In the United Kingdom (UK), the term electrical engineering is used to cover power engineering, including the generation, transmission, control and use of all forms of electrical power. The term electronic engineering is used to include the expanding fields of electronic communications (including computer networks), computers (both hardware and software) and electronic components. These components include microcomputer chips and, increasingly, the optical devices now being used for many applications. In addition, the field of control engineering spans the electrical/electronic boundary and, with its use of computer systems, is very broadly based. Manufacturing engineering – involving as it does, computer techniques, control and power electrical engineering - is another major and vital branch within the field of electrical and electronic engineering.

Much of the advanced equipment found in the home or workplace such as entertainment systems, domestic appliances, personal computers, data processing equipment, robots and machine tools are made possible by electrical and electronic engineering.

This very broad and vibrant discipline has interfaces with physics (in the component field), computer science (in software engineering) and mechanical engineering (in manufacture and control).
Checklist: Why study Electrical and electronic engineering in the United Kingdom?

- there are more than 2,000 degree and diploma courses alone to choose from, reflecting the UK’s long and distinguished history in this subject
- your qualification, when professionally accredited, will be internationally recognised
- you will improve your fluency in English as you learn
- a wide range of career-based qualifications offer highly practical training at different levels
- UK courses in electrical and electronic engineering include training in management and communication skills as well as in technical skills
- the profession is regulated by the Institution of Electrical Engineers (IEE) and the Institution of Incorporated Engineers (IIE). By satisfying their membership requirements you can qualify for registration as a Chartered Engineer, Incorporated Engineer, Engineering Technician and European Engineer with the Engineering Council (UK), a professional standard that is recognised throughout the world
- the IEE and the IIE also encourage and help their members to keep up to date technically and to develop their full career potential through courses, conferences, seminars and networking with other professionals.

1 What can I study?

<table>
<thead>
<tr>
<th>Type of study</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNVQ and Scottish National Qualifications</td>
<td>Usually one or two years, full-time. Can lead to A-level study or to a National Diploma course.</td>
</tr>
<tr>
<td>BTEC/Edexcel First Diploma</td>
<td></td>
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<tr>
<td>Vocational A-level, Highers</td>
<td>One of two years, full-time. Can be used for entry to undergraduate study.</td>
</tr>
<tr>
<td>BTEC/Edexcel National Diploma</td>
<td>Two years full-time. Can be used for entry to undergraduate study.</td>
</tr>
<tr>
<td>SQA Higher National Certificate</td>
<td>One year full-time. Can be used for entry to undergraduate study.</td>
</tr>
<tr>
<td>BTEC/Edexcel/SQA Higher National Diploma (HND)</td>
<td>Usually two years full-time. Could be in electronic and electrical engineering or a particular speciality (for example, medical electronics). The HND is a respected qualification in its own right but it can also qualify you for transfer into the second or third year of a degree course.</td>
</tr>
</tbody>
</table>
| Foundation degrees (England only)                  | Foundation degrees are one level below honours degrees. They can be studied part-time or full-time over two years. These courses have been developed in conjunction with employers as part of an initiative to meet skills shortages. At present degree courses include:
  - electrical engineering
  - electronic engineering
  - electronics and computer interfacing
  - technology electronic engineering.         |
For more information go to www.foundationdegree.org.uk or www.ucas.com
The MEng is a first degree course that is now offered alongside or in place of the BEng at a number of institutions. The MEng is a higher award than the BEng and usually takes one year longer to complete. A BEng usually takes three or four years full-time; a MEng usually takes four or five years full-time. BEng students with high marks in their second year are usually offered the opportunity to transfer to the MEng.

An accredited MEng degree fulfils the educational requirements for the Chartered Engineer (CEng) qualification. An accredited BEng degree partially fulfils the educational requirements for the CEng but candidates will also need to complete further learning to Master’s level.

There is a vast range of courses offered. Examples include:

- automotive electronic engineering
- broadcast engineering
- communications engineering
- control engineering
- cybernetics
- digital systems engineering
- electronics
- electronic control
- electrical power engineering
- integrated circuit engineering
- mechatronics
- medical electronics
- microelectronics
- optoelectronics
- robotics
- telecommunications engineering.

You can combine electronic engineering with another subject, for example:

- aeronautical engineering
- business studies
- communications
- design
- e-business
- finance management
- a foreign language
- manufacturing engineering
- software engineering.

Several universities offer a foundation year before starting your degree – these are suitable for students whose entrance qualifications are not of the required standard (for example, those who did not achieve maths or physics at A-level) and for those who need some extra remedial or conversion tuition see ‘Entrance’ below.

Both BEng and MEng courses are available as sandwich courses. This
means that they include one or more periods of supervised work experience. The work placement is usually either in one twelve-month block or in two six-month blocks separated by a period of study.

| Postgraduate courses : MSc (Master of Science); MPhil (Master of Philosophy); PhD (doctorate); EngD (Doctor of Engineering) | The MSc is a taught course and takes one year full-time. The MPhil (two years) and the PhD (three years) are research degrees. Several universities are now offering taught doctorate courses in engineering – the EngD degree. The qualification, in an appropriate discipline would normally fulfil the educational requirements for CEng. |

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**Short courses and continuing professional development**

The IEE online Learning Resources Database provides a wide range of information about short courses, conferences and seminars, including IEE events, courses and endorsed providers. Topics range from technical engineering subjects and IT training to business management and associated skills ([www.iee.org/learn](http://www.iee.org/learn)).

The Institution of Electrical Engineers (IEE) has a well-established programme of short courses for continuing professional development. They include:

- effective management
- law for engineers
- marketing for engineers
- strategic marketing
- technical report writing
- effective presentations
- managing engineering projects
- finance and accounting
- negotiation skills for engineers
- key account management.

Details of all these are on the IEE website [www.iee.org/events/courses](http://www.iee.org/events/courses).

The Institution of Incorporated Engineers ([www.iie.org.uk](http://www.iie.org.uk)) also provides a support network for its members on a regional and international basis.

**IEE endorsed providers**

Endorsed providers are training organisations approved by the IEE for the quality and relevance of their professional development-focused courses and/or events.

Training provision includes courses, seminars, conferences and distance learning. Some lead to a qualification certification MSc or MBA. IEE - endorsed providers range from universities and technical training companies specialising in engineering skills and IT, to commercial providers focusing on project management and interpersonal skills and organisations concentrating on best practice.

Details are on the IEE website [www.iee.org/educareers/profdev/providers.cfm](http://www.iee.org/educareers/profdev/providers.cfm)

Short courses are also offered by universities and colleges of higher education. Search for these on [www.hotcourses.com](http://www.hotcourses.com)
Distance learning

The IEE produces a range of distance-learning packs for training and educational use in the electrical engineering, electronics, manufacturing and computer software industries. The courses are usually either video-based or computer-based training (CBT) packages.

They fall under the following headings:

- communications
- manufacturing
- management for engineers
- regulations, standards, codes of practice, safety
- software engineering courses.

Details are on the IEE website [www.iee.org/educareers/dlearn](http://www.iee.org/educareers/dlearn)

For courses offered by the Open University, go to [www.open.ac.uk](http://www.open.ac.uk) You can also search for distance-learning courses provided by educational institutions on the website [www.educationuk.org](http://www.educationuk.org)

<table>
<thead>
<tr>
<th>Checklist: Choosing the right course</th>
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<tbody>
<tr>
<td>• if you are unsure of the level of study to aim for, check with the professional body in the countries in which you would like to work</td>
</tr>
<tr>
<td>• consider whether you would be best advised to follow a general course in electrical/electronic engineering or a more specialised course (for example, in medical electronics); also consider whether you want to combine your engineering studies with another discipline (for example, business)</td>
</tr>
<tr>
<td>• think about where you would prefer to live as well as study, as you will be able to find courses at all levels throughout the UK.</td>
</tr>
</tbody>
</table>

2 Entrance

Entrance qualifications vary, but for IEE-accredited courses, the typical requirement for a MEng is three grade Bs at A-level, ABBB at Scottish Higher or thirty-two points at International Baccalaureate. For a BEng the typical requirement is three grade Cs at A-level, BBBC at Scottish Higher or twenty-nine points at International Baccalaureate. Your subjects at A-level/Scottish Higher/International Baccalaureate should include mathematics and a physical science or appropriate alternative (e.g. computer science, technology).

If you do not have the standard entry qualification, some universities offer a foundation year providing remedial or conversion tuition before you start your BEng/MEng.

The higher National Diploma asks for two subjects (usually non-specific) at A-level/Scottish Higher.

Refer to the section ‘Entrance’ in Engineering in this series for full details and information on how to check whether your qualifications are of the required standard.

3 How can I register as a professional?

Professional registration in the UK is through the Institution of Electrical Engineers (IEE) and the Institution of Incorporated Engineers (IIE). The IEE has reorganised its grades to be more accessible by separating its membership grade (MIEE) from the Chartered Engineer qualification. It is still possible to
register as a Chartered Engineer, Incorporated Engineer or Engineering Technician if the candidate wishes, and if the Engineering Council (UK)'s own standards are met – refer to ‘How can I register as a professional?’ in Engineering in this series. For more information on IEE membership go to www.iee.org/membership
Would a United Kingdom qualification be recognised in other countries?
Your qualification will be widely recognised wherever you want to work. See ‘Would a UK qualification be recognised in other countries?’ in Engineering in this series.

4 Next steps

<table>
<thead>
<tr>
<th>Checklist: Your next steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Look for courses on <a href="http://www.educationuk.org">www.educationuk.org</a></td>
</tr>
<tr>
<td>2 For degree courses, check whether the course is on the IEE’s list of accredited degrees at <a href="http://www.iee.org/professionalregistration/accreditation/academic.cfm">www.iee.org/professionalregistration/accreditation/academic.cfm</a> You could also look at the Engineering Council (UK)’s list of accredited degrees at <a href="http://www.engc.org.uk/accredatl/public/titleform.asp">www.engc.org.uk/accredatl/public/titleform.asp</a></td>
</tr>
<tr>
<td>3 Compare the institutions’ teaching and research assessment scores by going to <a href="http://www.gaa.ac.uk/revreps/reviewreports.htm">www.gaa.ac.uk/revreps/reviewreports.htm</a> (teaching) or <a href="http://www.hero.ac.uk/rae/index.htm">www.hero.ac.uk/rae/index.htm</a> (research). Bear in mind other factors such as prospective supervisors, the size of the department and the location of the institution.</td>
</tr>
<tr>
<td>4 Make sure the course you choose will be accepted by your own country by the relevant professional bodies and the government – this is especially important for electrical engineering.</td>
</tr>
</tbody>
</table>

5 Where can I find more information?

British Council Education information
Website www.educationuk.org
For further information, you can find details of your nearest office at www.britishcouncil.org/home-contact-worldwide.htm which includes links to all our country web pages and a worldwide address book giving contact details for all offices.

EducationUK Scotland
Website www.educationukscotland.org

Wales International Consortium
Website www.walesinternationalconsortium.com

Universities and Colleges Admissions Service (UCAS)
Rosehill
New Barn Lane
Cheltenham
Gloucestershire GL52 3LZ
Telephone +44 (0) 870 1122 211
Fax +44 (0) 124 2544 961
Email enquiries@ucas.ac.uk
Website www.ucas.com

The Institution of Electrical Engineers (IEE)
Savoy Place
London WC2R 0BL
Telephone +44 (0) 20 7240 1871
Fax +44 (0) 20 7240 7735
Email postmaster@iee.org
Website www.iee.org

IEE Professional Development Department
Michael Faraday House
Six Hills Way
Stevenage
Hertfordshire SG1 2AY
Telephone +44 (0) 1438 767282
Email profdev@iee.org
Other useful resources

British Qualifications 34th ed. (Kogan Page, 34th Ed., 2004, ISBN 0 7494 4138 0) – lists every recognised qualification on offer in the UK, by schools, colleges, universities, business schools, learned societies, trade and professional bodies and associations.

Occupations 2004 (DfES, 2003, ISBN 0 8611 0864 7) an in-depth guide to over 600 career choices of all types from unskilled to professional work. Also lists prospects and qualifications for each occupation.

NB. Please note these books may not be available at your local British Council office.

While every effort has been made to ensure that the information given here is correct and up to date, the British Council accepts no legal liability for its accuracy, currency or completeness.

June 2004