ www.icheme.org Institution of Chemical Engineers
- ◆ www.whynotchemeng.com for lots of useful help for those considering Chemical Engineering
- ◆ www.ice.org.uk Institution of Civil Engineers
- ◆ www.imeche.org Institution of Mechanical Engineers (*Most strands of Engineering have something similar*)
- ◆ <http://conferences.theiet.org/achievement/scholarships/diamondindex.cfm?origin=/diamond> for information on scholarships for students undertaking engineering courses at university
- ◆ www.rgsinfo.net use the Taster Course to find courses to help you to find out more about Engineering



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