



Cardiff School of Engineering
Undergraduate Degree Programmes



www.cardiff.ac.uk/engin

The Engineering Forum – a flexible space in which to ‘engineer’ – a space where new concepts can be developed



Ten Good Reasons to Choose Cardiff School of Engineering

International Recognition

Cardiff University is a member of the Russell Group of Britain's top 20 leading research universities and has an international reputation for its teaching and research activities, which draws students and staff from more than 100 overseas countries.

Excellence in Research and Teaching

Cardiff School of Engineering is recognised as one of the best-resourced, and 'most modern' Engineering Schools within the British university system in terms of facilities, research and teaching. The quality of teaching on most of our Engineering courses has been independently assessed as 'Excellent' by the Higher Education Funding Council for Wales.

Facilities

The University has one of the most up-to-date library services in the UK. The latest advances in information technology are used to support research and teaching. With over one million volumes and 9,000 different journal titles it is a large resource and still growing. The library service is organised into a network of eleven libraries. Each one is strategically situated close to the School it serves to maximise convenience for users. Students also benefit from excellent computing facilities, which are being continuously expanded and enhanced.

Guaranteed Accommodation

Cardiff University has some of the highest quality residences in the British university system. All first year students who apply through the normal admissions cycle are guaranteed a place in university accommodation. Cardiff is also one of the very few leading civic universities to guarantee all single overseas students University accommodation throughout the entire time of their degree programme. All rooms are single occupancy rooms with computer network connection points. More than 75% of study/bedrooms have private toilet and shower facilities.

Civic Campus

The University is located within and around Cardiff's magnificent civic centre and immediately adjacent to the main shopping centre. Academic schools, libraries, residences and social and sports facilities are situated within a short walk of each other, on a campus that is both compact and well-maintained.

Environment

Cardiff combines the practical advantages of a compact, friendly, inexpensive city with the cultural and recreational amenities of a successful and modern capital city. Cardiff has recently been hailed as one of the most desirable cities in the UK in which to work and live.

Extensive Academic and Pastoral Support

Cardiff University doesn't only offer support for you before you arrive and during your first few weeks; you will also find that at any time during your studies there will be someone to help with any academic, financial, or personal problems that you might have. Each student is assigned a personal tutor who will be your first point of contact throughout your studies for academic guidance and personal support, acting as gateway to the services provided by the University and the Students' Union.

Affordable Living

Students at Cardiff benefit from competitive tuition fees, minimal transport costs and a relatively low cost of living in comparison with other parts of the UK.

Location

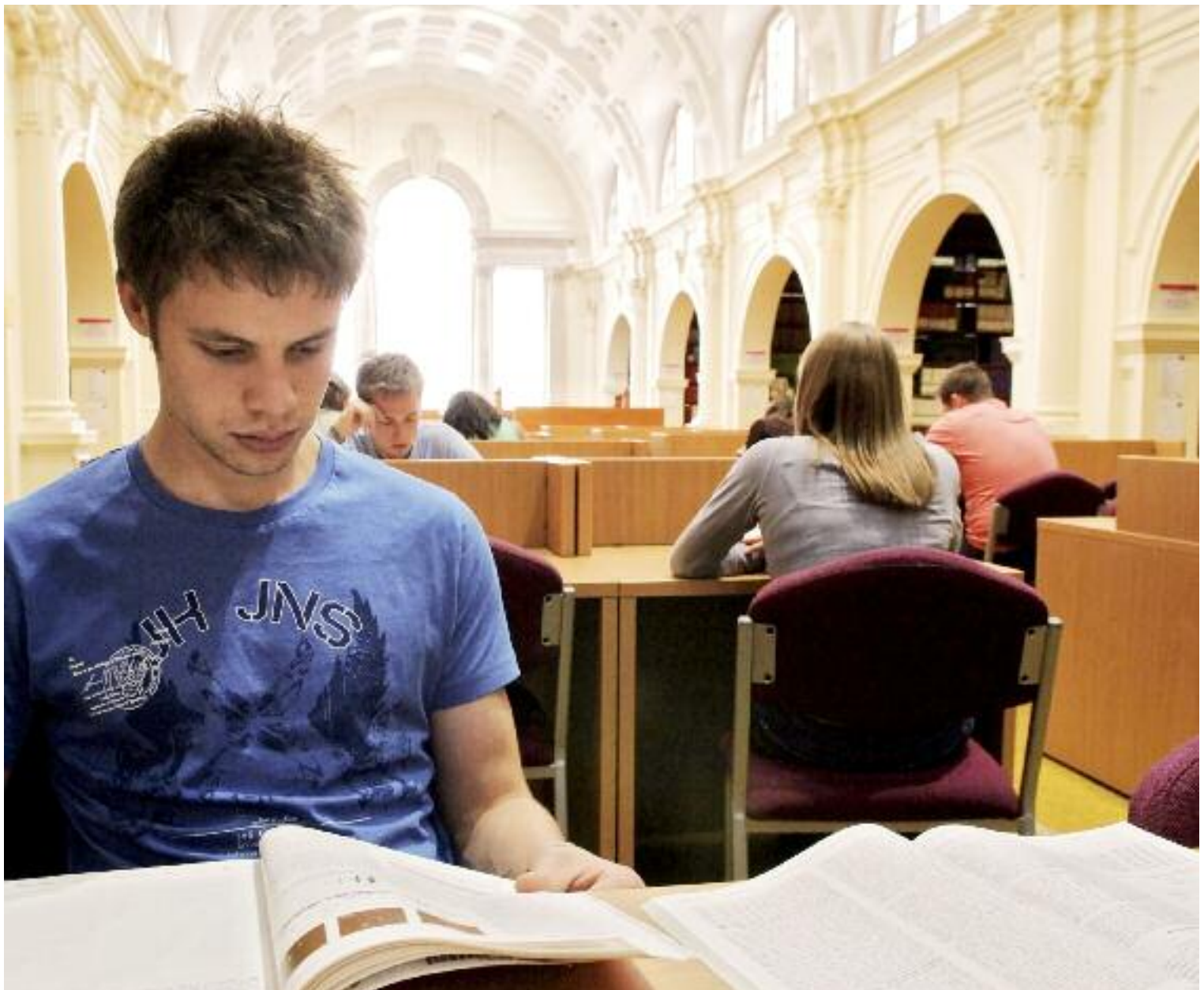
Cardiff is an extremely accessible city, with excellent road, rail and air transport. Using the hourly high-speed train service, London is reached in two hours. Cardiff has convenient connections to Heathrow and Gatwick airports and the city also benefits from its own international airport.

Friendly Welcome

Cardiff University has a long-established tradition of welcoming students from overseas to its undergraduate and postgraduate courses. We currently have over 2,500 students from more than 100 countries studying at the University. The University provides a free coach collection service for new international students from Cardiff and Heathrow Airports during the week before the start of the Autumn Semester. This is followed by a programme of induction events, both social and informative, to help new arrivals settle in quickly.

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Welcome

You are now at the challenging and exciting stage of your life where you have to choose what to study at university and which university will best suit your aspirations.

Cardiff School of Engineering has received recognition for its high quality teaching and research both in official government assessments and in independent league tables. Industry values our graduates highly and they are sought after both nationally and internationally.

This brochure contains details of the Engineering degree programmes offered by the Cardiff School of Engineering. Our degree programmes cover nine different areas of Engineering and within each programme there are further options of MEng or BEng, full-time or sandwich degrees. Many of our students opt for a Year in Industry which is highly valued by employers, and others choose to improve their language skills with one of our Year in Europe programmes. These options have been designed to give you a degree programme which will meet your needs now and for the future. All of our degree programmes are accredited by the relevant professional institution which is essential for students who wish to become Chartered Engineers.

We have very strong links with industry so you may find yourself working with companies to solve real life current problems. We also have some of the best teaching and research facilities in the UK as well as academic staff who are internationally renowned for their research.

The Cardiff School of Engineering is a supportive and friendly environment in which to study and we provide the very best facilities and academic support for our students. We value our students and their welfare is very important to us. As part of our overall framework of support, each student is allocated a personal tutor who becomes their first point of contact throughout their time here. The School is committed to equality of opportunity and inclusiveness and diversity.



The aim of the School is to provide you with a friendly and stimulating environment which allows you to fulfil your potential and enjoy your university experience. I look forward to welcoming you to the School, if you should chose to join us, and I wish you every success in your future studies.

Professor K M Holford
CEng, FIMechE, CPhys, FInstP
Director, Cardiff School of Engineering

“ We also have some of the best teaching and research facilities in the UK as well as academic staff who are internationally renowned for their research. ”

Cardiff: the City

Cardiff is one of Europe's youngest capital cities. Compact, green, friendly and full of life, it provides a first-class environment in which to live and study.

As the capital city of Wales, Cardiff has an impressive range of leisure, sporting and cultural amenities. Many of the facilities are of international standard. The city boasts world-class concert venues in the International Arena and St David's Hall, and is the focus of national and international sports events at the Millennium Stadium.

Culturally, Cardiff is well catered for, with the National Museum Cardiff, several theatres covering a wide range of tastes and the historic Cardiff Castle. The city also boasts a vibrant shopping centre, numerous cinemas and restaurants, great pubs and music venues. The development of Cardiff Bay is a major attraction and is home to the National Assembly for Wales and the impressive Wales Millennium Centre.

The Millennium Stadium



Cardiff is a compact city with large areas of parkland and good local transport. Unlike many other cities, it offers easy access to the countryside, coast and mountains. The Brecon Beacons National Park is only a 30-minute drive from Cardiff and the Glamorgan Heritage Coast is within easy reach. The city is also easily reached by road or rail from other parts of Britain. Cardiff International Airport, just outside the city, has frequent connections to Europe and destinations outside the EU.

Cardiff combines the practical advantages of a small, friendly city with the cultural and recreational amenities of a successful and modern capital. Such is the quality of the 'Cardiff experience' that in a recent survey a large majority of the students said they would like to stay and live in the city after graduation.

Don't just take our word for it . . .

"Cardiff is one of the best places to study in Britain. It has well situated, cheap housing, lively nights out, friendly people, great shops and hundreds of miles of countryside. It is all that any right-thinking fresher could desire."

Virgin Alternative Guide to British Universities

"Cardiff is a young, vibrant city. A blend of beautiful old architecture and new, cutting-edge developments. Cosmopolitan with a large student population."

Daily Telegraph Guide to UK Universities

"Cardiff has it all: grand civic architecture in a breezy waterside location, super-smart city bars just a short hop from lovely countryside."

Guardian University Guide



Come and see for yourself . . .

Cardiff benefits from excellent road and rail links with Britain's other major towns and cities. London, for example, is two hours by train, and the M4 links both the west and south of England, as well as west Wales. Travel to the Midlands and the North is equally convenient. The journey by road from Birmingham, for example, takes only two hours. The main coach and railway stations are both centrally placed and Cardiff also benefits from an international airport.



Cardiff's Civic Centre, home to the University



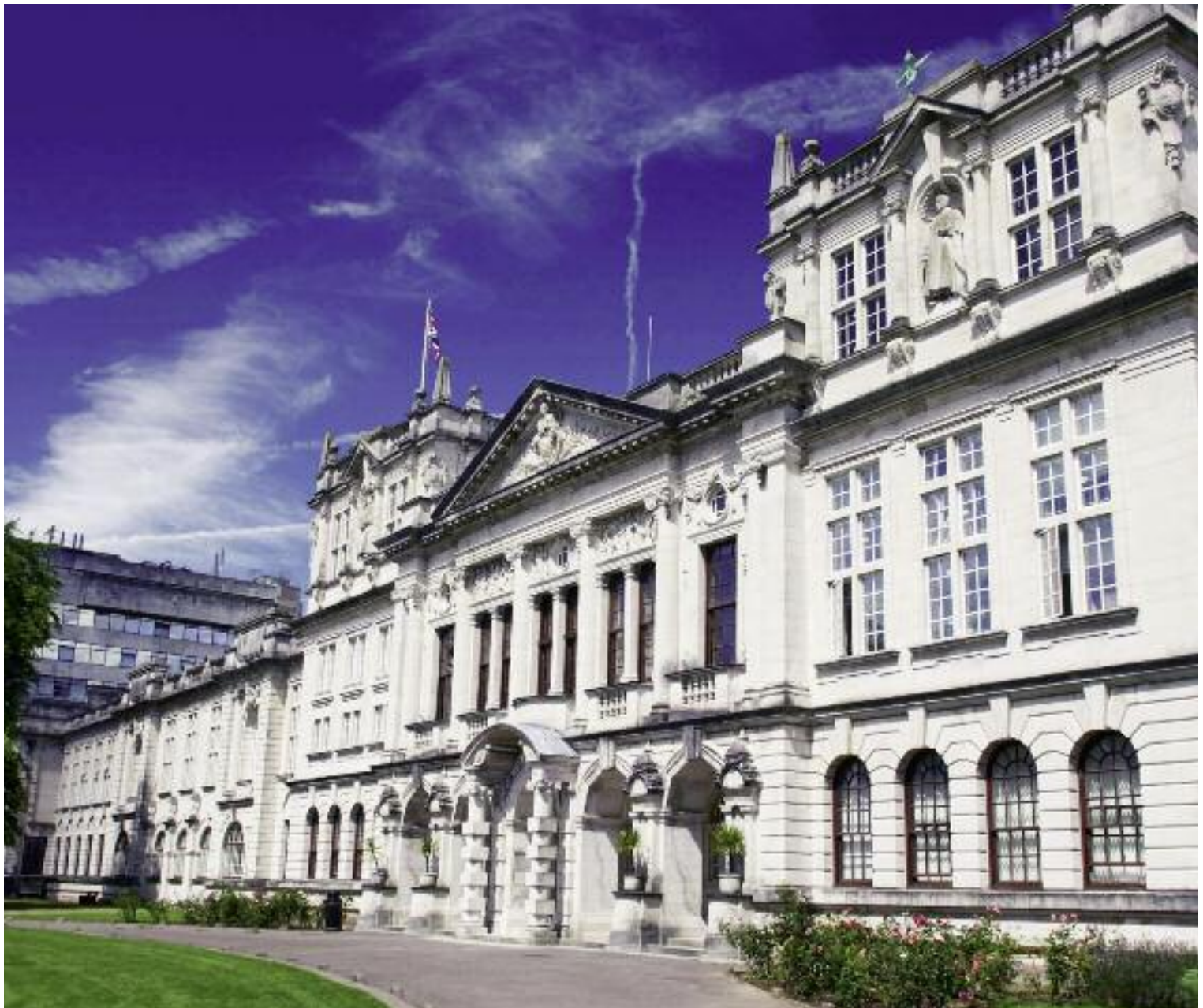
Cardiff Bay, the city's waterfront

Cardiff: the University

Cardiff University is recognised in independent government assessments as one of Britain's leading teaching and research universities. Founded by Royal Charter in 1883, the University today combines impressive modern facilities and a dynamic approach to teaching and research with its proud heritage of service and achievement. The University's breadth of expertise encompasses: the humanities; the natural, physical, health, life and social sciences; engineering and technology.

The University has an outstanding location amidst the parks, Portland stone buildings and tree-lined avenues that form the city's elegant civic centre. Unusually for a civic university, most of the University's student residential accommodation is within easy walking distance of lecture theatres, libraries and the Students' Union, saving you time and money. More than £200 million has been invested in the university estate in recent years to provide new and refurbished facilities of the highest quality.

The University's Main Building





More online at:

www.cardiff.ac.uk

Cardiff is a member of the Russell Group of Britain's leading research universities. This creates a stimulating environment for teaching, ensuring that you are exposed to the very latest thinking and that the most modern technology and equipment is available. Teaching at Cardiff has been independently assessed as being of an excellent standard. The Quality Assurance Agency for Higher Education, which undertakes assessments with all UK universities, confirmed that prospective students, parents, teachers and graduate employers can have every confidence in the quality and standards of Cardiff's awards. Feedback in the recent National Student Surveys has also been very positive.

The student population is drawn from a variety of backgrounds, with students attracted from throughout Wales, the rest of the UK and worldwide. The University currently has around 25,000 undergraduate and postgraduate students and there is an almost equal balance between male and female students. International students comprise some 17% of the total student population. Government performance indicators show that students at Cardiff are more likely to succeed in their studies than students at most other UK universities. Currently, 95% of students successfully complete or transfer, better than many similar universities and better than the UK national average.



What the Guides say:

"Cardiff offers a compelling student experience: Russell Group research credentials, the full gamut of traditional undergraduate degree courses and relatively affordable living with hot and cold running nightlife on tap."

Sunday Times University Guide

"Cardiff is a tip top uni academically... hugely popular with its students. Is Cardiff perhaps the best kept secret among Britain's universities?"

Virgin Alternative Guide to British Universities

"The University is as confident and forward-looking as the city it's located in, and has an excellent reputation for the quality of its teaching and research. Almost 60% of its research is ranked as world leading and it is a member of the Russell Group of leading universities."

Guardian University Guide



Students have access to the latest IT facilities



Cardiff has a relaxed and friendly atmosphere



More online at:

www.cardiff.ac.uk/residences

Accommodation

Cardiff has always attached great importance to the provision of student accommodation and has invested heavily in recent years to provide some of the highest quality residences in the UK university sector. Most of the accommodation is located close to the academic buildings. All first year undergraduates (who apply during the normal admissions cycle) are guaranteed a place in university accommodation. There is a choice of catered or self-catered residences.

New residences have been built in recent years and many of the older ones have been refurbished to a high standard. The majority of the 5,100 study/bedrooms have individual shower and toilet facilities and all halls of residence have computer network connection points.

Accepting an offer of a place at Cardiff University on a firm basis and completing your online Accommodation Request Form promptly increases the chances of your accommodation preferences being met. Full details of all University-owned accommodation are provided in the University Residences Guide.

Besides managing university property, the Residences Office maintains close links with the private sector and helps students looking to rent or share houses or flats.

What the Guides say:

“Guaranteed accommodation in halls and houses for first years. Very high quality and relatively cheap.”

Equitable Student Book

Talybont Court, the University's newest residence



A typical study bedroom



There is a range of catered and self-catered accommodation available



More online at:

www.cardiffstudents.com

Student Life

As a fast developing capital city, Cardiff is a great place to be a student. It's large enough to offer you an exciting variety of activities and entertainment, but small enough for you to feel comfortable in.

The Students' Union

Cardiff Students' Union is one of the biggest, best and most active in Britain. Solus, the Great Hall and the Taf are among the Union's major attractions. Solus is the students' own high quality nightclub, and is the second largest in South Wales. The Great Hall is a 1,600 capacity venue for major concerts and the Taf Bar is the Union's very own 'local'. Other facilities include CF10, a café offering a variety of hot and cold food, a general shop, University bookshop, computer shop, a games room and video arcade, five full size snooker tables and twelve pool tables, satellite TV, banking and insurance services. The Union also has its own letting agency and Student Advice centre. It is also home to Xpress Radio (the students' own radio station), an award-winning student newspaper, and more than 150 cultural, political, religious, social and sporting societies.

Jobshop

The Unistaff Jobshop is a student employment service that provides casual, clerical and catering jobs around the University to hundreds of students.

Solus nightclub, the Union's state-of-the-art nightclub



The University has three main sports centres providing you with access to both formal and informal activities



Cardiff Students' Union – the general shop

What the Guides say:

“Cardiff Students' Union is the biggest and best equipped in Britain.”

The Independent

“Cardiff Students' Union is independently recognised as the biggest and best in Britain.”

Equitable Student Book

“The Students' Union provides an excellent range of facilities, clubs and societies.”

The Times Good University Guide

Cardiff School of Engineering

Quality and Professional Accreditation

Cardiff School of Engineering is recognised as one of the best-resourced Engineering schools within the British university system in terms of facilities, research and teaching. The quality of our teaching has been independently assessed by the Higher Education Funding Council for Wales and we have received the following gradings in the latest assessments:

Civil Engineering	EXCELLENT
Electrical and Electronic Engineering	EXCELLENT
Electronic Engineering	EXCELLENT
Manufacturing Engineering	EXCELLENT
Mechanical Engineering	EXCELLENT

(An 'Excellent' in the Welsh system is considered to be equivalent to between 22 and 24 points in the English review system.)

The teaching on the Architectural Engineering and Computer Systems Engineering programmes has also been assessed, and was graded as 'Satisfactory'. Integrated Engineering has not been separately assessed as its teaching is an amalgam of the teaching on the Electronic, Mechanical and Manufacturing degree programmes, all of which have been independently assessed as 'Excellent'.

A significant advantage of our integrated School structure is that the opportunity to change programmes is a possibility within the first year of study, subject to satisfactory performance and the agreement of the Course Directors on academic grounds.

The School has also received independent recognition for the quality of its undergraduate provision. Our degree programmes for Civil, Mechanical, Electrical and Electronic Engineering are recognised as being among the best in the UK, as ranked by league tables produced by the various educational supplements. Overall, the Cardiff School of Engineering's degree programme's rank highly in independent league tables, such as the Times Good University Guide (Integrated Engineering 5th, Civil Engineering 7th, Mechanical Engineering 9th). Cardiff is one of the very few engineering schools nationwide which is an invited member of both the UK Electronic Skills Foundation and the Power Academy.

The School has also been recognised for the quality of its research in the recent Research Assessment Exercise and has consolidated its position in the top ten Engineering Schools in the UK. Linked to this success is an increase in undergraduate applications over the last five years. Applications have increased by 80% in this period and in 2010 the School received over 2,500 applications for undergraduate places.

All our degree programmes are accredited by the relevant professional engineering institutions.

3rd year project work in the High Voltage Laboratory



Facilities

Our high standard of teaching and research is complemented by outstanding, up-to-date facilities. The School is located in the modern complex known as the Queen's Buildings, the result of a £30 million investment. In the last five years the site has seen further improvements with a complete refurbishment of the library which has won a national award for innovative design. In addition the School has recently opened a new flexible learning space called The Forum. The Forum is located in the heart of the School, next to the Teaching Office and has spaces for up to 120 students and staff to engage in group learning, single study or just to grab a coffee and chat.

The complex is close to other academic schools, the Students' Union and the city centre. It houses outstanding self-contained facilities, including spacious and well-equipped teaching and research laboratories and a library containing a broad range of books and journals, the latest computer and CD-ROM reference media, together with numerous quiet areas for study.

We provide our students with extensive computing facilities which can be used to access specific reference material and the University network. This provides a wide range of applications such as word processing, spreadsheets and database management. The network also provides full email and internet facilities. Further computing facilities are found in the extensive computing suites which, as well as providing easy access to the software packages on the network, include specific CAD workstations and cater for other specialised computing needs.

The social aspects of university life are as important and informative as formal teaching and the Queen's Building complex has its own facilities. You will be able to relax and socialise in the in-house coffee shop and snack bar, or in the large refectory which opens at 8.00am for breakfast and also serves evening meals.

Lectures and Assessment

The School's teaching activities are overseen by a Deputy Head of School. They are organised into three main discipline groupings each headed by a Course Director responsible for the management of the degree programmes included in each group.

No matter which degree programme you choose, you will be taught the fundamental aspects of engineering through a combination of lectures and tutorials, supplemented by the practical aspects of engineering which are taught through laboratory and project-based work. On average, you will have 20 hours of timetabled lectures, laboratory classes and tutorials each week and will be expected to supplement this with your own private study.



Our teaching is organised into modules and you will take twelve modules per year, normally six in each of the two semesters. Each semester consists of eleven teaching weeks, one revision week and an examination period. Help with specific aspects of a module can be directly obtained from the lecturers concerned; staff will be happy to clarify any material or answer any of your questions.

Your progress in each module is usually assessed mid-way through each semester (through a one hour test) to give you feedback on your progress, then finally at the end of the appropriate semester. Assessment is undertaken using a variety of different methods including formal written examinations, case studies, assignments and project work.

Support Through Your Studies

Your first year of academic life will expose you to a broad range of new and exciting experiences. To help you through this transitional period in your life, upon starting your studies at Cardiff, you will be assigned a personal tutor who is a member of the academic staff associated with your degree programme. Your tutor will be there to advise you on academic, non-academic and personal matters in a confidential and informal manner as and when you need some guidance. We aim to help you overcome any problem, however big or small, as smoothly and quickly as possible. If more specialist assistance is required, then problems are referred to the University's Student Advisory Services where trained counsellors are on hand to provide guidance on a range of issues.

Degree Programmes and Entry Qualifications

There are a number of programme options available to you. (NB: not all the degrees offer all these possibilities. Check the details on the relevant degree in the table below.)

The MEng (Hons) Programme

The MEng programme is an engineering degree which leads to a higher qualification than the traditional BEng programme, and requires an additional year of study. The programme shares the first two years with the relevant BEng programme, while the last two years expand and strengthen your knowledge in your chosen engineering subject. The MEng programme offers a quicker, more direct route to chartered engineer status than the BEng programme. Continuation on this programme is subject to good performance in your first two years of study.

The BEng (Hons) Programme

This programme is the traditional way of studying engineering and involves three years of study in your chosen subject, or four years if you choose the Year in Industry option. Not all Engineers wish to seek chartered status – for instance, for those opting for certain aspects in research, careers in the Forces, the financial sector, or some kinds of consultancy work – and in these cases the BEng degree may prove a more appropriate choice than the MEng. Chartered engineer status still may be attained with a BEng degree, though the Engineering Institutions require further studies to be undertaken.

The Year in Industry Programme

The Sandwich programme is an enhancement of either the MEng or the BEng programme as it incorporates a year of industrial placement. This placement takes place after you have completed your first two years of engineering study, so the MEng programme takes five years to complete and the BEng programme takes four years. However, you are paid a salary during your industrial placement and our experience is that sandwich programme students obtain higher degree gradings than those taking straight degree programmes. The University has a formal partnership with the City and Guilds of London Institute, which enables our students to achieve the Senior Award of Licentiate status after successfully completing their sandwich placement. This is a professional qualification which rewards work related competence and expertise and is widely recognised by employers. Holders are entitled to use the letters LCGI after their names.

The Year in Europe Programme

The Year in Europe programme is also an enhancement of the MEng programmes, but this time, instead of spending a year in industry, you will spend a year attending a Higher Education establishment in France, Germany or Spain. Your year in Europe is undertaken after completing your first two years of study in Cardiff, so the MEng programme will take five years to complete.

Programme	Foundation Year	MEng	MEng Sandwich	MEng Year in Europe	BEng	BEng Sandwich	Approximate number of students per year
	1 Year	4 Years	5 Years	5 Years	3 Years	4 Years	
Architectural	H101	H294	H295	H291	H292	H293	25
Civil	H101	H207	H208	H209	H200	H201	70
Civil and Environmental	H101	H226	H224	H225	H221	H222	15
Computer Systems	H101	HG6K	HG6Q	-	HG66	HGQ6	15
Electrical and Electronic	H101	H601	H600	-	H605	H606	30
Electronic and Communications	H101	H602	H603	-	H610	H604	20
Integrated	H101	H113	H114	H115	H110	H111	20
Mechanical	H101	H302	H307	H308	H300	H301	70
Medical	H101	H1BV	HB99	-	H1B8	BH99	20

Entry Qualifications

The following are the minimum entry qualifications for our degree programmes. For some of our degrees, higher grades are required.

Qualification	MEng (Hons) Programmes	BEng (Hons) Programmes	Foundation Year
A-levels	AAB – ABB including Mathematics	AAB – BBB including Mathematics	ABB excluding Mathematics
Welsh Baccalaureate	Welsh Baccalaureate and AA at A-level (including Mathematics)	Welsh Baccalaureate and AA-AB at A-level (including Mathematics)	Welsh Baccalaureate and AB at A-level (excluding Mathematics)
AS-levels	Two AS-levels will be considered in lieu of a third A-level but not as a substitute for Mathematics	Two AS-levels will be considered in lieu of a third A-level but not as a substitute for Mathematics	Two AS-levels will sometimes be considered in lieu of a third A-level
International Baccalaureate	Obtain Diploma with an overall score of 32-34 points with five in Mathematics and another Science at higher level	Obtain Diploma with an overall score of 30-32 points with five in Mathematics and another Science at higher level	Obtain Diploma with an overall score of 30 points and Science at a higher level
European Baccalaureate	Obtain Diploma with an overall average of 78% with 75% in Mathematics	Obtain Diploma with an overall average of 75% with 70% in Mathematics	Obtain Diploma with an overall average of 75%
BTEC	Applications will be treated on an individual basis, and BTECs aligned with relevant degrees are welcome. Offers will be in the region of DDD. Some degrees may require supplementary Mathematics	Applications will be treated on an individual basis, and BTECs aligned with relevant degrees are welcome. Offers will be in the region of DDD/DDM. Some degrees may require supplementary Mathematics	Offers will be in the range of DDD/DDM and applications will be treated on an individual basis
Work experience and other international qualifications	Each application is considered individually	Each application is considered individually	Each application is considered individually

Please note: you will also be required to have a GCSE in English at Grade C or above, or equivalent.

Applicants to the Year in Europe programmes require Grade C or above at GCSE (or equivalent) in the appropriate language.

The Foundation Year

How to become an engineer without Mathematics A-level

If you are one of the many people who would like to become an engineer but you do not have the appropriate qualifications, at Cardiff School of Engineering we have a programme that might suit your needs. The programme is called the Foundation Year and is specially designed to give you the necessary basic knowledge to enable you to cope with an engineering degree programme.

Although the Foundation Year only lasts for one year, it must be considered as an entry route to one of our degree programmes. It is not a stand-alone year, but the initial part of a programme of study leading to a MEng or BEng degree. Providing you have successfully completed the Foundation Year, you will automatically progress to the first year of your chosen degree programme.

If you are a 'home' student on the Foundation Year, you will qualify for mandatory student support (means-tested assistance with tuition fees and Student Loan) to cover all years of study at Cardiff.

What sort of qualifications do I need?

The programme is aimed at a wide range of potential applicants. For instance, if you have a GCSE pass in Mathematics and good A-level passes in non-mathematical subjects, the Foundation Year would be an ideal route for you to enter engineering. Likewise, if you have a BTEC or a similar vocational qualification in a non-engineering subject, an Overseas Baccalaureate or School Leaving Certificate that is not recognised for direct entry to one of our degree programmes, then the Foundation Year could be just what you're looking for.

Special consideration is sometimes afforded to mature students who show the drive, commitment and potential necessary to complete the Foundation Year and continue further to gain a degree. In these cases, formal qualifications may be waived after consideration of vocational experience, although some evidence of mathematical and scientific potential would need to be evident.



The School's Newport Road entrance

Programme Structure

The programme is designed to expose students to a broad spectrum of engineering through modules consisting of lectures, tutorials and case studies. These include aspects of Mathematics, Physics and Information Technology that are relevant to engineering but omit many of the subjects taught at A-level.

The practical nature of the programme contrasts with the way such subjects may have been presented at school. Assessment is by project work, continuous assessment and end of semester examinations.

How to Apply

When completing your UCAS application, as well as using the H101 course code, please indicate the engineering degree programme you wish to study following the Foundation Year.

Please note: if you complete the Foundation Year to a satisfactory standard, you are not necessarily obliged to follow your original choice of degree programme.

The International Foundation Programmes

The International Foundation Programme in Engineering

This is a one-year academic programme and is designed to give you the academic and English language skills you need to enter undergraduate study in Engineering. All students who pass the International Foundation Programme will be guaranteed a place on their chosen degree course.

The International Foundation Programme is designed for:

- ▶ Students whose secondary school-leaving qualification means that an extra year's study is necessary to reach the appropriate level for undergraduate study in the UK.
- ▶ Students with appropriate academic qualifications who need to develop their English language and study skills in preparation for an undergraduate degree programme at Cardiff University or elsewhere in the UK.

Course Structure

The course is designed to expose students to a broad spectrum of engineering through modules consisting of lectures, tutorials and case studies. These include aspects of Mathematics, Physics and Information Technology that are relevant to engineering but omit many of the subjects taught at school.

The modular Engineering programme includes:

- ▶ Engineering Analysis
- ▶ Algebra and Engineering Functions
- ▶ Engineering Materials
- ▶ Foundations of Modern Physics

Expert English language tuition will be delivered by our experienced and well-qualified English language tutors. We aim to provide you with the skills in writing, reading, listening and speaking that you need to undertake a degree programme. There will also be the opportunity to continue with your English language studies for as long as you like after your Foundation Programme ends.

Your progress will be assessed using a variety of different methods including written examinations, case studies, assignments and project work.

How to Apply

Full information about the Programme and an application form for the International Foundation Programme are available from the Admissions Office in the School of Engineering (contact details available on page 37).

Foundation Year

If your English is good, but you need extra help with your Mathematics, the School of Engineering's own Foundation Year might be the course for you. The Foundation Year is specially designed to give you the necessary basic knowledge to enable you to cope with an engineering degree programme. Although the Foundation Year only lasts for one year, it must be considered as an entry route to one of our degree programmes. It is not a stand-alone year, but the initial part of a programme of study leading to a MEng or BEng degree. Providing you have successfully completed the Foundation Year, you will progress to the first year of your chosen degree programme.

The Foundation Year is designed for students whose English is good, but whose secondary school-leaving qualification means that an extra year's study is necessary to reach the appropriate level for undergraduate study in the UK. It is also for students with good results in non-Mathematical subjects who would like to pursue a career in Engineering and who therefore need additional Mathematical study to undertake an Engineering degree programme.

Course Structure

The course is similar to the International Foundation Programme, but has additional modules in engineering-related subjects.

Assessment is by project work, continuous assessment and end of semester examinations.

How to Apply

For this course you need to apply to UCAS – see page 37 for details. When completing your UCAS form, as well as using the H101 course code, please indicate the engineering degree programme you wish to study following the Foundation Year.

Architectural Engineering

Are you looking for a career that is creative, challenging and fulfilling? Then our degree programme in Architectural Engineering may well suit your needs. It is an engineering degree with a human face, which combines the challenges and inventiveness of the modern building industry with a flair for originality and creativity.

The creation of buildings is a complex operation requiring the skills of many disciplines. Typically, the design team would include architects, town planners, structural, environmental and building services engineers and landscape architects, whilst the building process would be supervised by construction professionals with many specialist subcontractors. Historically, these groupings have all come from independent specialist firms who then pool their knowledge in order to achieve a solution to the job in hand. This often leads to misunderstandings and inefficient ways of achieving the required result, which can mean that jobs are not completed on time or to budget. This state of affairs was clearly recognised by the great engineer Ove Arup, in 1970, when he articulated the need for a coordinated, multi-disciplinary approach. Speaking of his company:

“We are then led to the ideal of ‘Total Architecture’, in collaboration with other like-minded firms or, still better, on our own. This means expanding our field of activity into adjoining fields – architecture, planning, ground engineering, environmental engineering, computer programming, etc, and the planning and organisation of the work on site.”

Many companies have moved towards this ideal over the intervening years, as have the many professional institutions involved in the construction industry.

The Architectural Engineering degree programmes at Cardiff also aspire to this ideal.

Architectural Engineering at Cardiff

The Architectural Engineering degree programmes provide a broad based learning environment, which will enable you to understand the underlying process of building construction. You will be taught the role of each of the individual professional groupings and you will learn to solve the problems that each of them most commonly face. This leads to an understanding of the necessary interaction between the groups and the requirements of multidisciplinary work. Throughout this process, particular attention is focused on structural engineering and architectural studies. In support of multidisciplinary working, it is necessary to develop a wide range of personal skills, particularly communication, and this leads in a natural way to modules on the theory and practice of management, which form an important part of the degree programmes.

The four-year MEng and the three-year BEng represent the basic degree programme of each type. Both types of programme conform to the philosophy outlined above, but the MEng, although covering the same topics as the BEng, provides greater depth in the core topics and more width in supporting modules. This is typified by the MEng offering greater penetration into environmental issues, business studies and advanced architectural topics. Both programmes offer a Year in Industry option where the student works in industry for a year and then returns to complete their degree programme. In addition, the MEng programme offers the opportunity to spend an additional year at a European university.

The sandwich programmes, which offer an industrial placement, have the same academic content as the full-time programmes but the third year is spent gaining experience in industry, either at home or abroad. This takes the form of supervised training with a suitable company, which will pay a normal salary for the work undertaken. Experience shows that the year of industrial training enhances understanding of the relevance of the teaching and tends to lead to improved performance in the final examinations.

The intercalated programme, which offers a year in a European university, is for those who wish to develop their language skills in either German, French or Spanish. Special language modules are provided throughout the degree programme for these students. The third year is spent away from Cardiff, during which time support will be provided by a personal tutor.



Cardiff Bay has a range of buildings of special interest



Further information:
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You will learn about the underlying process of building construction

The remainder of this programme is spent back in Cardiff; the subjects studied being the same as for the equivalent full-time programmes.

The three-year BEng is the fundamental programme and provides a basis for progression to chartered engineer status. However, the four-year MEng has now replaced the BEng as the fast-track route to becoming a Chartered Engineer.

Employment

The Architectural Engineering degree programmes in Cardiff are recognised as being of very high quality. This, coupled to the fact that Cardiff is recognised as being one of Britain's leading centres for the teaching of engineering, means that our graduates readily obtain good quality jobs. Most often Architectural Engineers find employment in multidisciplinary design practices where professionals from a variety of disciplines will work. In addition, some of our graduates decide to work for traditional architectural practices or firms of structural engineers. Others prefer contracting and onsite management, providing a key link between the design engineers and architects.

Students at Cardiff have the benefit of being only minutes away from one of the biggest and most innovative developments in Europe: Cardiff Bay. Professional engineers working on the development, from companies such as Ove Arup, are regularly involved in teaching on the programmes.

Architectural Engineering Research

The lecturers that will be teaching you are research active. In the most recent government Research Assessment Exercise, Architectural Engineering at Cardiff was ranked third in the UK. This indicates that research by all the lecturers is recognised internationally. If you wish to pursue research after graduating, there are plenty of opportunities at Cardiff.

Degree Programmes

- **MEng (Hons)** 4 years full-time (UCAS code H294)
- **MEng (Hons)** 5 years with a Year in Industry (UCAS code H295)
- **MEng (Hons)** 5 years with a Year in Europe (UCAS code H291)
- **BEng (Hons)** 3 years full-time (UCAS code H292)
- **BEng (Hons)** 4 years with a Year in Industry (UCAS code H293)

Accreditation

Institution of Structural Engineers

Institution of Civil Engineers

Degree Modules

Year 1

- Architectural Engineering and Soil Mechanics
- Computing 1
- Drawing, Design and CAD B
- Engineering Analysis 1 and 2
- Environmental Fluid Mechanics
- Materials Science and Construction Materials
- Professional Development and Communication Skills in English
- Structural Mechanics
- Surveying and Construction (field course)
- French for Year in Europe *option*
- German for Year in Europe *option*
- Spanish for Year in Europe *option*
- Laboratory

Year 2

- ACE Computing
- Engineering Analysis
- Field Studies of the Natural and Built Environment (field course)
- Hydraulics
- Introduction to Economics, Law, Accounting and Management Science
- Introduction to History of Western Architecture
- Soil Mechanics
- Structural Analysis and Solid Mechanics
- French for Year in Europe *option*
- German for Year in Europe *option*
- Spanish for Year in Europe *option*
- Laboratory
- Steel and Concrete Theory and Structural Design

Year 3 BEng (Hons)

- Architectural Engineering Design Studies
- Business Management
- Concrete Materials and Structures *option*
- Continuum Solid Mechanics *option*
- Dynamics
- Environmental Geotechnics *option*
- Environmental Hydraulics *option*
- Geotechnical Engineering
- Integrated Building Design
- Major Project
- Object-Oriented Engineering Computing *option*
- Structural Analysis
- Structural Design Studies

Year 3 MEng (Hons)

- Architectural Engineering
- Business Management
- Computing *option*
- Concrete Materials and Structures *option*
- Continuum Solid Mechanics
- Design Studio
- Dynamics
- Environmental Geotechnics *option*
- Environmental Hydraulics *option*
- Geotechnical Engineering
- Integrated Building Design
- Major Project
- Object-Oriented Engineering
- Structural Analysis
- Structural Design Studies

Year 4 MEng (Hons)

- Alternative Energy Systems *option*
- Building Physics
- Design Feasibility
- Dynamics and Structures
- Finite Element Theory and Practice
- Fundamentals of Nanomechanics *option*
- Integrated Building Design
- Management in Industry *option*
- Professional Engineering Studies
- Soil Mechanics *option*
- Structural Engineering *option*
- Tensile Structures
- Numerical Techniques in Water Engineering *option*

Civil Engineering

Civil Engineers design, construct and maintain such things as roads, bridges, airports, flood and coastal defences, tunnels, water supply programmes and dams. Civil Engineers are also employed in aircraft design, ship building and the oil industry. Some follow alternative careers in management consultancy, information technology, accountancy and the legal profession.

Typically, as a Civil Engineer you would be involved in one of three basic areas of activity. First, there is the consultant who uses expertise and creative skills to produce various designs, the most appropriate of which is then passed onto a contractor, representing the second area, who is responsible for turning the design into the actual object. The final area is conservation and maintenance of both structures and the environment. For example, listed buildings and other structures require constant attention to protect them against deterioration; also as a Civil Engineer you will be central to the drive for environmentally sensitive design and sustainable development.

Students working in the heavy structures laboratory



Programme Structure

Both the BEng and the MEng degrees are fully accredited by the Institutions of Civil and Structural Engineers. The MEng is an enhanced degree, with MEng students benefiting from advanced learning in design and management, and has become the preferred route to becoming a Chartered Engineer.

The Cardiff School of Engineering is one of only a few to offer both sandwich and full-time MEng and BEng degree programmes in Civil Engineering. The sandwich programmes involve a year of practical training in industry during which time you are salaried. Our reputation makes it easy to place students with good companies. Among the advantages of the sandwich programmes is that the practical experience helps you to relate our teaching to current engineering practice, and many employers prefer graduates with practical experience.

The Year in Europe programme is aimed at those students undertaking an MEng who already have some language skills and wish to enhance them. If you opt for this programme, you will spend the first two years in Cardiff, Year Three in a university elsewhere in Europe, (undertaking supervised learning about Engineering in your chosen language), and the final two years back in Cardiff.



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The School has excellent facilities for practical work in Civil Engineering

Employment

Our Civil Engineering graduates readily find employment with a large number of employers such as design consultancies, construction contractors, utilities and local and national governments. In addition, some of our graduates choose to find work outside Civil Engineering. Examples of the type of work they select include finance, insurance, computing, journalism, general management, retailing and sales. Employers recognise that Cardiff School of Engineering is one of Britain's leading centres for the teaching of engineering.

Civil Engineering Research

The lecturers that will be teaching you are research active. In the most recent government Research Assessment Exercise, Civil Engineering at Cardiff was rated 3rd in the UK. This indicates that research by all the lecturers is recognised internationally. If you wish to pursue research after graduating, there are lots of opportunities at Cardiff.

Degree Programmes

- **MEng (Hons)** 4 years full-time (UCAS code H207)
- **MEng (Hons)** 5 years with a Year in Industry (UCAS code H208)
- **MEng (Hons)** 5 years with a Year in Europe (UCAS code H209)
- **BEng (Hons)** 3 years full-time (UCAS code H200)
- **BEng (Hons)** 4 years with a Year in Industry (UCAS code H201)

Accreditation

Institution of Civil Engineers

Institution of Structural Engineers

Degree Modules

Year 1

- Computing 1
- Drawing, Design and CAD B
- Engineering Analysis 1 and 2
- Engineering Geology and Soil Mechanics
- Environmental Fluid Mechanics
- Materials Science and Construction Materials
- Professional Development and Communication Skills in English
- Structural Mechanics
- Surveying and Construction (field course)
- French for Year in Europe *option*
- German for Year in Europe *option*
- Spanish for Year in Europe *option*
- Laboratory

Year 2

- ACE Computing
- Engineering Analysis 3 and 4
- Field Studies of the Natural and Built Environment
- Hydraulics
- Introduction to Economics, Law, Accounting and Management Science
- Soil Mechanics
- Steel and Concrete Theory and Structural Design
- Structural Analysis and Solid Mechanics
- French for Year in Europe *option*
- German for Year in Europe *option*
- Spanish for Year in Europe *option*

Year 3 BEng (Hons)

- Business Management
- Civil Engineering Design
- Concrete Materials and Structures *option*
- Continuum Solid Mechanics *option*
- Environmental Geotechnics *option*
- Environmental Hydraulics *option*
- Geotechnical Engineering
- Major Project
- Object Oriented Engineering Computing *option*
- Structural Analysis
- Structural Design Studies
- Waste Management and Recycling *option*
- Water Engineering

Year 3 MEng (Hons)

- Business Management
- Civil Engineering Design
- Concrete Materials and Structures *option*
- Continuum Solid Mechanics
- Environmental Geotechnics *option*
- Environmental Hydraulics *option*
- Geotechnical Engineering
- Major Project
- Object Oriented Engineering Computing *option*
- Structural Analysis
- Structural Design Studies
- Water Engineering
- Waste Management and Recycling *option*

Year 4 MEng (Hons)

- Automotive Design *option*
- Design A *option*
- Design B *option*
- Design Feasibility
- Finite Element Theory and Practice
- Fundamentals of Nanomechanics *option*
- Integrated Building Design *option*
- Professional Engineering Studies
- River Basin Management *option*
- Soil Mechanics *option*
- Structural Engineering *option*
- Renewable Energy Design *option*
- Management in Industry
- Numerical Techniques in Water Engineering *option*

Civil and Environmental Engineering

Are you concerned about the increasing damage to our planet? Do you wish to gain the skills to enable you to take positive action to reduce the level and impact of pollution? Do you wish to contribute towards achieving a more sustainable society?

On our Civil and Environmental degree programme you will study a wide range of subjects that are balanced to cover both green and technological solutions to these problems. Society is facing an increasing number of environmental problems ranging from global to local, such as:

- ▶ Global risks from increasing energy use and the resulting atmospheric pollution, with solutions ranging from renewable energy through to more energy efficient processes
- ▶ Problems faced by third world countries where basic needs, such as clean, safe drinking water are often not met
- ▶ Waste left by old industries which needs to be cleaned up and the land returned to beneficial usage
- ▶ Local risks, e.g. pollution within the workplace, which can lead to poor health
- ▶ The need to deal with the ever increasing production of waste material by society

In Cardiff we have established a large number of national and international links. Real environmental problems are tackled with the help of undergraduate and postgraduate student projects and research-led initiatives.

Recent projects and initiatives include:

- ▶ Mine water treatment systems in Peru
- ▶ Determination of contamination migration into drinking water in the Middle East
- ▶ An undergraduate group project for a local multi-national electronics manufacturer to introduce water recycling technology

Cardiff School of Engineering has specialist staff who are recognised experts in the whole range of environmental topics. These range from health risks associated with industrial processes and land reclamation to ensuring clean water supplies; from efficiency improvements in combustion processes with associated monitoring and reduction of exhaust gas emissions, through to renewable energy systems. This expertise leads to teaching which is at the forefront of current technology and ensures that the learning process is stimulating and challenging.

The high standard of teaching has been recognised by the Higher Education Funding Council for Wales, which has awarded the degree programme an 'Excellent' rating.

Employment

Graduates from this degree programme have no difficulty in obtaining relevant employment. There is good demand for young engineers with environmental specialisms. Consultancy firms account for most of the job opportunities, followed by government organisations including Local Authorities and the Environment Agency.

Others have chosen to work for national and multinational companies: recent examples include companies in the electronics, pharmaceutical and aeronautic fields. Health and Safety management is a growing career path for our graduates. Due to current global environmental legislation changes, waste management has also become a major employment option. You will also be attractive to a wide range of employers who are looking for graduates with good analytical, computing and management skills.

Specific examples of the jobs that a Civil and Environmental Engineering graduate might end up doing include design, operation and management of water treatment plants; flood defence management; contaminated land remediation and reclamation; integrated transport systems; and general civil engineering consultancy.

In some cases our graduates opt to register for higher degrees, either to obtain more specialist skills before starting their careers or to undertake research.

Industrial Practice

The industrial practice module offered to our MEng students on the Civil and Environmental Engineering degree programme has been singled out for praise during the Teaching Quality Assessment. It provides the opportunity for students to work in groups to solve real industrial problems.

You will spend one day per week at the premises of the industrial collaborator, where you will be expected to work as a professional engineer. Under supervision, you will be expected to identify the problem; investigate a number of appropriate solutions, possibly in collaboration with other companies; and put forward economic designs for environmental improvement. You will be expected to communicate your findings in both written and oral reports assessed by both the company and the University.



Further information:
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Civil engineering students conducting a study on river flooding in the hydraulic laboratory

Excellence in Research and Technology Transfer

The School has an excellent reputation for research in this area and has recently won a number of awards for work in waste management and sustainable development with local companies.

Degree Programmes

- **MEng (Hons)** 4 years full-time (UCAS code H226)
- **MEng (Hons)** 5 years with a year in Industry (UCAS code H224)
- **MEng (Hons)** 5 years with a year in Europe (UCAS code H225)
- **BEng (Hons)** 3 years full-time (UCAS code H221)
- **BEng (Hons)** 4 years with a year in Industry (UCAS code H222)

Accreditation

Institution of Civil Engineers

Institution of Structural Engineers

Degree Modules

Year 1

- Computing 1
- Drawing, Design and CAD B
- Engineering Analysis 1 and 2
- Engineering Geology and Soil Mechanics
- Environmental Fluid Mechanics
- Materials Science and Construction Materials
- Professional Development and Communication Skills in English
- Structural Mechanics
- Surveying and Construction (field course)
- French for Year in Europe *option*
- German for Year in Europe *option*
- Spanish for Year in Europe *option*
- Laboratory

Year 2

- ACE Computing
- Engineering Analysis
- Environmental Engineering
- Field Studies of the Natural and Built Environment (field course)
- Hydraulics
- Introduction to Economics, Law, Accounting and Management Science
- Soil Mechanics
- Steel and Concrete Theory and Structural Design
- Structural Analysis and Solid Mechanics
- French for Year in Europe *option*
- German for Year in Europe *option*
- Spanish for Year in Europe *option*
- Laboratory

Year 3 BEng (Hons)

- Business Management
- Civil Engineering Design
- Continuum Solid Mechanics *option*
- Environmental Geotechnics *option*
- Environmental Hydraulics *option*
- Environmental Law
- Geotechnical Engineering
- Major Project
- Object Oriented Engineering Computing *option*
- Structural Design Studies
- Waste Management and Recycling *option*
- Water Engineering

Year 3 MEng (Hons)

- Business Management
- Civil Engineering Design
- Continuum Solid Mechanics *option*
- Environmental Geotechnics *option*
- Environmental Hydraulics *option*
- Environmental Law
- Geotechnical Engineering
- Major Project
- Object Oriented Engineering Computing *option*
- Structural Design Studies
- Waste Management and Recycling *option*
- Water Engineering

Year 4 MEng (Hons)

- Alternative Energy Systems *option*
- Building Physics
- Design A *option*
- Design B *option*
- Environmental Engineering Applications *option*
- Industrial Practice
- Integrated Building Design *option*
- Management in Industry *option*
- Professional Engineering Studies
- Renewable Energy Design *option*
- River Basement Management *option*
- Water Quality Control *option*

Computer Systems Engineering



Students have access to library and computing facilities across the campus

The Computer Systems Engineering degree programme is a unique programme of study jointly run by the School of Engineering and the School of Computer Science. This programme integrates hardware and software engineering and is, therefore, distinctly different from a computer science or computer design degree programme. If you are interested in all aspects of a computer – from the electronics through programming to its practical applications – then this is the degree programme for you.

Programme Structure

We offer both a BEng and an MEng degree programme and an industrial placement year (Sandwich option) is available for both streams. We encourage candidates with potential for high achievement to follow our MEng programme, which provides a fast track route to attaining chartered engineer status with The Institution of Engineering and Technology (IET).

In the first year of your studies you will be taught the fundamentals of computer science, electronics and communication systems, as well as some basic systems modelling.

During your second year you continue to develop your knowledge in engineering and computing and will be expected to undertake a team project in which your team will have to use its resources to tackle an industrially relevant problem.

In your final year, you may continue to divide your time between the hardware and software aspects of computer systems or, if you wish, you can choose to bias your studies towards the software elements. In addition, you will choose a project under the supervision of an expert within either the computer science or engineering department. This allows you to develop specialist skills which will aid you in your future career.



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Digital Signal Processing board used for second year laboratory teaching

Employment

The skills developed throughout this degree programme are designed to bridge the gap between a software system and the physical world. You will have a wide range of sought after abilities so your employment prospects are excellent whether you choose to work in software development, telecommunications, medical instrumentation, nuclear plant control, banking or manufacturing.

The Computer Systems degree programme is accredited by two professional bodies. It is an excellent degree for individuals who want a wide choice of careers.



Team projects tackle relevant industrial problems

Degree Programmes

- **MEng (Hons)**
4 years full-time (UCAS code HG6K)
- **MEng (Hons)**
5 years with a Year in Industry (UCAS code HG6Q)
- **BEng (Hons)**
3 years full-time (UCAS code HG66)
- **BEng (Hons)**
4 years with a Year in Industry (UCAS code HQQ6)

Accreditation

British Computer Society

Institution of Engineering and Technology (IET)

Degree Modules

Year 1

- Basic Systems Modelling
- Communication Skills and Project Management
- Electronic Engineering 1 and 2
- Electronics Laboratory
- Engineering Analysis 1 and 2
- Java 1
- Java 2 and Algorithms 1
- Network Analysis 1
- Operating Systems
- Programming Project

Year 2

- Algorithms 2 and Data Structures
- Control Engineering *option*
- Digital Comms and Network Analysis
- Electronic Engineering 3 and 4
- Engineering Analysis 3
- Introduction to Economics, Law, Accounting and Management Science
- Microelectronic Circuits and DSP Concepts *option*
- Object Oriented Methods System Design and Group Project
- French *option*
- German *option*
- Spanish *option*

Year 3 BEng (Hons)

- Advanced Analogue IC Design *option*
- Automatic Control *option*
- Business Management Communications Systems *option*
- Compiler Design and Construction *option*
- Database Systems *option*
- Digital Design *option*
- Digital Signal Processing Systems *option*
- Electronic Circuits and Systems *option*
- Evolutionary Computing *option*
- Human Computer Interaction *option*
- Information Systems Management
- Object Oriented Engineering Computing *option*
- Optoelectronics *option*
- Parallel Processing *option*
- Programming Languages, Principles and Paradigms *option*
- Project
- Robotics and Image Processing *option*
- Software Engineering
- French *option*
- German *option*
- Spanish *option*

Year 3 MEng (Hons)

- Advanced Analogue IC Design *option*
- Automatic Control *option*
- Business Management and Communications Systems *option*
- Compiler Design and Construction *option*
- Database Systems *option*
- Digital Design *option*
- Digital Signal Processing Systems *option*
- Electronic Circuits and Systems *option*
- Evolutionary Computing *option*
- Human Computer Interaction *option*
- Information Systems Management
- Object Oriented Engineering Computing *option*
- Optoelectronics *option*
- Parallel Processing *option*
- Project
- Programming Languages, Principles and Paradigms
- Robotics and Image Processing *option*
- Software Engineering
- French *option*
- German *option*
- Spanish *option*

Year 4 MEng (Hons)

- Adaptive Non-Linear DSP *option*
- Advanced Communications Systems *option*
- Advanced Communications Networks *option*
- Advanced Database Topics *option*
- Advanced Robotics *option*
- Artificial Intelligence *option*
- Database Management *option*
- Distributed Systems Technology *option*
- Image Processing *option*
- Industrial Computer Control Systems *option*
- Industry Linked Project
- Intelligent Signal Processing *option*
- Introduction to Magnetic Materials *option*
- Management in Industry
- Magnetic Devices: Transducers, Sensors and Actuators *option*
- Multimedia *option*

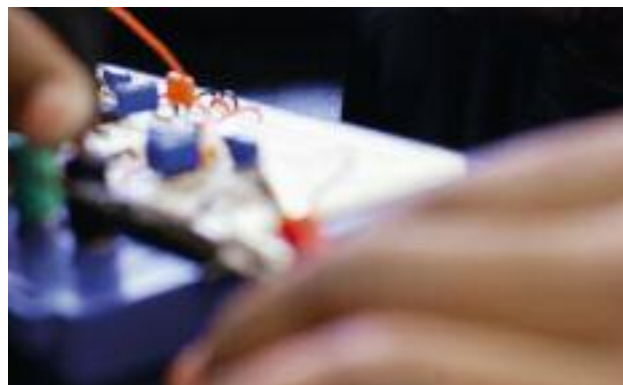
Electronic and Communications Engineering

The Degree Programme

With the teaching of Electronics firmly embedded in the field of communications technology, students studying Electronics and Communications Engineering will have a unique opportunity to engage with industry in this important and fast changing sector. With full accreditation from the IET, the scheme allows for a fast-track route to Chartered Engineer status.

Strong Industrial Links and Excellence in Research

Being a research-led school, students will experience at first-hand the latest in practical laboratory skills that are of direct relevance to employers in the electronics and communications sector. Teaching is based on high quality research which was awarded a 5A grading in the last Research Assessment Exercise. Coupled with the practical hands-on teaching is the provision of Agilent Technologies Advanced Design System, which is a powerful electronic design automation software system. This industry standard application offers a complete design integration package to designers of electronic products such as mobile communications systems, wireless networks, and radar and satellite communications systems. Use of this package is fully integrated into the teaching of modules at all levels from the first year onwards. In the third and fourth years of study, students will be encouraged to engage with industrially-led research projects that not only provide relevant and up-to-date experience, but lead to opportunities for establishing a relationship with industrial organisations that can lead to employment following graduation.



Degree programmes are reviewed annually to ensure that they are up-to-date and relevant to your needs

State-of-the-Art Facilities

Our teaching laboratories have benefited greatly from the generosity of major companies, all of whom have made significant investment in the provision of state of the art equipment and software. In recent years, the School has invested over £150,000 in the refurbishment of the laboratories, providing a unique teaching environment and experience that is unparalleled in the UK. Agilent Technologies, National Instruments, Texas Instruments, and Rohde Schwarz are just some of the industries working with staff in the Electronics and Communications field.

Career Prospects

Students graduating from Cardiff in Electronic and Communications Engineering have excellent career prospects. The School has strong links with all the major employers in this area and well qualified graduates are much in demand.

Programme Structure

We offer both BEng (3 year) and MEng (4 year) degrees in Electrical and Electronic Engineering, both with the option of an industrial placement year (Sandwich option).

Level One

The first year is common for all combinations of our degree programmes and provides you with fundamental analytical, computational and experimental skills.

Modules you will study include:

- ▶ Mathematics
- ▶ Digital and Analogue Electronics
- ▶ Electromagnetics and Circuits
- ▶ Materials
- ▶ Telecommunications
- ▶ Power Systems and Machines



Cardiff University is one of the only three universities in the UK which are members of both the UK Electronics Skills Foundation (UKESF) and the Power Academy. These organisations have been established to address the skills shortages in these areas. They provide assistance with the cost of study through scholarships and professional development opportunities for students in Electrical and Electronic Engineering related degree programmes. Please see www.theiet.org/about/scholarships-award/power-academy for information about the Power Academy, and www.ukesf.org/scholarship-scheme for information about the UK ESF.



Further information:
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You will also study information technology, professional engineering studies and develop oral and written communication skills.

Level Two

The second year, also common for all programmes, extends study of the core subjects and introduces you to:

- ▶ Digital Signal Processing
- ▶ Microprocessors and Instrumentation
- ▶ Control Engineering
- ▶ Software Engineering
- ▶ Engineering Management
- ▶ Power Systems Analysis and Machines
- ▶ EM Fields and Transmission Lines

There is also an option to study French, Spanish or German.

Level Three

At this point in the degree programme, you will be in a position to develop the technical breadth, depth and flexibility required in today's multidisciplinary technical environment. It is here that the research-led nature of our programmes will allow you to specialise in a specific area of Electronic and Communications Engineering. (Industrial placements take place after your second year of study.)

Advanced modules at Level Three include:

- ▶ Digital Signal Processing
- ▶ HF and RF Engineering
- ▶ Optoelectronics
- ▶ Communications Systems

For all programmes at Level Three, you will participate in a major individual project spanning the two semesters.

Students are encouraged to become involved in research and industry-led projects in their chosen area of focus.

Level Four

(MEng programmes only)

The final year of the MEng programme is designed to cover an enhanced depth and breadth of technical coverage as prescribed by the IET professional body. Level four modules available to this programme include:

- ▶ Advanced Communications Networks
- ▶ Advanced Communications Systems
- ▶ Artificial Intelligence and Expert Systems
- ▶ Management in Industry

Degree Programmes

- **MEng (Hons)**
4 years full-time (UCAS code H602)
- **MEng (Hons)**
5 years with a Year in Industry (UCAS code H603)
- **BEng (Hons)**
3 years full-time (UCAS code H610)
- **BEng (Hons)**
4 years with a Year in Industry (UCAS code H604)

Accreditation

Institution of Engineering and Technology (IET)

Degree Modules

Year 1

- Advanced Analogue and Network Simulation
- Computing 1
- Electrical Materials
- Electromagnetics 1
- Electronic Engineering 1 and Materials
- Electronic Engineering 2
- Engineering Analysis 1 and 2 Laboratory
- Network Analysis
- Power Engineering
- Professional Development and Communications in English

Year 2

- Computing 2
- Control Engineering
- Digital Comms and Network Analysis
- Electronic Engineering 3 and 4
- EM Fields and Transmission Lines
- Engineering Analysis 3 and 4
- Introduction to Economics, Law, Accounting and Management Science
- Laboratory and Design
- Microelectronic Circuits and DSP Concepts
- Power Engineering 2
- French *option*
- German *option*
- Spanish *option*

Year 3 BEng (Hons)

- Advanced Analogue IC Design *option*
- Automatic Control *option*
- Business Management Communication Systems
- Digital Design *option*
- Digital Signal Processing Systems *option*
- Electronic Circuits and Systems *option*
- Fundamentals of Micro and Nanotechnology *option*
- HF and RF Engineering *option*
- Microprocessor and Instrumentation Systems *option*
- Object Oriented Engineering Computing *option*
- Optoelectronics *option*
- Power Electronics *option*
- Project
- Robotics and Image Processing *option*
- French *option*
- German *option*
- Spanish *option*

Year 3 MEng (Hons)

- Advanced Analogue IC Design *option*
- Automatic Control *option*
- Business Management
- Communication Systems
- Digital Design *option*
- Digital Signal
- Electronic Circuits and Systems *option*
- Fundamentals of Micro and Nanotechnology *option*
- HF and RF Engineering *option*
- Microprocessors and Instrumentation Systems *option*
- Object Oriented Engineering Computing *option*
- Optoelectronics *option*
- Power Electronics *option*
- Processing Systems *option*
- Project
- Robotics and Image Processing *option*
- French *option*
- German *option*
- Spanish *option*

Year 4 MEng (Hons)

- Adaptive and Non-Linear DSP *option*
- Advanced Communication Networks *option*
- Advanced Communication Systems *option*
- Advanced Robotics *option*
- Artificial Intelligence *option*
- Automotive Design *option*
- Automotive Electrical Technology *option*
- Fundamentals of Nanomechanics *option*
- Group Project *option*
- High Frequency Electronic Materials *option*
- Integrated Building Design *option*
- Intelligent Signal Processing *option*
- Introduction to Magnetic Materials *option*
- Magnetic Devices: Transducers And Actuators *option*
- Management in Industry
- Renewable Energy Design *option*
- RF Circuit Design and CAD *option*

Electrical and Electronic Engineering



Classes take place in the newly refurbished Agilent Electronics Laboratory

The Degree Programme

In studying Electrical and Electronic Engineering at Cardiff, you will be at the centre of a vibrant and fast moving engineering discipline. This research-led degree scheme will provide a fast-track towards attaining Chartered Engineer status with the Institution of Engineering and Technology. In addition, the strong links we have with our industrial partners can provide opportunities for work placements and possible sponsorship during your study. The degree programme is reviewed annually with input from our industrial partners to ensure that the modules taught are at the cutting edge and reflect the current state of the industry.

State-of-the-Art Facilities

The teaching of our degree programmes has recently received major investment in the provision of state-of-the-art teaching laboratories, enabling students to experience the latest in industrial standard test equipment and software. To support this, National Grid Transco (NGT) has designated Cardiff as one of their few centres of excellence.

Career Prospects

Students graduating from Cardiff in Electrical and Electronic Engineering have excellent career prospects. The School has strong links with all the major employers in this area and well qualified graduates are much in demand.

Programme Structure

We offer both BEng (3 year) and MEng (4 year) degrees in Electronic and Communications Engineering, both with the option of an industrial placement year (Sandwich option).

Level One

The first year is common for all combinations of our degree programmes and provides you with fundamental analytical, computational and experimental skills.

Modules you will study will include:

- ▶ Mathematics
- ▶ Digital and Analogue Electronics
- ▶ Electromagnetics and Circuits
- ▶ Materials
- ▶ Telecommunications
- ▶ Power Systems and Machines



Cardiff University is one of the only three universities in the UK which are members of both the UK Electronics Skills Foundation (UKESF) and the Power Academy. These organisations have been established to address the skills shortages in these areas. They provide assistance with the cost of study through scholarships and professional development opportunities for students in Electrical and Electronic Engineering related degree programmes. Please see www.theiet.org/about/scholarships-award/power-academy for information about the Power Academy, and www.ukesf.org/scholarship-scheme for information about the UK ESF.



Further information:
www.cardiff.ac.uk/engin

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For International Students:

Mr Barry Sullivan

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You will also study information technology, professional engineering studies and develop oral and written communication skills.

Level Two

The second year, also common for all programmes, extends study of the core subjects and introduces you to:

- ▶ Digital Signal Processing
- ▶ Microprocessors and Instrumentation
- ▶ Control Engineering
- ▶ Software Engineering
- ▶ Engineering Management
- ▶ Power Systems Analysis and Machines
- ▶ EM Fields and Transmission Lines

There is also an option to study French, Spanish or German.

Level Three

At this point in the degree programme, you will be in a position to develop the technical breadth, depth and flexibility required in today's multidisciplinary technical environment. It is here that the research-led nature of our programmes will allow you to specialise in a specific area of Electrical and Electronic Engineering. (Industrial placements take place after your second year of study.)

Advanced modules at Level Three include:

- ▶ Electrical Machines and Drives
- ▶ HF and RF Engineering
- ▶ Automatic Control
- ▶ Power Electronics

Specialities in this area include CAD of power systems, high voltage engineering and machines and drives.

For all programmes at level three, you will participate in a major individual project spanning the two semesters. Students are encouraged to become involved in research and industry-led projects in their chosen area of focus.

Level Four

(MEng programmes only)

The final year of the MEng programme is designed to cover an enhanced depth and breadth of technical coverage as prescribed by the IET professional body. Level four modules available to this programme include:

- ▶ Advanced Power Electronics and Drives
- ▶ Advanced Power Systems and High Voltage Technology
- ▶ Alternative Energy Systems
- ▶ Management in Industry

Degree Programmes

- **MEng (Hons)**
4 years full-time (UCAS code H601)
- **MEng (Hons)**
5 years with a Year in Industry (UCAS code H600)
- **BEng (Hons)**
3 years full-time (UCAS code H605)
- **BEng (Hons)**
4 years with a Year in Industry (UCAS code H606)

Accreditation

Institution of Engineering and Technology (IET)

Degree Modules

Year 1

- Analogue Comms and Network Simulation
- Computing 1
- Electromagnetics 1 and Electrical Materials
- Electronic Engineering 1 and Materials
- Electronic Engineering 2
- Engineering Analysis 1 and 2
- Laboratory
- Network Analysis
- Power Engineering
- Professional Development and Communication Skills in English

Year 2

- Computing 2
- Control Engineering
- Digital Comms and Network Analysis
- Electronic Engineering 3 and 4
- EM Fields and Transmission Lines
- Engineering Analysis 3 and 4
- Introduction to Economics, Law, Accounting and Management Science
- Laboratory and Design
- Microelectronic Circuits and DSP Concepts
- Power Engineering 2
- French *option*
- German *option*
- Spanish *option*

Year 3 BEng (Hons)

- Automatic Control *option*
- Business Management Communication Systems *option*
- Digital Design *option*
- Digital Signal Processing Systems *option*
- Electronic Circuits and Systems *option*
- Electrical Machines and Drives A *option*
- Fundamentals of Micro and Nanotechnology *option*
- HF and RF Engineering *option*
- Microprocessor and Instrumentation Systems *option*
- Object Oriented Engineering Computing *option*
- Optoelectronics *option*
- Power Electronics *option*
- Power Engineering 3 *option*
- Power Systems A
- Project
- Robotics and Image Processing *option*

Year 3 BEng (Hons) cont.

- French *option*
- German *option*
- Spanish *option*

Year 3 MEng (Hons)

- Automatic Control *option*
- Business Management
- Communication Systems *option*
- Digital Design *option*
- Digital Signal
- Electrical Machines and Drives A *option*
- Electronic Circuits and Systems
- HF and RF Engineering *option*
- Microprocessor and Instrumentation System
- Object Oriented Engineering Computing *option*
- Optoelectronics *option*
- Power Electronics *option*
- Power Engineering 3 *option*
- Power Systems A
- Processing Systems *option*
- Project
- Robotics and Image Processing *option*
- Micro and Nanotechnology
- French *option*
- German *option*
- Spanish *option*

Year 4 MEng (Hons)

- Advanced Communication Networks *option*
- Advanced Communication Systems *option*
- Advanced Power Electronics and Drives *option*
- Advanced Power Systems and High Voltage Technology *option*
- Advanced Robotics *option*
- Alternative Energy Systems *option*
- Artificial Intelligence *option*
- Automotive Design *option*
- Automotive Electrical Technology *option*
- Fundamentals of Nanomechanics *option*
- Group Project *option*
- High Frequency Electronic Materials *option*
- Integrated Building Design *option*
- Intelligent Signal Processing *option*
- Introduction to Magnetic Materials *option*
- Management in Industry
- Renewable Energy Design *option*
- RF Circuit Design and CAD *option*

Integrated Engineering

The Integrated Engineering degree is a broad-based engineering degree that embraces many aspects of electrical, electronic, mechanical and manufacturing engineering. Therefore, by choosing to study Integrated Engineering you will qualify as an engineer of the highest quality: your broad knowledge of various aspects of engineering will ensure that you can interact with engineers from all the traditional engineering disciplines in any multidisciplinary environment.

Integrated Engineering at Cardiff

Both MEng and BEng programmes are offered: both provide the engineering institutions' necessary academic standard to satisfy educational requirements for a Chartered Engineer, with the MEng offering the fast-track route to chartered status. The degree programmes are accredited by the Institution of Mechanical Engineers, the Institution of Engineering and Technology and the Energy Institute. These interdisciplinary programmes, which draw on modules taught across the School, benefit from the 'Excellent' teaching rating achieved by the School in many of its discipline areas.

Programme Structure

We offer both BEng (3 year) and MEng (4 year) degrees in Electronic and Communications Engineering, both with the option of an industrial placement year (Sandwich option).

Level One

The programmes are designed to ensure the continuity and development of material through all the years of study. In addition, the strong collaborative links we have with industry means that you will benefit from relating your academic studies to the reality of industry.



Cardiff University is one of the only three universities in the UK which are members of both the UK Electronics Skills Foundation (UKESF) and the Power Academy. These organisations have been established to address the skills shortages in these areas. They provide assistance with the cost of study through scholarships and professional development opportunities for students in Electrical and Electronic Engineering related degree programmes. Please see www.theiet.org/about/scholarships-award/power-academy for information about the Power Academy, and www.ukesf.org/scholarship-scheme for information about the UK ESF.



A student project in the Combustion Laboratory

The degree programmes are built around six primary themes that run through each year; the foundations are laid in the first year, strengthened in the second and supplemented by a number of specialised mechatronic modules at the end of Year Two.

The six themes are:

- » Information Engineering
- » Engineering Mechanics
- » Electrical and Electronic Engineering
- » Manufacturing Engineering
- » Professional Engineering Studies
- » Integrating Studies

In Information Engineering you will study topics such as mathematics, computing and data analysis, as well as the latest developments in this area, plus knowledge-based systems, which incorporate aspects of artificial intelligence and expert systems.

Professional Studies covers a range of topics, from real case studies with participating industrial partners through to law, accountancy and financial control in the final year. Since the objective of engineering is the development of an idea into a marketable product, you will learn the vital aspects of manufacturing systems technology and manufacturing management throughout your three or four years of study.



Further information:
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Integrated Engineering is a broad-based general engineering degree

Degree Programmes

- **MEng (Hons)**
4 years full-time (UCAS code H113)
- **MEng (Hons)**
5 years with a Year in Industry (UCAS code H114)
- **MEng (Hons)**
5 years with a Year in Europe (UCAS code H115)
- **BEng (Hons)**
3 years full-time (UCAS code H110)
- **BEng (Hons)**
4 years with a Year in Industry (UCAS code H111)

Accreditation

Institution of Engineering and Technology (IET)
 Institution of Mechanical Engineers (IMechE)
 Energy Institute (EI)

Industrial Collaboration

Industrial collaboration is vital to our degree programmes and we have a close association with a number of national and international companies. This collaboration takes many forms, such as sponsorship and industrial placement, as well as educational support through the provision of case studies and equipment. Through these links you will become familiar with a range of industries embracing materials, manufacturing, energy supply, component manufacture and advanced systems manufacturing. This collaboration and breadth of engineering knowledge will provide you with excellent job opportunities when you graduate, leading to a flexible choice of career.

All academic staff, most of whom are Chartered Engineers, have their own research interests and expertise, and many have worked for companies such as Rolls-Royce, ICI and Shell. Research at the Cardiff School of Engineering is consistently recognised as being of a very high standard and although this may not seem of direct relevance to you entering as an undergraduate, a strong research base means that the programmes are closely integrated with industry and are at the leading edge of technology.

Degree Modules

Year 1

- Computing 1
- Drawing, Design and Engineering Analysis 1 and 2
- Engineering Applications
- Materials and Mechanics 1 and 2
- Network Analysis
- Power Engineering
- Professional Development and Communication Skills in English
- Thermofluids 1 and 2
- French for Year in Europe
- German for Year in Europe
- Spanish for Year in Europe

Year 2

- Advanced Manufacturing Technology
- Computing 2
- Control Engineering
- Design
- Electronic Engineering 1
- Engineering Analysis
- Integration
- Introduction to Economics, Law, Accounting and Management Science
- Manufacturing Systems
- Power Engineering 2
- Product Design and Systems
- Solid Mechanics
- French for Year in Europe
- German for Year in Europe
- Spanish for Year in Europe

Year 3 BEng (Hons)

- Business Management
- Electrical Machines and Drives A *option*
- Electronic Engineering *option*
- Energy Studies *option*
- Fluid Power and Control *option*
- Industrial Computer Control Systems *option*
- Microprocessor and Instrumentation Systems
- Project

Year 3 BEng (Hons) cont.

- Operations Management
- Power Engineering *option*
- Product Design Quality and Reliability
- Solid Mechanics *option*

Year 3 MEng (Hons)

- Business Management
- Corporate Economics *option*
- Electrical Machines and Drives A *option*
- Electronic Engineering *option*
- Energy Studies *option*
- Fluid Power and Control *option*
- Microprocessor and Instrumentation Systems
- Operations Management
- Power Engineering *option*
- Product Design
- Project
- Quality and Reliability
- Solid Mechanics *option*
- Strategic Management

Year 4 MEng (Hons)

- Advanced Robotics
- Artificial Intelligence *option*
- Automotive Design *option*
- Computer Controlled Manufacture *option*
- Condition Monitoring, Modelling and Forecasting *option*
- Control *option*
- Energy Management *option*
- Fundamentals of Nanomechanics
- Group Project *option*
- Industrial Computer Control Systems *option*
- Integrated Building Design *option*
- Management in Industry
- Renewable Energy Design
- Robotics and Image Processing *option*
- Waste Management and Recycling *option*

Mechanical Engineering



An ergonomic evaluation of the Formula Student School racing car

Mechanical Engineering is the creative application of science and expertise to the design, construction and operation of products and processes. Mechanical Engineers combine imagination with modern technology to offer innovative solutions to meet the complex requirements of society and industry. In all industrial sectors, Chartered Mechanical Engineers develop well-designed products, manufacture them by efficient processes and sell them skilfully on world markets.

Mechanical Engineering at Cardiff

Our MEng and BEng degrees are accredited by the Institution of Mechanical Engineers and the Energy Institute, allowing smooth career progression to professional status after you obtain your degree. The quality of our programmes means that we attract well qualified students.

All academic staff, most of whom are Chartered Engineers, have their own research interests and expertise, and many have worked for companies such as Rolls-Royce, ICI, and Shell. Research within the School is consistently recognised as being of a very high international standard and although this may not seem of direct relevance to you entering as an undergraduate, a strong research base means that the programmes are closely integrated with industry and are at the leading edge of technology.

If you choose to study at Cardiff, we will make every effort to ensure that you enjoy all aspects of your student life, and that you leave having fulfilled your academic potential.

The national reputation of Mechanical Engineering at Cardiff is indicated by the fact that we have been consistently ranked amongst the top institutions. Our quality of teaching was awarded the top grade 'Excellent' by the government in the last assessment.

Employment

Employment prospects for Mechanical Engineers from Cardiff are excellent, with recent statistics indicating that the vast majority are following chosen career paths within six months of graduating. A substantial number of graduates work in product design for the automotive, aeronautical, communications and energy industries. Some are employed in medical engineering, others are travelling the world for the petrochemical industry, whilst some are involved in development, production and general management. A few choose to use their degrees as a qualification to enable them to work in other disciplines. Those who have followed this route typically work in the Forces, the financial sector, the legal profession, chartered accountancy or computing. With such high calibre and broad opportunities, a career in Mechanical Engineering is varied, challenging and rewarding.



Further information:
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Programme Structure

The Mechanical Engineering degree programme at the Cardiff School of Engineering is designed to give maximum flexibility whilst providing a broad-based engineering education of the highest standard. Modules employ a variety of assessment methods: coursework, continuous assessment and examination. In Years One and Two, students develop a thorough understanding of the basic mechanical disciplines of dynamics, fluid mechanics, thermodynamics, design, materials, solid mechanics, statics and control. These modules are supported by studies in mathematics, computing, electrical engineering, manufacturing and professional engineering studies. Design projects and laboratory exercises provide students with the opportunity to practise and integrate all the skills learned.

Cardiff is one of the traditional universities which offers a sandwich programme. On this programme, students spend their third year gaining industrial experience, which enhances the relevance of the teaching in the final years. Students receive a full salary during their industrial placement.

In the third year of the BEng programme, in addition to the basic elements, a wide range of specialist subjects such as tribology, energy studies, machines or further language studies are offered as options.

Students choose modules according to their particular requirements. At this stage, design remains an important aspect of the degree programme structure. Another important element in this year is the individual project, which can be design, research or industrially based. Students undertake an individual project in which they research, manage and present a report for assessment. Whilst we encourage students to take ownership of their projects, an academic supervisor is nominated to provide guidance and encouragement.

In the third and fourth year of the MEng programme, students follow more specialist options in such areas as robotics, expert systems, bioengineering, energy management and risk/hazard assessment. Group design projects and assignments are also undertaken to provide breadth of training in a range of disciplines important to industry, including project management, problem solving and decision making, as well as analytical design at the highest level.

A number of our fourth year group projects are multidisciplinary. You will work alongside engineering students from across the School on real engineering projects.

Degree Programmes

- **MEng (Hons)**
4 years full-time (UCAS code H302)
- **MEng (Hons)**
5 years with a Year in Industry (UCAS code H307)
- **MEng (Hons)**
5 years with a Year in Europe (UCAS code H308)
- **BEng (Hons)**
3 years full-time (UCAS code H300)
- **BEng (Hons)**
4 years with a Year in Industry (UCAS code H301)

Accreditation

Institution of Mechanical Engineers
Institute of Energy

Degree Modules

Year 1

- Computing 1
- Engineering Analysis 1 and 2
- Engineering Applications
- Engineering Technology
- Materials and Manufacture
- Mechanics 1 and 2
- Professional Development and Communication Skills in English
- Thermofluids 1 and 2
- French for Year in Europe
- German for Year in Europe
- Spanish for Year in Europe

Year 2

- Biomechanics *option*
- Computing 2 *option*
- Control and Instrumentation Design
- Design *option*
- Dynamics
- Engineering Analysis
- Fluid Mechanics
- Introduction to Economics, Law, Accounting and Management Science
- Manufacturing Systems
- Materials and Manufacture
- Mechanical Engineering Labs
- Solid Mechanics
- Thermodynamics and Heat Transfer
- French for Year in Europe
- German for Year in Europe
- Spanish for Year in Europe

Year 3 BEng (Hons)

- Automotive Power Transmission *option*
- Biomechanics 2 *option*
- Business Management
- Energy Studies *option*
- Fluid Mechanics *option*
- Fluid Power and Control *option*
- Materials and Manufacture *option*
- Product Design
- Project
- Robotics and Image Processing *option*
- Solid Mechanics *option*
- Thermodynamics and Heat Transfer *option*

Year 3 MEng (Hons)

- Automotive Power Transmission *option*
- Biomechanics 2 *option*
- Business Management
- Corporate Economics *option*
- Energy Studies *option*
- Fluid Mechanics *option*
- Fluid Power and Control *option*
- Materials and Manufacture *option*
- Project
- Robotics and Image Processing *option*
- Solid Mechanics *option*
- Thermodynamics and Heat Transfer *option*

Year 4 MEng (Hons)

- Applied Numerical Methods in Engineering *option*
- Automotive Design *option*
- Condition Monitoring, Modelling and Forecasting *option*
- Control *option*
- Energy Management *option*
- Forensic Bioengineering *option*
- Fundamentals of Nanomechanics *option*
- Group Project *option*
- Integrated Building Design *option*
- Management in Industry *option*
- Process Engineering *option*
- Quality and Reliability *option*
- Renewable Energy Design *option*
- Risk and Hazard Assessment *option*
- Thermodynamics *option*
- Tribology *option*
- Waste Management and Recycling *option*

Medical Engineering



A sports biomechanics project, investigating head impacts on artificial turf

Medical Engineering

Medical Engineering is a relatively new area of undergraduate study. The Cardiff programme is one of the most established in the UK, designed to appeal to students who wish to combine classical engineering training with a medical application. Students benefit from teaching by a dedicated team of research-active academic staff, in addition to receiving lectures by colleagues from Cardiff School of Biosciences, School of Medicine and Cardiff & Vale NHS Trust. The aim of the programme is to produce a highly competent engineer who can pursue a career in clinical engineering, bioengineering or engineering fields outside medicine.

Employment Opportunities

Graduate medical engineers benefit from employment opportunities within both the medical engineering and also broader mechanical engineering sector. Recent Cardiff graduates are now employed in medical engineering companies including Finsbury Orthopaedics, DePuy International, and Huntleigh Medical. Medical engineers can also pursue a career in the healthcare sector. Cardiff graduates regularly earn positions in the highly competitive Clinical Engineer/Scientist training scheme (www.ipem.org.uk for further details), whilst other students have used their degree as a precursor to other vocations. Numerous opportunities are also available worldwide for postgraduate study, with many graduates having since been

awarded a Doctor of Philosophy (PhD). Students have also sought further specialisation by studying for a Master of Science (MSc) qualification. Graduating with an IMechE accredited degree also allows students to work within the mechanical engineering sector. Graduate engineers are highly numerate and are therefore sought after in a number of other fields such as accountancy, finance, government and education, so for those who wish to pursue a career pathway away from engineering there are a range of other exciting opportunities.

Programme structure

Each academic year consists of modules, the content of which summates to 120 credits; 60 credits are delivered in each semester.

Years One and Two

Year One aims to ensure that students develop a fundamental knowledge of all relevant subjects. Theory is delivered within lectures and is supported by a dedicated double-module of laboratory experiments that comprises one-sixth of the year. Year Two begins applying engineering knowledge to medical applications, while further developing the fundamental theories learnt in year one. Additionally, dedicated Anatomy & Physiology modules are delivered in both years to ensure the students have sufficient breadth and depth of knowledge.

Year in Industry

The Year in Industry scheme allows students to work in a salaried post within a company for approximately 12 months; this happens between years two and three, with the student gaining skills that may lead to the awarding of a City & Guilds qualification. The University actively assists students in searching for such a position, with collaboration established with national and multinational medical engineering companies, including Biomet, Arup, Huntleigh Technology, Gyrus Medical and Finsbury Orthopaedics. Opportunities also exist for summer placements.

Year Three

Year Three is structured around providing students with the opportunity to integrate their medical and engineering knowledge, as they tackle a number of realistic clinical challenges throughout a variety of applied modules. Twenty five per cent of this academic year is also devoted to the Individual Project, where students select an area of research interest and then conduct a period of guided study. Recent projects have included: Linking Brain Imaging with Motion Analysis; Computational Modelling of Blood Flow in Cerebral Aneurysm; Football Injuries from Collision with the Ground; Biomechanical Analysis of Shaken Baby Syndrome.



Further information:
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Year Four

One-half of Year Four involves working within groups to tackle two substantial medical engineering research projects. A number of specialist medical engineering modules (eg sports biomechanics, forensic engineering) are also delivered that are aligned with key research interests of academic staff.

Research Activities

Medical engineering staff within the Cardiff School of Engineering are engaged in a broad range of research activities that supplement their teaching commitments. Some recent key activities include:

- The award of a £2.5m research grant from the Arthritis Research Campaign
- The establishing of cross-disciplinary research groups in: Paediatric Biomechanics; Skin; Shoulder Biomechanics; Tissue Engineering and Repair
- Sports biomechanics research in partnership with professional athletes
- Presentation of research at major national and international conferences

The integration of research into teaching ensures that Cardiff students graduate at the forefront of medical engineering, thus maximising their potential employability.

Student Experience

“Studying Medical Engineering at Cardiff University equipped me with the knowledge of anatomy and physiology – along with core concepts of engineering, which has given me the confidence and capability to tackle issues of clinical relevance within the orthopaedic industry. As an engineer, I have also developed numerous transferable skills including computer literacy, time management and problem solving skills that are of huge value for whichever career path you choose to pursue.”

Zoe Faulkner MEng (Hons)
 Medical Engineering Graduate
 Design Engineer, DePuy Orthopaedics

Degree Programmes

- **MEng (Hons)**
4 years full-time (UCAS code H1BV)
- **MEng (Hons)**
5 years with a Year in Industry (UCAS code HB99)
- **BEng (Hons)**
3 years full-time (UCAS code H1B8)
- **BEng (Hons)**
4 years with a Year in Industry (UCAS code BH99)

Accreditation

Institution of Mechanical Engineers (IMechE)

Degree Modules

Year 1

- Anatomy/Physiology 1
- Computing 1
- Engineering Analysis 1 and 2
- Engineering Applications
- Materials and Manufacture
- Mechanics 1 and 2
- Network Analysis
- Professional Development and Communication Skills in English
- Thermofluids 1

Year 2

- Anatomy/Physiology 2
- Biomechanics 1
- Control and Instrumentation
- Design
- Dynamics
- Electronic Engineering 1
- Engineering Analysis
- Introduction to Economics, Law, Accounting and Management Science
- Materials and Manufacture
- Solid Mechanics
- Thermofluids 2

Year 3 BEng (Hons)

- Biomaterials and Tissue Engineering
- Biomechanics
- Business Management
- Clinical Engineering 2 and 3
- Electronic Engineering
- Engineering Applications
- Fluid Mechanics *option*
- Fluid Power and Control *option*
- Microprocessor and Instrumentation Systems *option*
- Rehabilitation and Clinical Engineering
- Project
- Solid Mechanics *option*

Year 4 MEng (Hons)

- Digital Medical Imaging
- Ergonomics
- Forensic Bioengineering
- Group Project
- Integrated Building Design
- Sports Biomechanics
- Management in Industry
- Medical Ultrasound

Frequently Asked Questions

The Wales Millennium Centre and Pierhead Building, Cardiff Bay



What are the differences between MEng and BEng degree programmes?

The direct answer would be: one extra year of study, comprising twelve extra modules. The accredited MEng degree completely fulfils the academic training requirements section required en route to becoming a Chartered Engineer. The modules delivered on the final two years of the MEng programme are at a higher level than those on the BEng programme in terms of there being more research-based elements, more management based aspects, a higher level of technical content or a combination of these.

How easy is it to transfer from a BEng to an MEng degree programme?

The transfer is very easy if you perform well: you will need to attain a 60% average mark for your Year One and Two assessments. Every aspect of your education will have been identical to that of MEng students up until this stage, and if you meet the 60% target you will be encouraged to move onto the MEng programme. However, if you find that your career aspirations suggest that a move from an MEng to a BEng programme would be appropriate, this can also easily be arranged.

What A-levels do I need to study engineering?

The School requires a Mathematics A-level or equivalent plus a minimum of two additional A-levels which may include a range of subjects. Subjects such as Physics and Further Mathematics are also valuable but as Engineering is a Maths based discipline the only requisite subject is Mathematics.

Will I be interviewed?

Our general policy is to invite all our applicants who live within a reasonable travelling distance from Cardiff to visit the School, meet staff and students and talk to the relevant admissions tutors. In this way we hope you can then make an informed choice of where you want to study.

Does the University find a suitable industrial placement for my year out?

We will help you to find a placement through our strong industrial links. However, you will be encouraged to seek your own contacts to ensure that the best match is made between your aspirations and the company's business. Before you begin your placement year you will be offered advice and guidance on putting together your CV, and other activities that will help you in the corporate world.



How will I be funded during my Year in Industry?

You will be paid directly by the company. The average salary per year for students currently working in industry is £14,000, though some companies offer as much as £20,000. Sometimes the companies offer students some form of sponsorship on their return to University.

What entry qualifications do I need to spend a Year in Europe?

You do not need to be totally fluent in French, German or Spanish to go to the relevant country. You do, however, need a basic knowledge of the appropriate language, so as long as you have a minimum of a grade C at GCSE in the appropriate language for your chosen country, you will be able to spend a Year in Europe.



More online at:

www.cardiff.ac.uk/engin

www.cardiff.ac.uk/opendays

www.ucas.com

Admissions, Open Day

To be considered for entry onto the course you should apply online via the UCAS website using the 'UCAS Apply' facility. To use this facility you need to log on to:

www.ucas.ac.uk/apply

The website will provide you with information on how to apply and explain the procedure. Applications should be made by 15 January.

After we have received and considered your application, we may invite you to visit the School sometime during the period November to early March. There will not be a formal interview, but there will be a guided tour of the School, Students' Union and campus. You will meet students and staff, providing us with the opportunity of getting to know more about you and enabling you to find out what life is like as a psychology student at Cardiff.

Typical number of places available in the first year: 280

Typical number of applications: 2,500

Equal Opportunities

Cardiff University is committed to promoting equality and diversity in all of its practices and activities, including those relating to student recruitment, selection and admission. The University aims to establish an inclusive culture which welcomes and ensures equality of opportunity for applicants of all ages, ethnicities, disabilities, family structures, genders, nationalities, sexual orientations, races, religious or other beliefs, and socio-economic backgrounds. This commitment forms part of the Equality and Diversity Policy which is available at:

www.cardiff.ac.uk/cocom/equalityanddiversity/index.html

Applicants with Disabilities/Specific Needs

All offers to study at Cardiff University are made solely on the basis of academic merit. Where applicants have specific requirements that relate to a disability or medical condition, they are encouraged to discuss these with relevant staff in order that appropriate arrangements can be made to ensure the University provides an accessible environment. Specifically, applicants are invited to contact the Disability Adviser who can provide information about the applications procedure, course delivery and access to the physical environment. Where appropriate, informal visits can be arranged in which applicants can view accommodation and meet academic staff.

The Disability Adviser can be contacted at:

Student Support Centre
50 Park Place, Cardiff, CF10 3AT
Tel/Minicom: +44 (0)29 2087 4844
Email: disability@cardiff.ac.uk

Notes for Welsh Language Applicants

We recognise that if you are a Welsh speaker you may feel more comfortable speaking to a Welsh speaking personal tutor. Provided there are Welsh speaking members of staff in your subject area, every effort will be made to allocate a Welsh speaker to you. If you wish, you can also submit your assessed work and take your examinations through the medium of Welsh, regardless of the language of tuition of the course you are following. Some of the accommodation at Talybont and Senghennydd Court student residences has been allocated for Welsh speakers and learners who would like to be grouped together. If you would like to take advantage of this please make a note of this in your application for accommodation.

Open Day

Cardiff School of Engineering takes an active part in the annual University Open Day which takes place in April of each year. During this day you can visit the School and see for yourself what studying at Cardiff will be like. You can visit our lecture theatres as well as our modern and well-equipped laboratories and libraries. You will also be able to see the general facilities offered by the University, including the Students' Union, a number of Halls of Residence and the sports and social facilities which make Cardiff a great place to study. You will have the opportunity to talk to staff and students who will be able to answer any specific questions you may have relating to the admissions procedure, the various opportunities for European studies, the sport and recreational activities, the computing and library facilities, etc.

If you would like any further information on the Open Day you should contact:

Schools' and Colleges' Liaison Office:

Tel: +44 (0)29 2087 4455

Fax: +44 (0)29 2087 4457

Email: openday@cardiff.ac.uk

Web: www.cardiff.ac.uk/opendays

For Further Information

The Admissions Office
Freeport CF4009
Cardiff CF10 1YZ
Telephone: +44 (0)29 2087 4656
Fax: +44 (0)29 2087 5902
Email: engineering-ug@cardiff.ac.uk
Web: www.cardiff.ac.uk/engin

Notes for International Students

All applications for undergraduate programmes of study at Cardiff must be made through UCAS (www.ucas.ac.uk). You will be able to obtain information on how to apply and on the suitability of your qualifications from either:

- ▶ Your local British Council
- ▶ Your school/college
- ▶ The University's local education advisor (please see list below)

Cardiff University International Educational Advisors

The International Office works in co-operation with local educational advisors in a range of countries. These can provide students with a local source of assistance when applying to study at Cardiff. We have advisors based in a large number of countries.

Full details are available at:
www.cardiff.ac.uk/international/

Support for International Students

Coach Collection Service and Induction Programme

The International Office provides a coach collection service and induction programme for international students during the week before enrolment. The coach collection service, which runs over two days, picks up new arrivals from Cardiff and Heathrow airports. Newly arrived students are met in the Arrivals Lounge and escorted on to Cardiff-bound transport.

The Induction Programme which follows includes an Information Fair, social gatherings and guided tours to local attractions. The programme is designed to help new international students feel at home quickly, make new friends and deal with any initial difficulties.

English Language Programmes

English Language Programmes provide courses to prepare overseas applicants for degree programmes and then supports them during their academic studies. Language and study skills courses are offered year-round for periods from a few weeks to a full year to improve your level of general and academic English.

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The Bridge Programme

This is a full-time course for European and overseas applicants considering, or intending to enter, Cardiff University or another UK university for undergraduate or postgraduate studies. The focus of the course is on language and study skills development, with the opportunity to prepare for and take the British Council IELTS examination. This examination can be taken at Cardiff University and is accepted as an English language entry qualification to the University. Full details of the required grades are given on page 39.

Students on the Bridge Programme receive a range of free services subject to availability:

- ▶ Counselling on applying to Cardiff University
- ▶ Opportunities to visit University schools
- ▶ Reference use of University libraries
- ▶ Use of University computer workstations

Pre-Sessional English

The Pre-Sessional English course is a full-time, intensive summer English language programme specifically designed for international students holding offers from Cardiff University or other institutions in the UK.

Full details of all our courses are available at:
www.cardiff.ac.uk





More online at:

www.cardiff.ac.uk/international

Examination Centre

Cardiff University is an official British Council International English Language Testing Service IELTS examination centre. Full details of all courses, including dates and fees, and IELTS examination dates, are available on request from:

English Language Programmes
Cardiff University
42 Park Place
CARDIFF CF10 3BB
Tel +44 (0)29 2087 6587
Fax +44 (0)29 2087 6141
Email elt@cardiff.ac.uk
Web www.cardiff.ac.uk/elt

English Language Requirements

If you are an applicant whose first language is not English you will need to prove you have a standard of written and spoken English which enables you to benefit fully from lectures, seminars and tutorials.

The table below is a broad guide to the amount of time and type of programme required to reach the English Language level of IELTS 6.5+/TOEFL 232.

The table below applies to courses for which the minimum entry requirement is IELTS 6.5 or equivalent. You should note that some Admissions Tutors may ask for higher grades than the standard stated above.

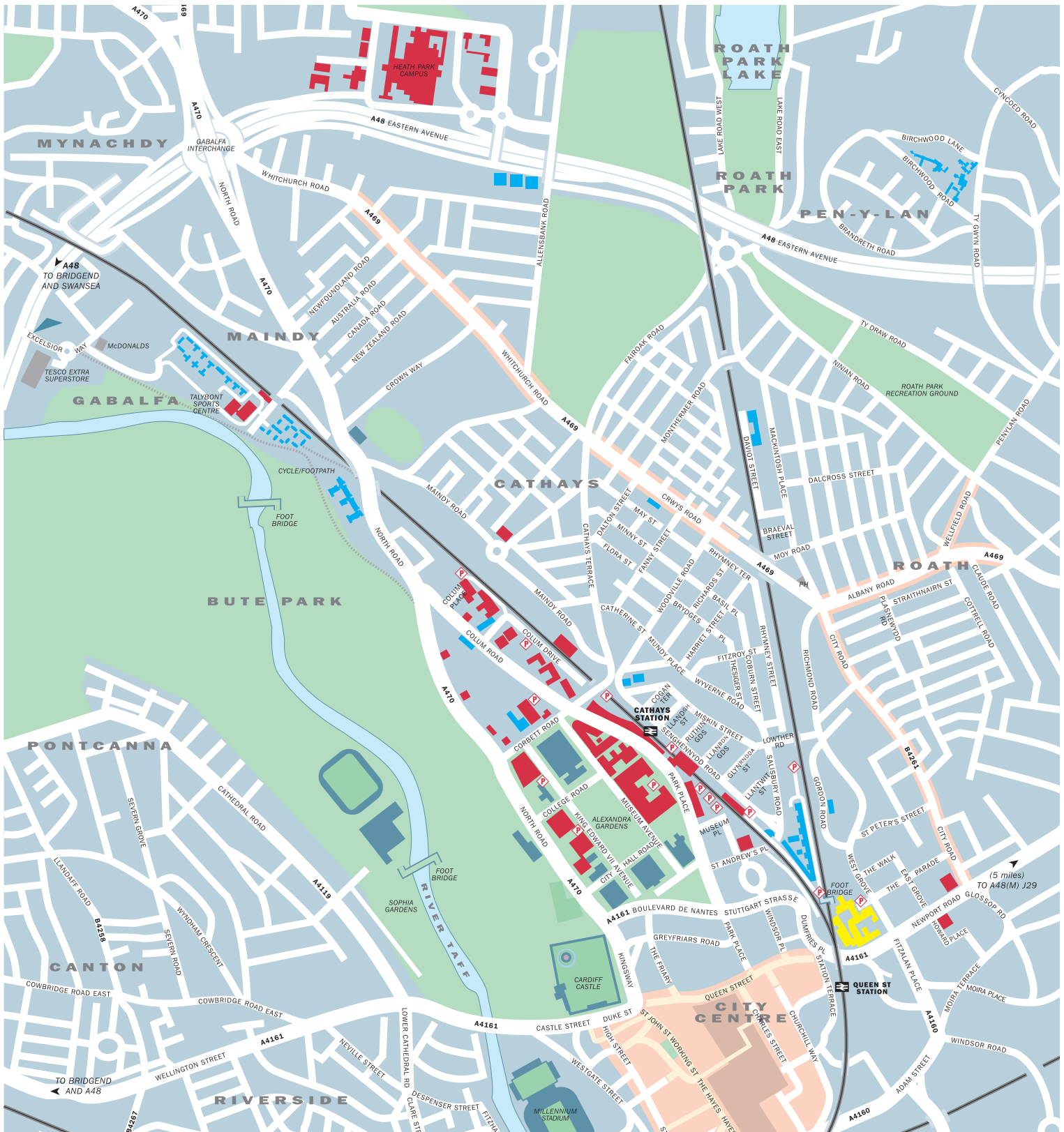
If you have a recognised English language qualification other than IELTS or TOEFL, you should include details on your application form.

IELTS	TOEFL (comp)	TOEFL (paper)	NEAB: UETESOL	CAE	CPE	Recommended Language course
7.0 - 9.0	250 - 300	600 - 680	AABBB		A/B	None required.
6.5	232	575	BBBBB	A	B/C	None required. Summer Pre-Sessional course available.
6.0	213	550	BBBCC	B	--	8-week Summer Pre-Sessional course.
5.5	196	525	CCCCC	B/C	--	11-week Summer Pre-Sessional course.
5.0	173	500	CCDD		--	11-week Summer Pre-Sessional course plus 1 additional semester.
4.5	152	475	Fail			2-semester full-time English programme plus 11-week Summer Pre-Sessional course.

How to Find us

Key

- Cardiff School of Engineering
- University Buildings
- Student Residences





More online at:

www.cardiff.ac.uk/fees

www.cardiff.ac.uk/scholarships

Tuition Fees and Financial Assistance

The University charges an annual fee which covers all tuition fees, registration and examinations other than the re-taking of examinations by applicants not currently registered. Please note charges for accommodation in University Residences are additional.

Tuition Fees

Please see the following website for more information:
www.cardiff.ac.uk/fees

Scholarships and Bursaries

For more information please visit the following website:
www.cardiff.ac.uk/scholarships

Useful websites for information about tuition fees and financial assistance:

Cardiff University website:
www.cardiff.ac.uk/fees

Student Support Centre website:
www.cardiff.ac.uk/financialsupport/index.html

DfES Student Support web pages:
www.dfes.gov.uk/studentssupport/

Welsh Assembly Student Finance web pages:
www.studentfinancewales.co.uk

Student Finance England:
www.studentfinanceengland.co.uk

Student Loans Company
www.slc.co.uk

Important information. Please read carefully.

The University offers the information contained in this brochure as a guide only. It does not constitute a contract and is not binding on prospective students, students or the University. While the University makes every effort to check the accuracy of the factual content at the time of publication, some changes will inevitably occur in the interval between publication and the academic year to which the brochure relates (Entry 2011). For example, courses, entry requirements and typical offers may have changed in-line with market and student demand, and research development. Applicants should not therefore rely solely on this brochure and should visit the University website (www.cardiff.ac.uk) for up-to-date information concerning course content, accreditation, and entry requirements for the relevant academic year when considering applying to the University.

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This document can also be made available in large print (text), braille and on audio tape/CD. To request an alternative format, please contact
Laura Roberts:
Tel: **029 2087 4455**
Email: **RobertsL9@cardiff.ac.uk**



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Thank you.



Cardiff School of Engineering

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www.cardiff.ac.uk/engineering



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