

영국의 공학교육

Engineering Education in the United Kingdom

As a prospective international student wishing to study in Britain you will find a great variety of educational opportunities, whether you are looking for general education or for vocational and professional training. You will find institutions ranging in size from under one thousand to forty thousand students, located in rural areas as well as major cities and towns. However, the fact that there is such a wide choice means that you will have to look very carefully at all your options to ensure that you choose the course of study that best suits your personal circumstances.

There are many different types of course to choose from ranging from purely academic courses to those which will provide you with training for a specific job. As an international student, it is also very important to make sure that the qualification you hope to obtain will be recognised by employers back home in Korea, or by the college or university where you wish to continue your studies.

In Britain, there are regulatory and professional bodies which have the responsibility of advising on and policing these concerns. Of most interest to engineers is the Engineering Council which has a Charter responsibility to advise on engineering education issues and to set standards across all fields of engineering for those who are registered as engineers. These standards amount to a basic specification of professional competence to which must be added the features needed in each different branch of engineering, such as civil, mechanical or electrical.

In order to gain a better understanding of the higher education system in the United Kingdom, let us first take a general look at degrees offered at the undergraduate and postgraduate level. Such courses are offered by universities and by colleges of higher education.

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Undergraduate degrees

Undergraduate degrees, or first degrees, normally take three years to complete in England and Wales and four years in Scotland. Degrees which include a period of work experience (sandwich courses) take longer. At some universities and colleges, students studying for degrees in certain subjects (for example art and design) are required to take a foundation course followed by a three-year degree course. Courses leading to degrees in medicine, dentistry and architecture can take up to seven years to complete. Degrees can be awarded for study of a single subject, a combination of two subjects (joint degree) or, on modular degree courses, three or more subjects.

Depending on the subject or subjects being studied, successful students will be awarded one of the following: BA, B.Sc., B.Ed., B.Eng., LL.B. Degrees are graded and successful students may be awarded a first-class honours degree, an upper second-class honours degree (2i), a lower second-class honours degree (2ii) or a third-class honours degree. Students who do not achieve the standard required for an honours degree will be awarded an ordinary degree.



Postgraduate degrees

After completing a first degree, students can continue their studies by taking a postgraduate course. Postgraduate courses can lead to:

- postgraduate certificates and diplomas;
- master's degrees;
- research degrees.

Postgraduate certificates and diplomas normally take one year to complete. The courses are often vocational in nature and students holding these awards can sometimes gain exemption from some professional examinations. Master's degrees are normally obtained by taught courses leading to an award such as MA, M.Sc., M.Eng., M.Tech., MBA or LL.M. Students obtaining a master's degree by research are normally awarded an M.Phil. Most taught master's courses last for one year. They will consist of lectures, seminars, training in research methods, practical work where relevant, coursework, and a written and sometimes spoken examination (called a viva). Some courses will also include a research project which has to be written up as a short thesis or dissertation. Master's degrees are not graded although some universities may award a distinction for outstanding performance. Some master's courses will provide exemption from profession-





al examinations. A doctoral degree (Ph.D.) is awarded after completion of a thesis which sets out the results and conclusions of original research in a specific area. A doctorate can take three years or more to complete. Students are supervised but rarely attend formal lectures.

This, then, is the general higher education degree structure. Let us now be more specific and look only at engineering courses. In addition, we must consider the full range of engineering competencies and the education routes which apply to them.

Engineering courses are offered by:

- independent colleges;
- colleges of further education;
- colleges of higher education;
- universities.



As an international student you will probably be coming to Britain with some qualifications you have already obtained in your home country. Provided that you fulfil the entry requirements specified by the college or university to which you are applying you may enter at any point along any of the routes.

Entry requirements

Once you have chosen which course you wish to study, it is important to make sure that you have the appropriate entry requirements. Entry requirements will vary from one institution to another, and holding the minimum qualifications for entry does not guarantee a place on a course as there are often more applicants than places available.

Overseas qualifications

Although entry requirements are normally stated in terms of British qualifications, you may find that the qualifications you have gained in Korea are accepted by colleges and universities in Britain. You can check how your own qualifications compare to British qualifications by contacting the British Council office in Seoul. We can put you in touch with the national bodies whose job it is to advise on such equivalencies. You should be aware, however, that it is up to each individual college and university to decide which, if any, overseas qualifications it will accept, so you must also check this with the institution before making your application.





Advanced standing

If you have reached a certain level of education in Korea, it may be possible to be admitted directly on to the second, or even third, year of a degree course at a British college of university. If you think that you might be eligible to do this, you should contact the university or college directly, telling them what qualifications you already have and asking whether you may be exempt from any part of the course you wish to take.

Access, bridging and foundation courses

If your own school-leaving qualifications do not quite match UK university entry requirements, you may be advised to take an access or bridging course. Typically lasting for six months to one year, these courses prepare students for degree-level work. Quite often, they are linked to a particular area of study, a good example being an access course for students who wish to study engineering. However most will include help with English language for academic purposes and study skills. Some also provide training in information technology and basic mathematics. The courses are often run by colleges of further or higher education, although many are linked to a particular university so that students successfully completing the access course will be guaranteed a place at that university. A number of British colleges and universities now have links with institutions overseas and you may find a college in your home country running an access course which prepares students for study at a particular college of university in Britain. Details of these are available from the British Council office.



Other routes to British higher education

Many colleges and universities overseas now have formal agreements with partner institutions in Britain allowing their own students to take part of their course at a college or university in Britain. This means, for example, that you may start a course at your home college or university and then in your second or final year come to Britain to complete your qualification at the partner institution. Again, the British Council office has information about institutions which have formal links with British colleges and universities.





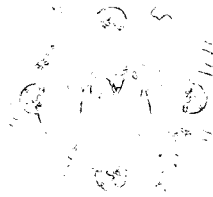
1. Education routes

1 a) NVQs in engineering

The National Council for Vocational Qualifications (NCVQ) was set up in 1896 to administer a system of workplace based qualifications which recognise skills used in industry. They are called National Vocational Qualifications(NVQs). NCVQ also offer vocational education through General National Vocational Qualifications (GNVQs) at advanced level and vocational A Level. The Scottish Vocational Educational Council (SCOTVEC) offers similar qualifications in Scotland (SVQs). In essence, NVQs, and SVQs are formal recognition of competence in workplace tasks. They have been developed by industry for industry, and are available at five levels. Awarding bodies administer NVQs in co-operation with industry and NCVQ.

All NVQs slot into the NVQ framework according to their occupational area and level. The framework offers a way of comparing qualifications and shows how an individual can progress through the NVQ system either between levels or across different occupational areas. The framework has five levels of qualifications which cover the range of occupational performance from level one which recognises the most basic skills, to level five which covers the highest levels of professional skills. Here is a definition of the NVQ levels available:

- Level 1 provides competence in the performance of a range of varied work activities, most of which may be routine and predictable.
- Level 2 provides competence in significant range of work activities. Some of the activities are complex or non-routine and there is some individual responsibility or autonomy. Applicable for a skilled worker in engineering.
- Level 3 provides competence in a broad range of varied work activities performed in a wide variety of contexts which are complex and non-routine. There is considerable responsibility and autonomy and guidance of others is often required.
- Level 4 provides competence in a broad range of complex, technical or professional work activities performed in a wide variety of contexts with a substantial degree of personal responsibility for the work of others.
- Level 5 provides competence which involves the application of a significant range of fundamental principles and complex techniques across a wide variety of unpredictable contexts. Also covers significant responsibility for the work of others. The



allocation of substantial resources features strongly.

An example of courses available:

- Aircraft maintenance engineering (mechanical and avionics) level 3
- Engineering assembly - level 1, 2 and 3
- Engineering manufacture - level 4
- Engineering material processing - level 1, 2 and 3
- Engineering technical services - level 3

A full list of qualifications available can be obtained through the British Council.

1 b) Craft level

Engineering craftspersons turn ideas and designs into products. The length of training varies from one to three years, with students studying for City and Guilds (C&G) qualifications in their chosen discipline. C&G qualifications are usually divided into three parts:



- Level one is designed for school-leavers and provides the basic study necessary for the next level.
- Level two provides the minimum technical skill and knowledge required for industrial competence.
- Level three represents advanced study in the field.

There are usually no formal entry requirements for level one courses and admission is at the discretion of the college. Students who acquire good results in their C&G examination may progress to a technician level course offered either by C&G, BTEC (Business and Technology Education Council) or SCOTVEC (Scottish Vocational and Education Council). The names and addresses of colleges offering C&G courses can be found in the Directory of further education available in the British Council.

1 c) Technician Level

Technician Engineer

The technician forms a key link between the professional engineer and the craftsman. In Britain's engineering industry, the work of the technician is recognised at the





level of Engineering Technician (EngTech).

The incorporated engineer has a broader training and requires a higher level of education than the engineering technician. These types of qualifications are offered by C&G, BTEC and SCOTVEC.

Engineering technicians study for the appropriate C&G technician course, GNVQ(advanced)/GSVQ level 3 or for a BTEC or SCOTVEC national diploma which normally takes two years. To take a BTEC/SCOTVEC, national diploma, you should normally have four passes at GCSE including mathematics, English and a science or engineering subject; or a BTEC first certificate or an equivalent overseas qualification.

Incorporated engineer

The BTEC or SCOTVEC Higher National Diploma (HND) normally lasts two years. The entry requirement for a BTEC/SCOTVEC is one A-level with supporting GCSEs; or a BTEC/SCOTVEC National Certificate or National Diploma; or an equivalent overseas qualification. The names and addresses of colleges offering BTEC and SCOTVEC courses can be obtained from the British Council.

During the 1990's, profound changes have occurred in the UK university system, with student numbers rising to record levels. Nowadays, about 32% of each age group enters higher education compared with 15% a decade ago. The target is a 45% participation rate. In engineering, student numbers have grown considerably, though at a lower rate than average for the higher education system as a whole. More significantly, the needs of engineering students, and consequently of degree courses, have been transformed by a number of circumstances.

1d) Academic

First degrees

The responsibilities of a professional engineer include research, design and development, project management, staff supervision, production planning and control, and also manufacture. The normal route for training at this level is to take a first honours degree in engineering which has been accredited by The Engineering Council or relevant professional institution.

First degrees in engineering in Britain vary in name, length and method of study. A number of different degrees are awarded: BSc (Bachelor of Science); BTech (Bachelor of



Technology); BSc Eng (Bachelor of Science in Engineering); BEng (Bachelor of Engineering) and MEng (Master of Engineering).

The majority of institutions now offer BEng and MEng courses. These are engineering degrees enhanced with subjects appropriate to today's industry. The MEng is an extended version of the BEng designed for the more able student. The degrees vary in length, from three years for a BSc and BEng course, to five years for some MEng programmes.

You can also choose whether to follow a full-time course or a sandwich course. Sandwich courses combine academic study with a period in industry and add a year on to the length of the course.

Postgraduate courses

There are a wide variety of courses available at postgraduate level, from taught Master (MSc) and diploma courses to research degrees (PhD). Course details can be obtained

from the British Council.



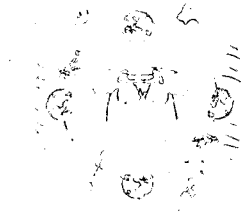
1 e) Professional level

To be eligible to register with The Engineering Council as a Chartered Engineer, you require a relevant accredited honours degree, plus completion of two years industrial training, a further two or three years of relevant experience with professional responsibility and corporate membership of a chartered engineering body. There are two final tests of competence: the Professional Review and an interview.

2. Alternative routes

The Engineering Council, on behalf of the institutions, conducts its own examination as an alternative to an accredited honours degree. It is especially suited to those whose circumstances prevent them from qualifying for professional engineer status through the normal route, and to those who wish to take further qualifications to obtain professional engineer status. There are around forty Engineering Institutions which are recognised by the Engineering Council and they have a central role in determining whether individuals have satisfied the appropriate education, training and experience requirements for registration and for the accreditation of academic courses and of arrangements for training and experience.





3. The UK Register of Engineers

It is not currently a legal requirement to register before practising as an engineer in Britain. However, registration provides a guide to the competence of an engineer and it denotes the internationally recognised standard of chartered engineering.

There are three sections within the Engineering Council's Board of Engineering Registration (BER). The different levels depend on the candidate's academic achievement, experience and age. They are :

- Engineering Technician (EngTech)
- Incorporated Engineer (IEng)
- Chartered Engineer (CEng)

The criteria for admission into each of the categories have recently been the subject of a wide consultative process involving universities, Engineering Institutions, employers and UK government departments. Details of the new regulations for admission can be obtained from the Engineering Council.

Useful contact addresses :

The British Council
 Tel 02-737-7157
 Fax 02-737-9911
 Internet : <http://www.bckorea.or.kr>

The Engineering Council
 Internet : <http://www.engc.org.uk>