

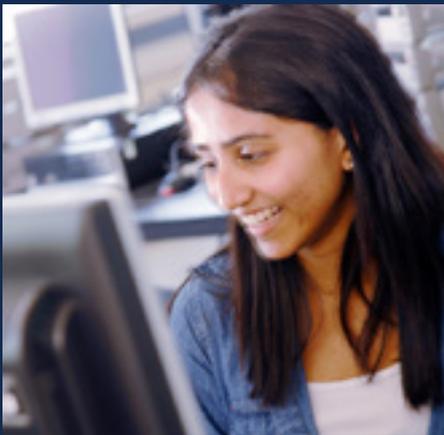


CARDIFF  
UNIVERSITY

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# School of Engineering **Postgraduate** Degree Programmes

[www.cardiff.ac.uk/engineering](http://www.cardiff.ac.uk/engineering)



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## Important Legal Information

The contents of this prospectus relate to the Entry 2020 admissions cycle and are correct at the time of going to press in April 2019. However, there is a significant period of time between printing this prospectus and applications being made to and processed by us, so please check our website [www.cardiff.ac.uk](http://www.cardiff.ac.uk) before making an application in case there are any changes to the course you are interested in or to other facilities and services described here. Where there is a difference between the contents of this prospectus and our website, the contents of the website take precedence and represent the basis on which we intend to deliver our services to you.

Any offer of a place to study at Cardiff University is subject to terms and conditions, which can be found on our website [www.cardiff.ac.uk/offerters](http://www.cardiff.ac.uk/offerters) and which you are advised to read before making an application. The terms and conditions set out, for example, when we might make changes to your chosen course or to student regulations. It is therefore important you read them and understand them.

If you are not able to access information online please contact us:  
 Email: [postgradenquiries@cardiff.ac.uk](mailto:postgradenquiries@cardiff.ac.uk)  
 Tel: +44 (0)29 2087 0084

### Your degree:

Students admitted to Cardiff University study for a Cardiff University degree.

# Welcome to the School of Engineering



## At the School of Engineering we have a wide range of opportunities for postgraduate study.

Our postgraduate taught courses range from core disciplines such as Civil Engineering to topical programmes such as the MSc in Manufacturing Engineering, Innovation and Management. All of our taught programmes combine teaching of a very high quality and excellent research facilities and supervision. We also provide PhD, EngD and MPhil programmes across the core discipline areas of civil, electrical and electronic, and mechanical engineering.

We are organised into world class research groups which focus on today's most challenging and exciting engineering issues, including nanotechnology, additive manufacturing, communications, medical engineering, sustainability and the environment, and energy generation and supply.

We have very strong links with industry so you may find yourself working with well-known global companies to solve real life current industrial problems during the course of your studies with us. We also have excellent teaching and research facilities as well as academic staff who are nationally or internationally renowned for their research.

We place a strong emphasis on broadening your skills base and we encourage you to do this by attending a number of dedicated courses here in the School of Engineering and at the University's Doctoral Academy. This enables you to not only develop your knowledge and expertise in a range of areas, but also to meet other postgraduate students from across the university.

We are a supportive and friendly environment in which to study and we provide the very best in facilities and academic support for our students. We are committed to equality of opportunity and encourage inclusiveness and diversity.

I look forward to welcoming you to the School, if you should choose to join us, and I wish you every success in your future studies.



**Professor Sam Evans**  
Director, School of Engineering

*... a supportive and friendly environment in which to study and we provide the very best in facilities and academic support for our students.*

# Cardiff: a Capital City



## Key

### Cardiff City Centre

- 1 Cardiff University
- 2 Bute Park
- 3 Cardiff Castle
- 4 Principality Stadium
- 5 Shopping centre
- 6 Student neighbourhood

Cardiff is a thriving and attractive city, and an outstanding place in which to live and study.

## A beautiful part of the world

Cardiff is located on the coast of South Wales, which has beautiful national parks and beaches only 30 minutes away. Cardiff is approximately two hours from London by train, with excellent transport links to the rest of the UK. Cardiff also boasts an international airport that flies to many cities in Europe and worldwide.

Cardiff is a small, safe, friendly and affordable city with a population of about 360,000 people, with approximately 20% of the population being made up by students. As a capital city it is full to the brim with culture, sports, shops, entertainment, and work opportunities.

The beautiful waterfront area of Cardiff Bay is a modern development of homes, shops, offices, visitor attractions, and the National Assembly for Wales.



## Cardiff Fact Check

- ▶ Cardiff has more than 330 parks and gardens
- ▶ Cardiff has been confirmed as Europe's 'third best' capital city to live in, a European Union survey has revealed
- ▶ The popular TV shows Doctor Who and Sherlock are filmed in Cardiff
- ▶ Cardiff has one of the UK's biggest shopping centres, with around 40 million shoppers each year
- ▶ Cardiff boasts prestigious concert venues such as the Wales Millennium Centre, St David's Hall and the Motorpoint Arena, as well as the iconic Principality Stadium
- ▶ Welsh, Europe's oldest living language, is spoken by 20% of the population
- ▶ Cardiff also plays host to the National Museum Cardiff and Gallery of Wales, several theatres and the historic Cardiff Castle
- ▶ Cardiff has a 74,500 seater stadium, an international sports village and a professional football club: Cardiff City FC

# Cardiff: the University



**Cardiff University has an international reputation for excellence in teaching and research, built on a history of service and achievement since 1883, and recognised by our membership of the Russell Group of leading research-led universities.**

**In the most recent Research Excellence Framework, a prestigious national assessment exercise by the UK funding councils, Cardiff University was ranked 5th amongst UK universities when judged on research quality and 2nd on its impact.**

This has confirmed our place as a world-leading centre of research excellence. Our research staff are world-class and include Nobel Laureates, fellows of the Royal Society and members of other prestigious institutions. We were also awarded our fifth Queen's Anniversary Prize – an award that recognises universities and colleges across the UK for work of outstanding excellence.

## Location

The University's Cathays Park campus is located in and around the impressive Portland stone buildings, parks and wide tree-lined avenues that form Cardiff's attractive civic centre. The majority of Academic Schools are located here – just a few minutes' walk from the city centre.

The three Academic Schools offering healthcare courses (excluding Optometry and Pharmacy) are based at the Heath Park campus, approximately one mile away, which is also home to the University Hospital of Wales.

## Facilities

A massive £600m capital investment programme across the University, including £260m in student facilities, will help us to ensure that we can give you the best student experience possible.

We are investing £300m in a new Innovation Campus, a research facility that will help to create economic and social prosperity.

One of our most ambitious projects is to create a £50m Centre for Student Life, to provide a central hub for our student support services as well as offering modern, flexible, social learning spaces and a 550-seat lecture theatre.

## Facts about Cardiff University

- ▶ We have been ranked 5th among universities in the UK based on research quality (REF 2014) and in the world top 100 (Shanghai Academic Ranking of World Universities, 2017)
- ▶ We are a member of the elite Russell Group of top 24 UK research-led universities
- ▶ We have more than 30,000 students from more than 100 countries
- ▶ Accommodation in University residences is guaranteed for most international students and is within walking distance of the University
- ▶ We have 13 libraries, 28 IT suites, a Wi-Fi enabled campus and more than 1.3m printed books
- ▶ The University is on two campuses at the very centre of Cardiff, the capital city of Wales

# Accommodation



**We know that where you live is very important to you. You will want to settle quickly and live in a secure, sociable location that is also a suitable study environment.**

**International postgraduate students are guaranteed a single-occupancy place in University residences for the full duration of their studies, and EU students for the first year of their studies.**

Living in a University residence provides you with the opportunity to meet and get to know students from a variety of backgrounds and studying a range of different subjects. Dedicated postgraduate flats and blocks are available so that you can meet, live and work alongside students who understand the demands of postgraduate study.

We have numerous residences, with facilities, locations and budgets to suit every student.

Your choices include:

- ▶ Single or mixed gender accommodation
- ▶ Private or shared bathrooms. About 70% of University residences have private bathrooms
- ▶ Self-catered, part-catered or fully catered (with vegetarian options)
- ▶ A variety of social and sporting facilities
- ▶ A limited supply of residences suitable for couples or families\*

Information on how to apply for University residences will be sent electronically to all eligible offer-holders.

## Safe and supportive

Each residence has a network of administrative staff, student wardens and security staff to provide you with 24-hour assistance. Only you, your guests, and staff are allowed on University residences sites.

## How much do University residences cost?

University residences are great value for our students. The price includes utility bills, internet, and furniture. By combining everything in to one payment, we want to make things as easy for you as possible.

Residences fees depend on a range of factors such as facilities within the residence and whether residences are catered, part-catered or self-catered. Typically a study bedroom in catered residences costs approximately £147 per week. A self-catered residence costs between £108-£137 per week (2018/19 prices for single occupancy residences).

Residences fees and associated charges are payable by Direct Debit in three instalments (usually in October, January and April).

\* Please note this cannot be guaranteed and so we would advise you not to bring your family to Cardiff until suitable accommodation has been secured.

## Private Sector Accommodation

For UK students, or for any international or EU students who wish to rent privately owned accommodation rather than live in University residences, there is a good variety of accommodation available for rental in the city and close to the University. Cardiff has a diverse accommodation market, with a wide range of housing options for you to choose from. You can contact our Residences Office for lists of properties available to rent. Our Students' Union also runs its own professional letting agency, Cardiff Student Letting, who provide a varied selection of student houses without charging agency fees.

## How does Cardiff compare with other places?

**“Cardiff boasts one of the lowest living costs in the UK.”**

The Complete University Guide 2018

**“Compact, multicultural Cardiff dances to its own beat, with abundant cultural and historical sights, independent businesses and a friendly atmosphere.”**

Lonely Planet, 2017

# Postgraduate Student Support Services

## You might be wondering what life is like for the 28,000 students at Cardiff University?

Outside of academia you will find a vast range of opportunities to try new things, meet new people and enjoy the exciting atmosphere on campus.

### The Students' Union

- ▶ The University's social life revolves around an organisation called the Students' Union.
- ▶ Every student enrolled at Cardiff University is automatically a member of the Union.
- ▶ The Union is run by a committee of students and is dedicated to the social and welfare needs of all students on campus. All profits made go back into improving the services available to you.
- ▶ The Union building includes a bar, nightclub, concert venue, shopping mall, cafés and an advice centre.
- ▶ The Union runs its own student newspaper, magazine, radio station and television station.

### The Lounge

The Lounge is located within the Students' Union and is open to all, free of charge. It boasts state of the art multimedia stations with Skype and VOIP capabilities, versatile work spaces, modern meeting rooms and touch screen tables giving students access to international channels and games.

### Student societies

The best way to make friends is to join a student society. These clubs are very important to student life and are run by other students. There are more than 120 societies, many of which represent areas of the world including: Arabia, China, Malaysia, India, Pakistan, Nigeria and many more.

For two weeks every year the international societies celebrate **Go Global** – a festival that showcases the University's diversity involving dance, music and food.

### Sport and keeping fit

The University takes sport very seriously, and the Athletic Union runs 60 sports clubs and arranges fixtures against other universities. Almost every popular sport is played at the University and whatever your level you will find an opportunity to play and participate.

### Supporting you

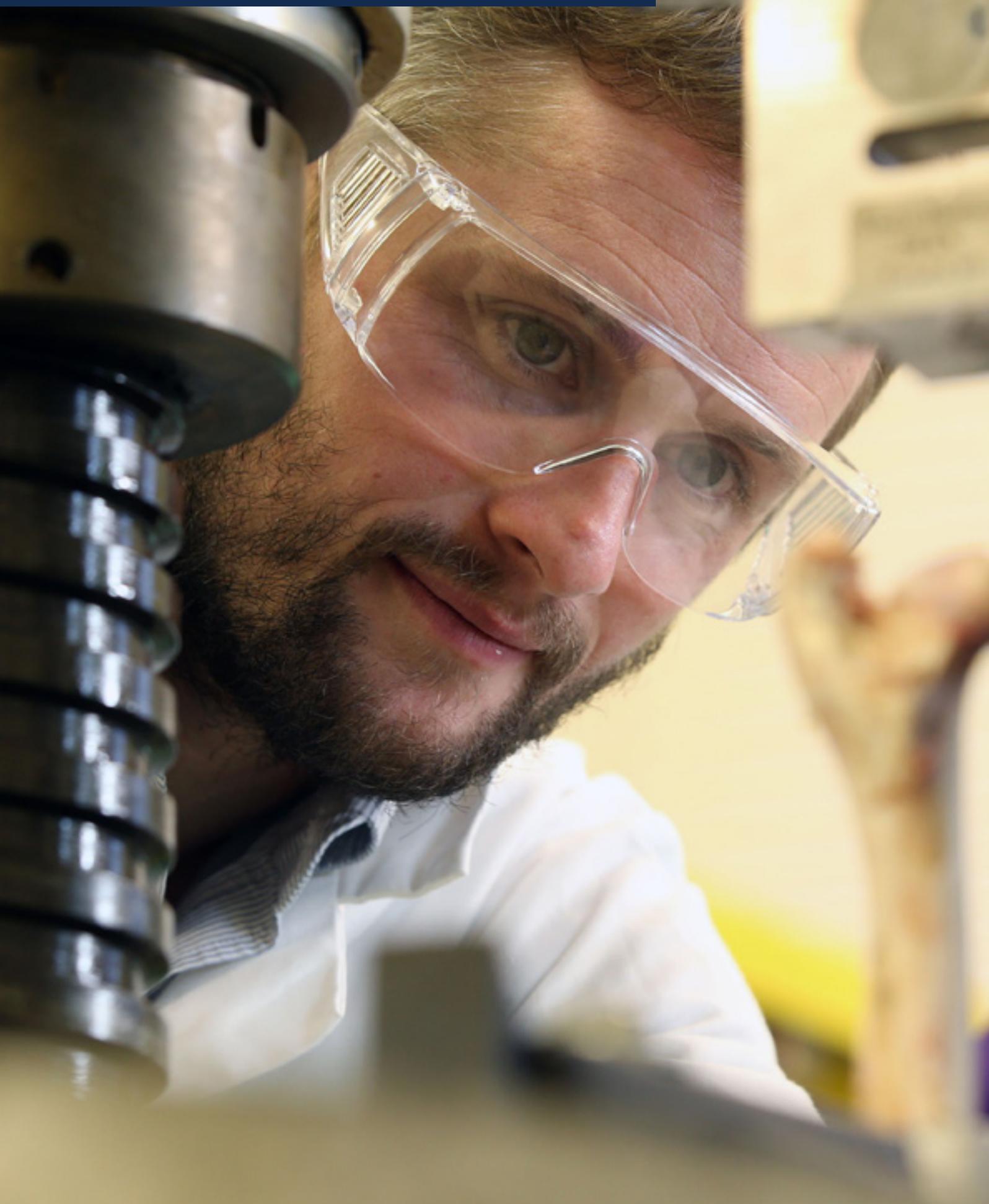
The University knows that while you are here you may need some help. You might have an academic question, or you might have a more personal issue.

**Cardiff University offers support in many ways:**

- ▶ Every student is allocated a personal tutor. Your tutor can assist with any academic or personal problems you may have.
- ▶ The Student Support Centre has specialist international advisers who can help you with visas, housing, finances and anything which you would like to talk about.
- ▶ If you want to talk to someone outside the University, the Students' Union also has an advice centre.



# About the School of Engineering





## The School of Engineering brings together excellent teaching and world-class research from the major fields in engineering.

**The research and teaching activities undertaken here are supported by outstanding research laboratories, computing, and library facilities.**

The School is integrated within the College of Physical Sciences and Engineering. This environment allows for an exciting, interdisciplinary approach to teaching and research.

We offer a wide range of postgraduate taught and research courses to suit the needs of our students with topics ranging from civil and structural engineering to wireless and microwave communication engineering. All of our established MSc programmes are accredited or recognised by the relevant professional institutions. New courses are immediately submitted for accreditation at the earliest opportunity. For our PhD programmes there are a variety of funding opportunities and scholarships on offer.

There is a vibrant research culture within the School – a high number of academic staff are involved in internationally recognised research. We are internationally renowned for the quality of our research. In the latest higher education Research Assessment Framework (REF) the School was ranked 1st in the UK for Civil Engineering and 7th in the UK for General Engineering (incorporating Mechanical,

Electrical and Electronic Engineering) and was ranked 1st in the UK overall for the impact of its research (REF 2014).

We pride ourselves on conducting research that has valuable applications in real life and can solve modern engineering problems. In order to identify and find solutions to current engineering issues we have fostered strong links with industrial partners. You will find that there are many opportunities to benefit from the School's ties with industry; from the development of modules on our taught programmes to the research projects that are available to students. We have close ties with both local and global companies such as Laing O'Rourke, TATA, Ove Arup, Qinetiq, EADS, Rolls Royce, National Grid, Augusta Westland, Motorola, GEC, Siemens, IBM, Hewlett Packard, Nokia and Bosch, to name but a few.

Many of our academic staff have extensive experience of working in industry and therefore have excellent industrial links. Due to our close ties with industry and the fact that almost all of our staff are research active, our students are provided with a large scope of interesting and topical MSc and PhD research projects to choose from.

We conduct international research of the highest calibre and each year earn between £15-20 million in research income. This income helps to support our

state of the art facilities. It also helps to ensure that our teaching is up-to-date, taking into account the latest trends and research findings in engineering.

### Location and student facilities

The School of Engineering is located in Queen's Buildings which is close to other University departments, the Student's Union and is situated in the heart of Cardiff city centre. The Queen's Buildings site is also home to the Schools of Physics & Astronomy and Computer Science & Informatics. We have a student refectory on-site serving breakfasts, lunches and dinners.

The Trevithick library, dedicated to Engineering, Physics and Computer Science, is also on-site. The library is an outstanding facility which has recently had an award-winning refurbishment and expansion. It is a well-equipped facility offering a broad range of books, journals and the latest computer and CD-ROM reference media. All of our on-site computer terminals provide a wide range of general and specialised software packages for use in engineering study and are connected to the university network with email and internet facilities.

# Postgraduate Research Programmes



# The School of Engineering is proud of its reputation for conducting world-class research and advancing knowledge across a wide range of disciplines.

**In the latest higher education Research Assessment Framework (REF) we were ranked 1st in Civil Engineering and 7th in General Engineering in the UK.**

We were also ranked top in the UK in all units of assessment for the impact of our research (REF 2014). This position has further enhanced our reputation for a vibrant research-led culture and has currently attracted more than 400 postgraduate students from the UK and around the world to study and undertake research in the School. Many of our academic staff are involved in internationally recognised research projects, which earn the School around 20 million in research income each year. This enables us to continue investing these funds in the maintenance of award-winning teaching facilities and research laboratories.

## Research Programmes

We offer postgraduate research (PhD, MPhil, EngD) opportunities across a wide range of research areas. We have also developed an MRes degree programme to complement our MSc programmes in Wireless and Microwave Communications Engineering. This programme has a taught element but the research project element makes up the major part of the course. Many of our academic staff have

excellent industrial links which provides our postgraduate research students with a wide scope of exciting and practical research projects to choose from. Due to this strong tradition of collaboration with industry, our graduates are highly sought after, and have gone on to work for major global engineering companies, such as Tata Steel, Hewlett Packard, Bosch, BP and Ford.

Entry requirements for the research programmes are usually a minimum of an upper second class Honours degree (or equivalent) in Engineering or a related subject, and a master's degree. We also consider any applicants with appropriate professional experience. For those applicants whose first language is not English or who have not had a substantial part of their education taught in the English language, evidence of their ability in the English language is required – usually an IELTS score of 6.5.

The MPhil (Master of Philosophy) degree can be studied full-time over one year or part-time over two years and the PhD (Doctor of Philosophy) degree can be studied full-time over three years or part-time over five years. There are four intakes for these programmes during the year (January, April, July and October).

Progress in the standard of study at MPhil and PhD level is monitored by formal six-monthly and twelve-monthly assessments. At the conclusion of the programme,

all students submit a thesis that shows evidence of original scholarship. For the MPhil the thesis is up to 60,000 words – for the PhD the thesis is up to 100,000 words.

We are also a partner in the Centre for Doctoral Training in Compound Semiconductor Manufacturing, Resilient Decarbonised Fuel Energy Systems, Water Informatics, the NERC GW4+ Doctoral Training Partnership and the Engineering Doctoral Centre in Steel Technology.

Our MRes in Wireless and Microwave Communications Engineering is a one year full-time Masters programme which involves a semester of taught modules followed by an eight month research project and a dissertation see page 13 for more information about the course.

## Research Areas

We have a reputation for excellence and innovation in research, which has been further consolidated by a recent review and reorganisation of the research structure in order to facilitate a more dynamic approach to solving modern engineering problems.

Our varied research groups have been brought together under three main research areas: Civil Engineering; Electrical and Electronic Engineering; and Mechanical Engineering. They also mirror the main engineering disciplines and reflect the breadth of our research portfolio.



The research groups in this department cover a wide range of civil, structural and environmental research areas.

In addition to geo-environmental and hydro-environmental engineering, we are also conducting research into engineering materials and the generation of new sustainable materials and smart engineering systems for the built environment.

## Applied and Computational Mechanics

The Applied and Computational Mechanics Group carries out internationally recognised research into engineering materials and processes which can be applied to improve the economics, efficiency and efficacy of construction materials, and the design of safer and more resilient structures. The Group also investigates a wide range of composite materials and develops computational methods for multiscale modelling and the optimisation of structures and micro-architected materials.

## BRE Trust Centre for Sustainable Engineering

The Building Research Establishment (BRE) Centre for Sustainable Construction aims to pave the way for a new generation of digital buildings that have lifelong resilience and adaptability to their environment, usage and occupancy. In essence, buildings should have the ability to be context-aware, i.e. factor in environmental and user needs, such as behaviour and lifestyle patterns, and thus be adaptive to change. There is a need to re-think the concept of a building and move from traditional 'low value' components towards extended IT-aware materials and products embedding various forms of 'intelligence'.

The Centre is conducting research into smart materials and products, integrated design and manufacturing systems, and total lifecycle approaches through a variety of projects that are sponsored by the European Commission, the Welsh Assembly Government and the Engineering and Physical Sciences Research Council.

## Geo-environmental Research Centre

The Geo-environmental Research Centre was established in 1996 and has been a leader in the field of geo-environmental engineering by tackling the problems caused by the environmental effects of waste, regionally and around the world, and providing new solutions to energy generation. This relates to harnessing geo-energy, improving the resilience and durability of geo-technical infrastructures, and finding means to recover resources from natural and man-made deposits.

The centre's research work ranges from fundamental studies of soil behaviour, through project based applications to commercial exploitation and development. The growing demand for energy, climate change and a carbon constrained future mean that the geo-environmental agenda is of increasing strategic importance globally. With its wide remit of work and interdisciplinary expertise, the GRC is well positioned to play a major part in developing pragmatic solutions to such challenges.

## Hydro-environmental Research Centre

The Hydro-environmental Research Centre was established in 1997 with the aim of pursuing research into the development

and application of computer models for investigating flow, water quality, sediment and contaminant transport processes, in coastal waters, estuaries and river basins. As well as understanding and managing the hydro-environment, the Centre is actively involved in research and development to design, test and simulate tidal stream turbines and other renewable energy structures.

Current research activities include modelling flood risk and hazard, water quality and sediment transport modelling, marine and riverine renewable energy, modelling large scale waves, tides and surge prediction, vegetation hydrodynamics, and the impact of climate change on coasts and estuaries.

## Materials for Life

The Materials for Life Research Group are developing a new generation of unique, versatile and robust self-healing construction materials, which will be sustainable and resilient. This research is aimed at enhancing durability, improving safety and reducing maintenance costs and creating a sustainable and durable built environment.

The vision for this research is a built environment and infrastructure comprised of materials and structures that continually monitor, regulate, adapt and repair themselves without the need for external intervention. Conglomerate materials, which comprise the majority of our buildings and structures, form a major part of the research in this group.



# Electrical and Electronic Engineering

The cutting-edge research covered by this department includes work on the effective generation and supply of renewable energy, ensuring a safe and continuous supply of electricity, advanced wireless communications systems, sensors and signal processing, magnetic materials and thermo-electrical engineering.



## Advanced Voltage Engineering Centre

Research in this centre focuses on systems and phenomena related to very high voltage electricity, e.g. working to make the use of electricity and global air travel safer, more efficient and more environmentally friendly. With millions of homes and businesses relying on the National Grid, engineering research in high voltage electrical energy systems is also very important in protecting from surges, preventing blackouts and ensuring safety and efficiency from the grid across the UK. One of the major projects which the Advanced Voltage Engineering Centre is involved in is the National Grid Centre, which provides research and consultancy services as well as establishing collaborative partnerships between university researchers and company engineers.

## Centre for High Frequency Engineering

The Centre for High Frequency Engineering aims to conduct world-leading, interdisciplinary research using high-end electronics technology to solve future engineering challenges. This covers the specific areas of the fundamental science and applications of electronic materials, wireless communications systems, sensor technologies, embedded systems, signal conversion/processing and microfluidics.

Pioneering the development and application of a new generation of non-linear, high-power, high-frequency measurement systems, researchers are continuing to break new ground in enabling 'Waveform Engineering'; an alternative approach to traditional non-linear characterisation and modelling.

Recent work in the area of high frequency properties of novel electronic materials has involved the development of new types of electromagnetic sensors. The group also has expertise in independent component analysis for blind signal separation and polynomial matrix algorithms for broadband sensor array signal processing. This work has application to radar, sonar, seismology, medical diagnostics and wireless communications.

The centre works closely with the multi-million pound world-class Compound Semiconductor Technology Foundation, a joint Engineering and Physics facility in partnership with local semiconductor technology company IQE.

## Centre for Integrated Renewable Energy Generation and Supply

This well established group aims to address the demands of current and future energy policies which often result in the competing aims of maintaining the security of supply, ensuring affordability and reducing environmental impact.

They are a multidisciplinary group with international expertise in the supply and transmission of energy which includes wind and solar energy, HVDC, smart grids and integrated energy systems.

## Magnetics and Materials

The group has a strong background in thermo-electric and measurement techniques of electrical and thermal transport properties of semiconductors. Recent research focuses on novel approaches to thermo-electrics in an attempt to bridge a traditional conversion technology with the quantum realm and micro/nano world.

Magnetics research in this group focuses on several areas related to the production, characterisation and application of magnetic materials which can have a major impact in areas such as renewable energy, electrical supply and energy efficiency. The group has an established track record in research on soft magnetic materials and is involved in projects such as the magnetic behaviour of electrical steels, improving efficiency and noise in transformer cores, and the application of magnetic materials in power magnetic devices.

## Sensors, Signals and Imaging

The Sensors, Signals and Imaging (SSI) Research Group is actively engaged in research in sensors, signal processing and imaging with applications in medical image analysis, medical informatics, health and sports monitoring, human motion analysis and other application areas. As a group we have extensive experience of working with ultrasound, PET and SPECT imaging, underwater acoustics, human body acoustics, polynomial matrix algorithms for broadband sensor array signal processing, body sensor networks, image and video segmentation, human motion analysis and human action and activity recognition. We have close links with Velindre, Llandough Hospital and the University Hospital of Wales, which support our activity in medical research.

# Mechanical Engineering

**Our research in the Mechanical Engineering department encompasses a wide diversity of fields including the production of reliable, efficient, low carbon energy, bioengineering and biomechanics, intelligent and knowledge based systems, advanced manufacturing technologies, the detection and analysis of damage to materials and structures, and tribology.**



## Biomedical Engineering

Biomedical engineering aims to find solutions to contemporary problems faced by modern medicine and health care through the application of engineering principles. The Biomedical Engineering Research Group works to understand how the body responds to trauma, implants and other medical technologies. Areas of expertise include orthopaedic engineering, forensic engineering, trauma science and medical electronics. The Group also undertakes investigative work in microfluidics technology which has applications in health and medicine, and provides opportunities for working at the interface between engineering and chemistry, biosciences, medicine and pharmacy.

The group includes the research work carried out by the multidisciplinary Arthritis Research UK Bioengineering and Biomechanics Centre. The Centre is made up of a team of internationally recognised researchers and clinicians who are conducting interdisciplinary research aimed at improvement in care for patients suffering with arthritis.

The cutting-edge research conducted under this research theme, which supports

and is supported by current clinical practice, allows engineers to work towards solutions that will have positive benefits for patients and the health care industry.

## Centre for Energy, Waste and the Environment

The focus of this centre is to provide efficient, reliable heat and power generation, whilst moving towards a lower carbon economy. Research work involves mitigating the effect of carbon-based heat and power generation. The Centre specialises in the characterisation of hazards from traditional and alternative fuel sources, energy surveys and audits for high energy demand leisure centres and hospitals, and waste-to-energy schemes. The Centre's work also focuses on the application of new fuels and propulsion technologies for the transport sector, primarily automotive and aerospace.

## High Value Manufacturing

This established research group conducts research across a range of areas including intelligent and knowledge-based systems, smart systems, sustainable manufacturing, advanced manufacturing technologies and micro/nano-manufacturing. The work in

this area supports manufacturing industries by improving manufacturing technologies and systems, and reducing environmental impact through increased sustainability. Work in intelligent and knowledge based systems improves the manufacturing process and increases efficiency.

## Tribology and Performance of Machines, Structures and Materials

Damages in structures such as buildings, bridges, or aircraft components, can have a devastating effect, and manufacturing efficient structures, as well as detecting and preventing damage, is an important challenge for engineers.

The Mechanical and Structural Performance Group works across a range of disciplines including aerospace, automotive, civil, manufacturing, and medical engineering. Research in the group focuses on the design, validation, analysis and inspection of a wide range of advanced materials and structures, with the aim of offering operators of high-value structures and systems the potential to increase usage, reduce maintenance costs and improve safety.

Tribology is the study of surfaces and their interactions. This study is vitally important for a lot of different materials and their uses in a range of machinery and devices, at a range of scales. For example, the group has a specialised interest in larger scale contacts that occur in rolling element bearing and between the teeth of power transmission gears, as well as the tribology of nano-devices. A major research aim of the Group is to improve understanding of the gear distress phenomena of micropitting, scuffing and wear. Also, at the nanoscale, research into the problems of contact and adhesion is being aided by pre-fractal representations of surface geometry.

# MRes Wireless and Microwave Communication Engineering

**This course aims to provide you with an excellent platform for career development, whether that be within industry or academic research. You will be taught advanced level knowledge and skills that will allow you to succeed in the rapidly growing wireless and microwave communication industry, whilst also enhancing your research skills.**



## Special features

You will learn in a research-led teaching institution, taught by staff in one of the highest ranked university units in the 2014 Research Excellence Framework (REF).

You will benefit from the modern facilities commensurate with a top-class research university, in an environment graded as Silver standard in the first Teaching Excellence and Student Outcomes Framework (TEF).

## Course Description

The course focuses on the development of expertise in new and evolving areas of microwave engineering, including mobile communications and the medical applications of microwaves. You will improve your advanced computer-aided design, measurement and characterisation skills.

**The course will also offer modules in:**

- ▶ radio frequency engineering
- ▶ advanced fabrication and test
- ▶ commercialising innovation
- ▶ non-linear RF design and concepts.

You will also complete an independent project as part of an intensive research stage, putting you in a strong position for a possible future in academic or industrial research.

## The Degree Programme

The course is a one-year full-time programme split into two stages. In stage one, students follow one semester of taught modules from September to January, focusing on research skills. Stage two consists of independent research of eight months' duration, leading to the submission of a significant research project in the following September.

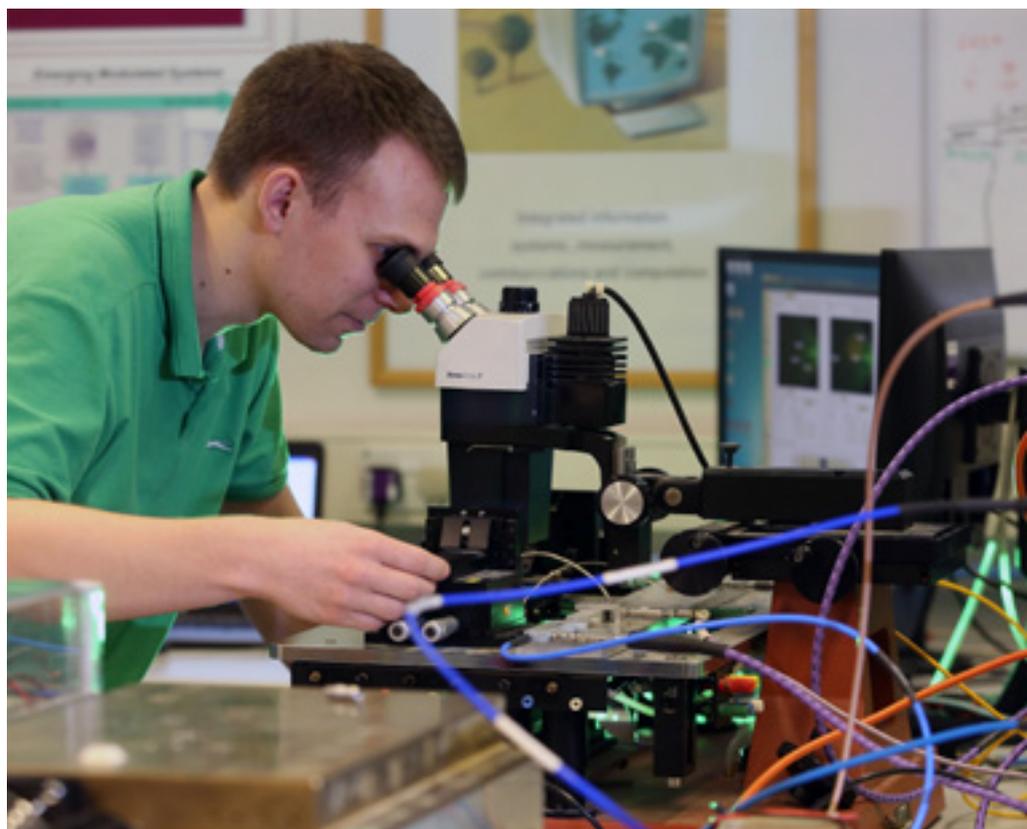
The project will be selected by the student in combination with academic staff in one of the School's active research teams. You will be allocated a research tutor who will guide your work and dissertation write-up.

## Entry Requirements

The normal entry requirement is an upper second-class Honours degree in a relevant subject area from a British or recognised overseas university; or appropriate professional experience.

You will need to demonstrate understanding or experience in electromagnetic concepts relevant to microwave engineering, as well as an understanding of basic nonlinear devices such as transistors and diodes.

For applicants whose first language is not English, the minimum English language requirement is an IELTS score of 6.5.



# Support for research students

The School of Engineering is committed to providing the best possible support for our research students. This includes high quality research facilities, an extensive in-house training programme for professional development, and support for working towards professional registration.

## Supporting Our Students

We are committed to developing world-class researchers through undertaking a rigorous research programme and providing professional development opportunities that promote key attributes and employability skills.

Our research community is cosmopolitan and friendly and this provides a supportive environment in which to study. Our academic staff are internationally recognised for the quality of their research and have extensive experience in supervising people from many different academic and ethnic backgrounds.

We aim to provide students with a supportive environment where they can develop both personally and professionally throughout their studies at Cardiff. Students have the opportunity to develop a Personal Development Plan (PDP) and to discuss their training needs with their supervisor on an on-going basis.

Both the University and School offer a wide range of training courses, and if you identify a training need that cannot be met by these courses, you can consider external training courses, in conjunction with your supervisor. We provide financial support to every PhD student to enable them to attend training activities.

As a new research student, you will be allocated office space with fellow students and researchers, and be fully integrated into a Research Group and wider research community. You will have access to world class equipment and facilities, supported by the Research Office which provides advice, guidance and access to office stationary and consumables. To further support your studies all students are allocated a Student Support account, with funds which you manage to support the purchase of a PC/laptop, small items of equipment, research consumables and attendance at training courses or national and international conferences.

## Doctoral Academy Training Programme

The Doctoral Academy offers a very wide range of courses, covering both personal skills and discipline-specific skills to help you complete your research degree on time and to enhance your employability. Some courses are available as on-line training modules. All the events in the programme are open to Cardiff University research students, usually at no cost. The Doctoral Academy also provides one-to-one advice on planning your skills development.





## Our Supporting Studies Programme

Increasingly, professional institutions, employers, and Research Councils, are demanding that PhD students, as part of their degree, complete a training programme which includes courses in teamworking, presentation and communication skills, research methods, problem-solving, time management and information technology. We coordinate a programme of training and development activities specifically tailored to the needs of engineering research students. This is intended to complement the Doctoral Academy Training Programme,

with content directly relevant to engineering. Some courses aim to improve skills and knowledge of direct benefit to a researcher's project needs, and some to develop longer-term professional skills.

## Chartered Engineering Status with a Professional Institution

We strongly support our students in working towards becoming a chartered engineer. If you are interested in working towards Professional Registration i.e. CEng, an "Engineering Lens" has been developed which demonstrates the strong link between the requirements for CEng and the development of an engineering researchers' knowledge, understanding, skills, competence, and attributes.

Further information is available from the Engineering Council website: [www.engc.org.uk](http://www.engc.org.uk)

## Professional Development Planning

Professional Development Planning (PDP) is a structured and supported process that will help you to review your learning experiences, set personal and academic goals, and evaluate your progress towards these goals. The Quality Assurance Agency for Higher Education (QAA) embodied PDP within its revised Code of Practice for Postgraduate Research Programmes.

Consequently, PDP now forms a core element of Cardiff University's Skills and Employability Strategy.

PDP is designed to assist you in developing further as an independent learner, and will be of benefit not only during your time at Cardiff University but throughout your career, and will help to:

- ▶ Identify your training needs
- ▶ Develop and enhance research-specific and transferable skills in many areas (e.g. oral and written communication skills, how to get grant funding)
- ▶ Monitor your personal and professional development
- ▶ Discuss your development needs with your Supervisor(s)
- ▶ Enhance your ability to articulate and demonstrate your skills to a wide range of potential employers (both academic and non-academic) and professional bodies.

An on-line resource, designed to guide you through the process of PDP and help you construct an electronic record of your development is available to all students via our online learning system.

## Further Information:

Tel: **+44 (0)29 2087 7159**

Email: [engineering-pgr@cardiff.ac.uk](mailto:engineering-pgr@cardiff.ac.uk)

Web: [www.cardiff.ac.uk/engineering](http://www.cardiff.ac.uk/engineering)

# EPSRC Centres for Doctoral Training

These Engineering and Physical Sciences Council (EPSRC) funded centres provide four-year fully funded studentships and valuable training for postgraduate research students in specialized areas.

## Centre for Doctoral Training in Compound Semiconductor Manufacturing

Cardiff University is the lead partner in the EPSRC Centre for Doctoral Training (CDT) in Compound Semiconductor Manufacturing. The Centre, with partners the University of Manchester, the University of Sheffield and University College London (UCL), will provide fully funded PhD studentships and comprehensive training in Compound Semiconductor Manufacturing for postgraduate research students.

The CDT has been designed to complement the aims of the world's first Compound Semiconductor (CS) Cluster established in the UK, which has attracted over £500m in public and private funding. It will provide studentships for a four-year PhD programme including a one year taught Masters in the first year.

The CDT will fully equip you with transferable and practical skills for the future. In conjunction with our academic partners, you will receive appropriate

hands-on experimental and theoretical training related to CS device and system level design and implementation. We will help you develop the capacity to develop innovative alternatives to improve the current capabilities in a range of CS related industrial/technological sectors like Energy and Healthcare Technology. Visit the Coursefinder pages on our Cardiff University website for more information and how to apply.

## Centre for Doctoral Training in Resilient Decarbonised Fuel Energy Systems

The EPSRC Centre for Doctoral Training (CDT) in Resilient Decarbonised Fuel Energy Systems aims to bring together the expertise of the Universities of Nottingham, Sheffield and Cardiff, industrial sponsors and high-calibre doctoral students, to tackle major challenges in the way we harvest, distribute and use energy. Our aim is to reduce CO<sub>2</sub> emissions and support an environmentally friendly but reliable energy world.

The CDT will provide a number of fully funded EPSRC studentships for a four year PhD degree programme in each of the partner institutions, including Cardiff University. Year 1 is utilised for developing research based skills as well as familiarisation with industrial sponsor and specific specialist modules tailored for your project.

The CDT aims to develop the next generation of research leaders and innovators, allowing them to develop a broad economic, societal and contextual awareness, as well as strong technical skills, that will enable them to operate within a multi-disciplinary team. The Cardiff research students will be hosted at the School of Engineering's large scale facility, the Gas Turbine Research Centre. For more information and how to apply visit the Centre's website: [www.resilient-decarbonised-energy-dtc.ac.uk](http://www.resilient-decarbonised-energy-dtc.ac.uk) or visit the Coursefinder pages on our Cardiff University website.

# PhD student profiles

Our PhD students conduct research in a diverse range of engineering fields, and assist in finding solutions to a variety of modern global challenges. We asked four students to tell us about their research, and what they hope to do after their PhD.



**Mo Binesmael**  
PhD Student, Engineering

I enjoyed my undergraduate study at Cardiff so much that I decided to stay on and do my PhD here as well. The School of Engineering has a good reputation and I found that I was encouraged to explore my own ideas which I found really stimulating. I did a final year module on Building Information Modelling and wanted to take that further with my PhD project. I am really enjoying my PhD and there are lots of supplementary training courses provided by the Doctoral Academy which I would recommend to any prospective PhD students. I have also been able to take a year's interruption of study as I have been invited by the government in Dubai to focus on developing a tech start-up which came out of my final year of undergraduate study.

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*I chose Cardiff University as it is one of the high ranking universities in electrical engineering, and it has highly knowledgeable supervisors and excellent research facilities.*

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**Sahar Alimohammadi**  
PhD Student, Engineering

I am undertaking a PhD in electronic engineering within the Magnetics research group. I chose Cardiff University as it is one of the high ranking universities in electrical engineering, and it has highly knowledgeable supervisors and excellent research facilities. Compared to other cities Cardiff is a cheap, safe and beautiful city with lots of natural resources such as parks, countryside and beaches. Anyone who is interested in nature would find it a good place to go. During my study at Cardiff University I met really lovely people and the supervisors and staff are friendly and kind and help you during your study as much as they can.



**Matthew Rolley**  
PhD Student, Engineering

My PhD was about the development of solar technology. My supervisor was brilliant. I loved the fact that we were able to attend conferences, meet other students and extend the interdisciplinary nature of our research.



**Jacob Hill**  
PhD Student, Engineering

My research area is Mechanical Engineering, specifically looking at optimising aspects of manufacturing processes. Cardiff has a good reputation. In reality this translates to more positive acknowledgement from others when travelling and presenting research. Support from supervisors is indeed exceptional, but support from peers (fellow Post Grads) makes all the difference. The facilities suit my research and allow focus to remain on what my work could be, rather than what it's limited to. It helps that my PhD is sponsored and hence funding is not a problem. Overall the links with, and support from, industry seem to be excellent.



**Nick Clark**  
PhD Student, Engineering

I did my PhD project on the magnetic properties of electrical steels. The best thing about the PhD was being able to develop your engineering skills and also having an opportunity to explore your subject area intellectually. I was also able to meet people from all over the world which really helps to expand your horizons, both academically and socially.

# Postgraduate Taught Programmes



We are one of the UK's leading centres for postgraduate studies in engineering.

The combination of excellent research credentials (one of the top 10 engineering Schools in the UK – Research Excellence Framework 2014), and close ties with global engineering firms, has drawn more than 400 students from the UK and around the world to embark on a postgraduate course in engineering with us.

We pride ourselves on successful collaboration with industry and place great importance on industrial involvement in both the development and practice of its postgraduate programmes. Our Industrial Advisory Board is asked to provide continuous input and feedback on our teaching and research, and many of our practising industrial partners teach on appropriate modules or participate in projects carried out by our postgraduate students.

Our lecturing staff also have considerable experience of working on a wide range of practical engineering projects. Some of the large international companies that are currently working with us include Laing O'Rourke, TATA, Ove Arup, Siemens, IBM, Hewlett Packard and Nokia. Prospective students can therefore be assured that course content and teaching is current, practical and applicable in modern engineering businesses.

All our postgraduate students benefit from excellent student facilities. These include an on-site student refectory and coffee shop, extensive computing facilities across the campus (many of which are open 24 hours a day) and the newly refurbished Trevithick Library. We are also home to state-of-the-art teaching and research laboratories for each engineering discipline, many of which have recently been modernised with the help of extensive funding awards.

We provide a wide range of MSc programmes that have been designed with industry and business in mind. All our established MSc courses have been accredited or recognised by the relevant professional institution and meet the requirements towards the CEng qualification. Many of the courses are also available on a part-time basis.

Our postgraduate courses are therefore of interest to anyone wishing to specialise in a particular field of engineering, continue their professional development or acquire Chartered Engineer status. They are also an excellent basis for anyone considering PhD studies or an academic career.



# MSc in Advanced Mechanical Engineering

**This degree programme aims to provide advanced knowledge of mechanical engineering over a range of specialist subjects, with an in-depth study, via a research led project, in a chosen area.**

**It will equip students with an awareness of the context in which a professional mechanical engineer must operate in industry, in terms of the safety, environmental, social, and economic, aspects of their decision making roles.**

## Special Features

The course benefits particularly from the direct involvement of industrial collaborators, in terms of course content, delivery and facilities.

Renishaw PLC has equipped and supports a state of the art Metrology laboratory to underpin the teaching and projects offered in this course. This laboratory also supports post-graduate research collaboration and on-going doctoral level projects.

Research-led advanced mechanical engineering projects are made available to all students in collaboration with current industrial partners.

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree.

## Course Description

The course provides the opportunity for graduate mechanical engineers to enhance or renew their knowledge across a spectrum of relevant topics. It enables master's level understanding of student selected mechanical engineering subjects whilst expanding the boundaries of their expertise into areas that reflect our specialist research interests.

The autumn and spring semesters utilise taught and research project based material to take students from a typical bachelor graduate standard at entry to the master's level. The nine taught optional modules are split between these semesters to provide ninety credits of master's level study. The third section of the course consists of a research project.

Students will be equipped with the advanced skills needed to complete an in-depth project and prepare a dissertation in the field of Advanced Mechanical Engineering.

**Subjects that are covered by this course include:**

- ▶ Tribology
- ▶ Metrology
- ▶ Control engineering
- ▶ Thermodynamics and heat transfer
- ▶ Energy management
- ▶ Quality management
- ▶ Nano-mechanics
- ▶ Robotics
- ▶ Artificial intelligence
- ▶ Risk and hazard management
- ▶ Condition monitoring.

The close integration of the case study and project allows an in-depth exploration of a chosen topic related to the course. This provides individually tailored programmes to meet the needs of participants in a flexible yet focussed manner, with the project seen as being the key opportunity to acquire and exercise leading edge mechanical engineering knowledge. Students will be guided and encouraged to show originality in applying the knowledge they acquire, and will develop an appreciation of how the boundaries of knowledge are advanced through research. They will be trained to deal with complex issues both systematically and creatively, and will be given the opportunity and encouragement to demonstrate initiative and innovation in solving challenging problems and in designing new components and systems.

The close involvement with industry, particularly at the project stage, ensures that the experience the course provides has both relevance and meaning. Teachers delivering the modules are working with some of the world's most renowned engineering companies. Partners include Airbus, BAe Systems, Bosch, Tata Steel, Daimler, EADS, Fiat, Hewlett-Packard, IBM, Messier-Dowty, Network Rail, TWI, Parametric Technology, Physical Acoustics Ltd, Renault, Renishaw, Rolls-Royce, SAP, Siemens, Silicon Graphics, Stile Bertone,

The Highways Agency, TRL, Microchip, and WS Atkins.

The programme will prepare students for entry into a research or industrially-based career. In addition to technical skills, students will acquire professional skills such as how to effectively communicate to technical, management and non-technical audiences, project planning, evaluation and prioritisation.

## Career Prospects

The course provides master's level training to the standard necessary to practice as a chartered professional mechanical engineer. It equips its graduates for management level roles across a broad spectrum of mechanical and related engineering fields. The material presented during the course will provide an excellent foundation for any career in mechanical engineering or related discipline.

The course actively encourages the understanding and practice of interdisciplinary systems engineering thinking that brings together the mechanical engineering subjects it provides in a manner that reflects the needs of industrial and academic problem solving.

## Entry Requirements

The normal minimum requirement will be 2:2 Honours degree (or equivalent) BEng in Mechanical Engineering or related subject areas from a British or recognised overseas university. Other applicants with relevant industrial experience will be considered on an individual basis. For overseas students, the minimum requirement for English language is an IELTS score of 6.5.

## Further Information:

Tel: **+44 (0)29 2087 9999**

Email: **engineering-pg@cardiff.ac.uk**

Web: **www.cardiff.ac.uk**

# MSc Building and Infrastructure Information Modelling (BIM) for Smart Engineering

The emergence of BIM has brought revolutionary changes to the Architecture, Engineering and Construction/Operation (AEC/O) industry and there is an increasing demand for specialists in this sector.



This course will provide you with the tools you need to become an established professional in the dynamic fields of BIM and smart engineering, giving you a distinct edge when applying for a career in civil or structural engineering and related fields, or for a PhD studentship in these areas.

## Special features

The MSc Building and Infrastructure Information Modelling (BIM) for Smart Engineering uniquely focuses on a smart engineering perspective covering both buildings and infrastructure sectors, with the opportunity to obtain highly regarded industry BIM certificates.

The course is based on the research strengths of the Building Information Modelling (BIM) group within the School of Engineering, which has been an established research group for over twenty years. The BIM research group has been recognised internationally and has developed a close working relationship with major BIM research and training centres worldwide as well as collaborating with a wide range of international industrial partners in the UK, EU and China.

You will have the opportunity to gain a Building Research Establishment (BRE) BIM Manager Certificate and building SMART certificate which is highly regarded by industry.

## The course

The core modules have been carefully designed to provide fundamental theory, modelling, simulation and management skills. You will learn how to plan and propose research projects, conduct literature reviews and critiques, design, simulate, optimize and manage building/infrastructure projects/assets, supported by cutting edge BIM related computing technologies.

The wide selection of optional modules and the multi-disciplinary nature of the course provides the opportunity for candidates who have different backgrounds and are interested in becoming a BIM specialist to gain a postgraduate qualification which will enhance your career prospects in a wide range of professions.

Topics covered in modules include: Geo and Hydro-Environmental Modelling, Artificial Intelligence, Flood Design, Advanced Robotics, Numerical Techniques in Civil Engineering, FE Theory and Practice and Building, BIM Computing and Information Processing, and Infrastructure Information Modelling

After successful completion of the taught component, students will proceed to undertake a three month research project and dissertation.

## Career Prospects

There are significant demands coming from industry requiring qualified BIM graduates with an engineering perspective. Graduates can expect career opportunities in the following areas:

- ▶ Technical, research, development and engineering positions in generic civil engineering and specifically BIM industry;
- ▶ Theoretical, experimental and instrumental doctoral research;
- ▶ Numerate, technical, research, development and engineering positions in related scientific fields;
- ▶ Engineering, mathematics and general science education.
- ▶ Related professions could include city planner and manager, architect, civil/structural engineer, MEP engineer, construction manager, surveyor, environmental analyst, mechanical engineer, electronic engineer, facility/asset manager, or computer scientist.

## Entry Requirements

A 2:2 honours degree or experience practicing in Civil, Structural, Environmental and Construction Engineering, or other related disciplines, such as Architecture, Mechanical Engineering, or Computer Science, working towards digital and smart engineering. For applicants whose first language is not English, there is a minimum language entry requirement of IELTS 6.5.

## Further Information:

Tel: **+44 (0)29 2087 9999**

Email: **engineering-pg@cardiff.ac.uk**

Web: **www.cardiff.ac.uk**

# MSc Compound Semiconductor Electronics

The MSc Compound Semiconductor Electronics has been designed to deliver thorough training and practical experience in compound semiconductor theory, fabrication and applications, and integration with silicon technology.

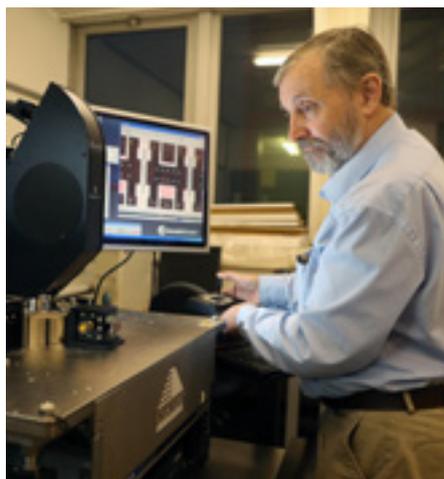


A collaboration between the School of Engineering and the Institute for Compound Semiconductors (ICS), this MSc course is designed to provide students with advanced-level knowledge and skills in the engineering, manufacturing and applications of compound semiconductors.

## Special Features

The experience of our staff and our reputation, as well as our position at the forefront of compound semiconductor technology, mean we have an unrivalled combination of expert researchers, cutting-edge facilities and industry contacts.

The ICS is an exciting new development at the cutting edge of compound semiconductor technology. The Institute has been established as a founding member of the Compound Semiconductor Cluster, which also includes companies such as IQE plc, SPTS and Newport Wafer Fab, to capitalize on the existing expertise at Cardiff University and to move academic research to a point where it can be introduced reliably and quickly into the production environment. It is a unique facility in the UK, and aims to create a global hub for compound semiconductor technology research, development and innovation.



This course will provide you with the skillsets necessary to take advantage of emerging employment opportunities within the growing national and international compound semiconductor sector.

We encourage a “research group” atmosphere within which you’ll be given the opportunity to work together, across disciplines, to enhance each other’s learning and be a vital part of our thriving, international scientific community.

## The course

Our flexible curriculum contains a robust set of required modules and a number of cutting-edge elective modules, which include the latest results, innovations and techniques and are designed to incorporate the most effective teaching and learning techniques.

Our range of specialist modules gives you the opportunity to tailor the programme to the particular industry or sector of interest to you. You’ll have the opportunity to interact with students on other related programmes, gain exposure to new fields, and even develop new business opportunities through our Commercialising Innovation module.

Topics covered in our modules include: Compound Semiconductor Fabrication, Fundamentals of Micro- and Nanotechnology, Quantum Theory of Solids, HF and RF Engineering, Compound Semiconductor Application Specific Photonic Integrated Circuits, Commercialising Innovation, and High Frequency Device Physics and Design

After successful completion of the taught component, students will proceed to undertake a three month research project and dissertation. You will undertake your summer project either within the ICS or the School of Engineering, or with one of our industrial partners such as IQE.

## Career Prospects

An MSc in Compound Semiconductor Electronics will provide you with opportunities in the following areas:

- ▶ Technical, research, development and engineering positions in industrial compound semiconductors, silicon semiconductors and advanced communication systems;
- ▶ Theoretical, experimental and instrumental doctoral research;
- ▶ Numerate, technical, research, development and engineering positions in related scientific fields;
- ▶ Physics, mathematics and general science education.

## Entry Requirements

A 2:2 honours degree in electronic engineering, electrical engineering, or physics. For applicants whose first language is not English, there is a minimum language entry requirement of IELTS 6.5.

## Further Information:

Tel: +44 (0)29 2087 9999

Email: [engineering-pg@cardiff.ac.uk](mailto:engineering-pg@cardiff.ac.uk)

Web: [www.cardiff.ac.uk](http://www.cardiff.ac.uk)

# MSc in Civil Engineering



The development and progression of society is largely dependent upon the skill, imagination and dedication of its civil engineers.

They are concerned with the planning, design, construction and maintenance of highways, railways, airports, docks, harbours, canals, coastal defences, irrigation systems, essential municipal services (such as water supply, drainage and sewage disposal), and structural work including buildings, bridges, dams, reservoirs and power stations.

This established course offers the knowledge and expertise necessary for a career across a broad spectrum of the professional discipline. A civil engineering career offers many different challenges and opportunities in all parts of the world.

## Special Features

The employment record of graduates is excellent, with the majority of graduates joining engineering consultancies.

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree.

## Course Description

The overall aim of this well-established course is to enhance the engineering skills of its graduates. The taught material is delivered during the Autumn and Spring semesters.

An extended project within one of the Civil Engineering fields forms a major part of the course. This course's graduate employment record is excellent, with the majority of graduates joining engineering consultancies.

### Topics covered on the course include:

- ▶ Environmental Fluid Mechanics
- ▶ Advanced Engineering Geology
- ▶ Steel Structures
- ▶ Advanced Engineering Management
- ▶ Numerical Techniques in Engineering
- ▶ Theoretical Soil Mechanics
- ▶ Management in Industry
- ▶ Water Quality and Treatment Engineering
- ▶ Coastal and Estuarine Engineering
- ▶ Engineering Case Study.

## The Degree Programme

This programme offers an opportunity for updating skills and undertaking advanced studies over a wide range of Civil Engineering topics. It is particularly well suited to those with broad interests in construction.

It can also be adapted for candidates who wish to receive advanced training in more than one specialised area, since subjects from the Geoenvironmental, Structural and Water Engineering MScs may be substituted for the non-compulsory subjects.

The degree programme is available on a one-year full-time basis or on a three-year part-time basis. The full-time programme is delivered over two taught semesters followed by a research period and preparation of a dissertation. Assessment is conducted via coursework and examinations.

## Entry Requirements

A 2:2 Honours degree (or equivalent) from a British or recognised overseas university. Applicants with relevant professional experience are also considered. Suitable for graduates in civil engineering or a related discipline, or for candidates with suitable professional experience.

For applicants whose first language is not English, the minimum English language requirement is an IELTS score of 6.5.

## Further Information:

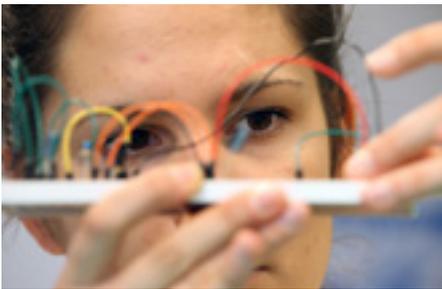
Tel: **+44 (0)29 2087 9999**

Email: **engineering-pg@cardiff.ac.uk**

Web: **www.cardiff.ac.uk**

# MSc in Communication Technology and Entrepreneurship

**This programme is designed to meet the urgent need for specialists trained in this field – specialists who will be responsible for facing the challenges posed by ever developing new technology. It will also provide you with the opportunity to gain valuable skills in entrepreneurship and starting a business.**



## Special Features

The MSc in Communication Technology and Entrepreneurship programme has been developed from the successful and well established course – the MSc in Wireless and Microwave Communication Engineering. This programme also includes specialist modules taught by our internationally recognised Business School, and guest lectures from industrial professionals. In addition, it will provide you with a unique opportunity to participate in the Alacrity Foundation Programme.

## Course Description

The course will allow you to develop expertise in new and evolving areas, such as advanced microwave computer aided design and communication systems engineering. The course will cover laboratory time and advanced engineering management alongside modules in HF and RF engineering, advanced microwave CAD, fabrication and testing, advanced communication systems, advanced communication networks and non-linear RF designs and concepts. This will complement the acquisition of skills in business and entrepreneurship.

The structure of the course is divided into twelve modules taught over seven months, followed by a five month industrially related project within the field.

During the final stage of your course you will complete your MSc project within the Business School, where you will be

able to undertake a related business and management project, and have the opportunity to make an application to the Alacrity Foundation. If you choose to take up the Alacrity option and are accepted onto the programme, you will begin a five-month group-based industrial project with the Alacrity Foundation in Newport. This will be followed by a 'boot camp', where you will be introduced to business focussed methodologies for commercialising technology and for creating successful companies. If you are successful in your application to the Alacrity programme, you will receive a tax free stipend of approximately £13,800 from the ninth month of your MSc course. The Alacrity Foundation programme will take fifteen months to complete.

Alacrity Foundation projects are at the leading edge of technology and offer opportunities for new methods and processes to be developed and the potential for the patenting of products.

Students will have a unique opportunity to work on innovative projects using the latest software development tools and methodologies requiring creative problem solving. You will have the opportunity to transform innovative project ideas (sourced from global industry partners) into market leading products and to be founders of a start-up company. Projects will be focused primarily on software and you will have the opportunity to work in areas such as:

- ▶ designing mobile apps for iPhone/iPad and Android devices amongst other platforms
- ▶ developing rich graphical interfaces and video/image streaming and processing
- ▶ machine to machine (M2M) and inter process communications
- ▶ speech recognition and synthesis
- ▶ cloud services development
- ▶ cyber security.

The relationship with industrial partners is what makes Alacrity's internship so valuable, as projects that are customer driven with a high probability of success can trigger the incorporation of a start-up company. Successful graduates will have an equity stake in the company, and most importantly, will have access to venture capital funding. Alacrity applicants will require at least twenty four months visa entitlement from the start of their MSc.

You may wish to complete your MSc course within the University where you will be supported by academic staff in the Business School. If you do not choose to undertake an Alacrity Foundation project, you will be offered a range of projects which reflect the emphasis on management and entrepreneurship.

Whether or not you choose the option to follow the Alacrity Foundation programme, this MSc will provide you with both the engineering and business skills you need to develop your career.

## Entry Requirements

A 2:2 Honours degree (or equivalent) from a British or recognised overseas university. Suitable for graduates in Electronic Engineering or a related discipline. Applicants with relevant professional experience will also be considered.

Applicants whose first language is not English will be required to pass IELTS with a minimum score of 6.5.

## Further Information:

Tel: **+44 (0)29 2087 9999**

Email: **engineering-pg@cardiff.ac.uk**

Web: **www.cardiff.ac.uk**

# MSc in Electrical Energy Systems

**Specialists in advanced electrical energy systems are urgently needed to design and build secure, reliable, low-carbon energy systems in developed and developing countries around the world.**

The MSc in Electrical Energy Systems is designed to meet this need, with a particular focus on the integration of renewable generation into electricity transmission and distribution networks and on preparing students for a new era of truly 'smart' grids.

Graduates of this MSc will obtain unique specialist training for their future professional employment trends and developments.

## Special Features

This research-led programme is based on partnerships with industry and involves industrially-linked projects with major electricity companies. We have a unique laboratory facility in Europe including a hardware power system simulator for training and projects. There are opportunities for PhD research following successful completion of the MSc, and excellent job opportunities with leading electrical energy companies. The University is also a partner on both the IET Power Academy and Power Networks Research Academy.

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree.

## Programme Structure

The core modules are delivered by research academics in the School of Engineering with key invited lectures from experienced engineers and managers from the electricity industry. A key feature of the programme is its integrated approach to teaching Power Systems, High Voltage Plant Technology and the enabling technologies which provides essential preparation for a career in future electricity networks.

Optional modules are taught by colleagues from other research groups in the School in order to achieve a multidisciplinary input to the programme. MSc students will work closely with our researchers in the Energy Theme.



## Topics covered on the course include:

Power Systems Analysis, Distributed Generation, Smartgrids and Active Network Devices, Power System Protection, Condition Monitoring, Systems Modelling & Forecasting, High Voltage Technology, Alternative Energy Systems, Sustainable Energy Studies, Advanced Power Electronics, Introduction to Digital Signal Processing, Industrial Computer Control Systems, Management in Industry, and Energy Management.

After successful completion of the taught component, students will proceed to undertake a research project. Students are able to choose a topic from one of the following areas of specialisation: Power System Protection and Control, Renewable Energy, Distribution System Design, Demand Side Management, Condition Monitoring, Smart Metering, High Voltage Insulation, Overvoltage Protection, Thermoelectricity and Earthing Systems.

## Research Project and Dissertation

Students will be required to undertake an individual research project in a specialist area of Electrical Energy Systems Engineering, leading to the preparation of a dissertation. Project work is undertaken under the direct supervision of a member of staff. Assessment is conducted via coursework and examinations.

## Employment Prospects

The demand for graduates from this type of course is very strong and is expected remain so for the foreseeable future. Graduates are expected to gain employment in large electrical energy utilities, electricity distribution companies, the public sector (Energy agencies, Carbon Trust etc), research and development, or set up their own companies.

## Entry Requirements

A 2:2 Honours degree in electrical engineering or applied science. Other related degrees will be considered. For applicants whose first language is not English, there is a minimum language entry requirement of IELTS 6.5. Prospective applicants with appropriate alternative qualifications and experience will also be considered.

## Further Information:

Tel: **+44 (0)29 2087 9999**

Email: **engineering-pg@cardiff.ac.uk**

Web: **www.cardiff.ac.uk**

# MSc in Civil and Geoenvironmental Engineering

**Geoenvironmental engineering is an inclusive discipline which recognises that many environmental challenges cannot be solved by one traditional discipline alone.**

The term **Geoenvironmental Engineering** is a broad one covering the contributions that **geotechnical engineers, environmental engineers, hydrogeologists, earth scientists, geochemists, water engineers, biologists, and ecologists, amongst others, make to environmental management, site characterisation, environmental risk assessment, waste disposal, soil and groundwater remediation, habitat protection, and environmental rehabilitation.**

Geoenvironmental engineering is a forward looking discipline interfacing with areas traditionally within civil engineering, earth sciences and the life sciences. The discipline centres on human interaction with the ground and water environment, in particular through infrastructure development, environmental assessment and environmental management. Geoenvironmental engineers are involved in a wide range of activities, including contaminated land management, hydrogeology, water resource management, geochemical analysis, groundwater and surface water contamination fate and transport prediction, environmental impact assessment, environmental risk assessment, and habitat management. Geoenvironmental engineers frequently work in multidisciplinary project teams and developments.

## Special Features

The solutions to the environmental challenges related to human interaction with soil, groundwater and surface water require engineers to possess a broad range of knowledge and expertise.

Our MSc in Civil and Geoenvironmental Engineering prepares students to meet those challenges. The MSc is an innovative partnership between the School of Engineering, the School of Earth and Ocean Sciences and the School of Biosciences.

A feature of this MSc programme is the series of short, workshop style training courses covering practical applications integrating professional practice issues with the scientific and engineering foundation of the course.



These workshops are delivered by recognised professional practitioners in the industry.

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree.

## Programme Structure

The degree programme is available on a one-year full-time basis or on a three-year part-time basis. The full-time programme is delivered over two taught semesters followed by a research period and preparation of a dissertation. Assessment is conducted via coursework and examinations.

### Topics covered include:

- ▶ Environmental Law
- ▶ Soil and Groundwater Chemistry
- ▶ Engineering Geology
- ▶ Land Contamination
- ▶ Advanced Engineering Management
- ▶ Geo and Hydro-environmental Modelling
- ▶ Water Quality Control
- ▶ Environmental Engineering Applications
- ▶ Management in Industry
- ▶ Theoretical Soil Mechanics.

## Research Project and Dissertation

Students will be required to undertake an individual research project in a specialist area of geoenvironmental engineering, leading to the preparation of a dissertation. Project work is undertaken under the direct supervision of a member of staff in one of the three participating departments.

## Employment Prospects

The record of employment of graduates of the MSc in Civil and Geoenvironmental Engineering is excellent, with the majority of graduates joining engineering consultants. A small number of graduates each year go on to further study, typically a PhD. Substantial industrial involvement with the design and delivery of the course ensures the continuing relevance of the MSc as preparation for professional employment work in this area.

## Entry Requirements

The normal entry requirement is a 2:2 honours degree in Civil or Structural Engineering, or a related discipline, from a recognised university, or equivalent professional experience. Good mathematical skills are an advantage. For applicants for whom English is not their first language, there is also a minimum English Language requirement of IELTS 6.5.

## Further Information:

Tel: **+44 (0)29 2087 9999**

Email: **engineering-pg@cardiff.ac.uk**

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# MSc in Civil and Water Engineering

In recent years, there has been a growing world-wide concern about environmental water management issues including, for example, concerns about coastal and estuarine water pollution, river flooding and urban drainage, wetland and mangrove management, and the ecological aspects of lakes and reservoirs, to mention but a few.

In addressing these and other environmental challenges, engineers and environmental managers are increasingly using sophisticated numerical models for predicting complex hydrodynamic, water quality and sediment transport processes. These models are increasingly complemented with decision support software systems and a wide range of related hydroinformatics software tools.

The programme is aimed at graduates in civil engineering, earth sciences, environmental sciences and biosciences. Good mathematical skills are an advantage. The degree programme is also aimed at engineers/scientists working in relevant areas wishing to upgrade or refresh their qualifications.

## Course Description

The MSc in Civil and Water Engineering is designed to provide specialised, postgraduate training in environmental water engineering whilst having the flexibility to permit study of related subjects in civil and geoenvironmental engineering.

The aim of the programme is to enhance the engineering skills of its graduates and an extended project within one of the water engineering fields forms a major part of the programme. Thus, the MSc aims to complement an undergraduate degree in civil engineering, or similar, by introducing candidates to hydroinformatics, computational hydraulics and environmental hydraulics, including water quality indicator and sediment transport processes in coastal, estuarine and inland waters. Students will have the opportunity to work with some of these models in an extended project.

The course lecturers have considerable experience of working on a wide range of practical environmental hydraulics projects

and their models have been mounted by over 35 companies for over 8 world-wide EIA projects and by over 45 universities in 17 countries.

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree.

## Programme Structure

The degree programme is available on a one-year full-time basis or on a three-year part-time basis. The full-time programme is delivered over two taught semesters followed by a research period and preparation of a dissertation. Assessment is conducted via coursework and examinations.

### Topics covered include:

- ▶ Geo and Hydro-environmental Modelling
- ▶ Flood Design
- ▶ Environmental Law
- ▶ Advanced Engineering Management
- ▶ Numerical Techniques in Hydro-environment Engineering
- ▶ Management in Industry
- ▶ Water Quality Treatment Engineering
- ▶ Environmental Engineering Applications.

## Research Project and Dissertation

Students will be required to undertake an individual research project in a specialist area of Hydro-environment Engineering, leading to the preparation of a dissertation. Project work is undertaken under the direct supervision of a member of staff in one of the three participating departments.

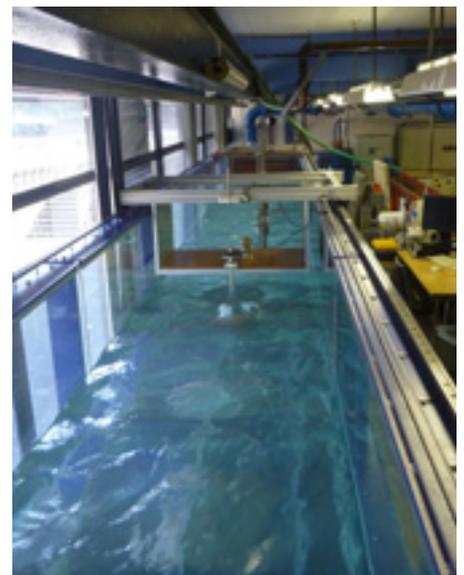
## Employment Prospects

The record of employment of graduates of the MSc in Civil and Water Engineering is excellent, with the majority of graduates joining engineering consultants. A small number of graduates each year go on to further study, typically a PhD.

## Entry Requirements

The normal entry requirement is a 2:2 honours degree in Science or Engineering, or a related discipline, from a recognised university, or equivalent professional experience. Good mathematical skills are an advantage.

For applicants for whom English is not their first language, there is also a minimum English Language requirement of IELTS 6.5.



## Further Information:

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Web: [www.cardiff.ac.uk](http://www.cardiff.ac.uk)

# MSc in Manufacturing Engineering, Innovation and Management

**This newly developed MSc programme aims to take well qualified students (typically those having a good bachelor's degree in Manufacturing Engineering or an equivalent qualification) and to equip them with the skills they need to be employed as professional engineers across a wide range of the Manufacturing Engineering industry.**

## **This MSc programme will:**

- ▶ Provide an advanced knowledge of topics in Manufacturing Engineering, and in associated engineering and scientific disciplines over a broad range of specialist subjects.
- ▶ Provide awareness of the context in which Manufacturing Engineering operates, in terms of safety, environmental, social and economic aspects.
- ▶ Offer the opportunity to develop a wide range of intellectual, practical and transferable skills that will allow students to follow careers in research, industry and other professional areas of the economy.
- ▶ Produce postgraduates with a systematic understanding of knowledge and a critical awareness of current problems and new insights which are at the forefront of Manufacturing Engineering.

Leading this programme will be the members of the Mechanics, Materials and Advanced Manufacturing Research Theme, which has a track record of research and research-led teaching aimed at fostering innovation and sustainability, supporting social and economic development, and contributing more widely to improvements in health and quality of life.

Research is conducted within a vibrant environment which has benefited from major strategic investment via directed SRIF funds of £2.4M into the Cardiff University Structural Performance (CUSP) laboratory, and collaborative industrial partnerships. A key element of this course will be the application of measurement techniques within the recently installed Renishaw Metrology Laboratory, part of a strategic partnership between the School and Renishaw.

A close involvement with industry ensures that the research has both relevance and meaning, working with some of the world's

most renowned engineering companies.

Significant inputs into teaching and project work will also be made by members of the Business School. The input from the Business School will ensure that the MSc in Manufacturing Engineering Innovation and Management provides the latest in business and management knowledge and skills, and is academically rigorous, and research led, as well as business orientated.

The degree programme will be informed by up-to-date internationally renowned research expertise undertaken within the School's Mechanics, Materials and Advanced Manufacturing research theme. These will include the modules in the subject areas of robotics, metrology, manufacturing, informatics, innovation and artificial intelligence/image processing. Industrial partners working within this Research Theme will provide opportunities for collaborative case studies and projects for students on the MEIM programme.

## **Programme Structure**

The MSc programme shall run as a full-time programme and comprise two stages: Stage 1 which will extend for two semesters and consist of predominantly taught modules and a research project and dissertation in the field of Manufacturing Engineering, Innovation, and Management to the value of 120 credits, and Stage 2, which shall follow on from the Diploma Stage to give a total programme duration of one calendar year. This second stage consists of a single dissertation module to the value of 60 credits. Students completing this stage successfully, with 180 credits from both stages, shall be eligible for a master's degree.

### **Topics covered include:**

- ▶ Measurement systems
- ▶ Case study
- ▶ Project
- ▶ Manufacturing Informatics

- ▶ Innovation and Sustainability Engineering: Commercialising Innovation
- ▶ Artificial Intelligence
- ▶ Quality and Reliability
- ▶ Condition monitoring systems modelling and forecasting
- ▶ Management in Industry
- ▶ Advanced Robotics
- ▶ Lean Operations.

## **Employment Prospects**

Employment opportunities for students undertaking the proposed programme will be largely with national and international companies in the manufacturing engineering sector. Some students may wish to use the MSc platform to go on to study for a PhD leading to industrial or academic careers.

## **Entry Requirements**

The normal minimum entry requirement will be a 2:2 Honours degree (or equivalent), BEng in Manufacturing Engineering, or a related subject area, from a British or recognised overseas university. Other applicants with relevant industrial experience will be considered on an individual basis. For international students, the minimum English language requirement is an IELTS score of 6.5.

### **Accreditation**

This course is currently under consideration for accreditation.

## **Further Information:**

Tel: **+44 (0)29 2087 9999**

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Web: **www.cardiff.ac.uk**

# MSc in Structural Engineering



The creation of modern buildings is a complex operation requiring professional skills from many disciplines.

**This course offers advanced training in the analysis, design and construction of structures in a variety of materials.**

The overall aim of the course is to enhance the knowledge and expertise of its graduates, preparing them for a career as a consulting structural engineer within this specialist professional area of civil engineering. It is founded on theoretical and applied research into the behaviour of real structures undertaken in the School of Engineering, which has established an international reputation for its work on composite structures, plate girders, large scale testing, site monitoring, and exact calculation of the buckling and vibration of structures. An extended project within one of the Structural Engineering fields forms a major part of the course.

## Special Features

The employment record of graduates is excellent, with the majority of graduates joining engineering consultancies.

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree.

## The Degree Programme

The MSc in Structural Engineering is a full-time course lasting twelve months, comprising of two semesters of lectures and coursework followed by a further dedicated project period of four months for research and the preparation of a dissertation.

The level of commitment of all staff to teaching and learning is high and the courses are taught by staff who are expert in the fields in which they lecture. All staff involved are research-active in practical areas of the discipline, and this provides scope for interesting and up to date MSc research projects.

## Course Structure

**Topics covered include:**

- ▶ Steel Structures
- ▶ FE Theory and Practice
- ▶ Advanced Structural Mechanics
- ▶ Engineering Geology
- ▶ Advanced Engineering Management
- ▶ Environmental Building Studies
- ▶ Numerical Techniques in Structural Engineering
- ▶ Engineering Case Study
- ▶ Dynamics and Structures
- ▶ Fundamentals of Nanomechanics
- ▶ Tensile Structures
- ▶ Theoretical Soil Mechanics
- ▶ Management in Industry
- ▶ Structural Engineering
- ▶ Building and Infrastructure Information Modelling.

## Research Project and Dissertation

Students will be required to undertake an individual research project in a specialist area of structural engineering, leading to the preparation of a dissertation. Project work is undertaken under the direct supervision of a member of staff.

## Employment Prospects

The record of employment of graduates of the MSc in Structural Engineering is excellent, with the majority of graduates joining engineering consultancies. A small number of graduates (about 5 to 10% each year) go on to further study, typically a PhD.

## Entry Requirements

The normal entry requirement is a 2:2 honours degree in civil or structural engineering, or a related discipline, from a recognised university, or equivalent professional experience.

For applicants for whom English is not their first language, there is also a minimum English Language requirement of IELTS 6.5.

## Further Information:

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# MSc in Sustainable Energy and Environment

**There is a considerable body of evidence that relates climate change to the global consumption of energy, and in particular, the use of fossil fuels to provide heat, power and transportation.**

Furthermore there is a strong link between energy use and industrial activity along with an increase in waste generation. Moreover, as supplies of fossil fuels reduce, security of supply worldwide becomes increasingly challenging, particularly given the current growth in world population.

The introduction of new energy and environmental technologies presents new risks, real and perceived, technical and financial, which require careful management. Sustainability is an essential part of any development in this field.

It is clear that a cross-disciplinary approach to developing solutions to these long-term problems is required, to ensure the best use of resources, as well as developing newer, more sustainable ways to produce and use energy. This will require graduates who are capable of thinking and working across the interface of traditional disciplines, and be effective in an ever increasing multidisciplinary environment. Training such graduates is the primary aim of this multi-disciplinary MSc course.

## Special Features

In several areas of the field there is predicted to be an employment shortage developing, and hence a demand for graduates from this type of course. Previous experience has shown that master's graduates in the field of energy gain employment in large energy-focussed companies, the public sector, consultancies, research and development, or set up their own companies. About a third gain PhDs to further enhance their career paths.

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree.



## Programme Structure

The structure of the course has three main themes: Energy Supply, Demand and Management. The course is delivered primarily through the School of Engineering which provides the bulk of the modules and is further supported by other Schools such as the Welsh School of Architecture. There will also be occasions when external industrial lectures will be invited to support specific modules to enhance the learning experience.

The course aims to provide a balanced training across the broad energy field, introducing the link between renewable and fossil based consumption, as well as encompassing the role of various industrial sectors (electrical power generation and distribution, built environment, transport, industry, etc.). The course is available on a 1 year full-time or 3 year part-time basis.

The programme is divided into 3 semesters, with increasingly more research-based learning and group projects in the second semester, culminating with an individual project in the final semester. Projects will be a mixture of industrial sponsored and research based. Students are also encouraged to develop their own projects which will be selected based on the appropriate support and supervision. The semester structure allows a blend on compulsory and optional modules to be taken based on the previous background of the students, thus allowing some degree of specialisation, and providing exposure to the frontiers of research in these areas.

## Topics covered include:

- ▶ Energy Studies
- ▶ Energy Management
- ▶ Risk and Hazard Management
- ▶ Fuels and Energy Systems
- ▶ Alternative Energy Systems
- ▶ Thermodynamics and Heat Transfer
- ▶ Hydro-Environmental Modelling
- ▶ Waste Management and Recycling.

## Entry Requirements

A 2:2 honours degree in engineering, architecture, environmental science, earth sciences, pure sciences or in a relevant numerate scientific discipline, is required. Professional experience in a relevant area will also be considered. Applicants without an engineering background should bear in mind that there are significant numerical/computational elements to this programme. For applicants for whom English is not their first language, there is also a minimum English requirement of IELTS 6.5.

## Further Information:

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# MSc in Wireless and Microwave Communication Engineering

**This degree aims to produce postgraduate specialists with essential knowledge and expertise in electronic and microwave engineering.**



**Its aim is to develop an awareness of the rapidly growing application space for microwave engineering and to use this to contribute significantly to a wide range of industry-focussed research, design and development work.**

## Special Features

All teaching staff are research active, often world leading, and also have very strong industrial links. The course is designed to develop industry-applicable skills to an advanced level.

Both taught and research-project elements are supported by key industrial partners, including Panasonic, Agilent, EADS, Rhode & Schwarz, Freescale and NXP, many offering placements during the research project phase of the MSc. Due to the industrial relevance and industry involvement of this programme, employment prospects are excellent.

This degree is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired a partial CEng accredited undergraduate first degree.

## Course Description

The aim of this course is to provide, at an advanced level, knowledge and skills in wireless and microwave communication engineering, and to develop related skills, enhancing the engineering competency and employability of its graduates.

The course will allow students to become expert in new and evolving areas of microwave engineering including mobile communications and medical applications of microwaves. Key focus areas include advanced computer aided design (CAD) and communication systems engineering. The course will cover laboratory work and advanced engineering management alongside modules in HF and RF engineering, advanced fabrication and test, advanced communication systems and non-linear RF design and concepts.

Other modules consider the fundamentals of micro and nano-technology or optoelectronics.

The course consists of lecture, lab and tutorial based study during the autumn and spring semesters, followed by an individual research project in the summer. The course is assessed through examinations, written coursework, and a final individual project report.

## Course Structure

**The programme comprises the following taught and project based topics:**

- ▶ Software tools and Simulation
- ▶ Advanced Communications Systems
- ▶ High Frequency Electronic Materials
- ▶ HF & RF Engineering
- ▶ Non-Linear RF Design and Concepts
- ▶ RF Circuit Design and CAD
- ▶ Fundamentals of micro and nanotechnology
- ▶ Optoelectronics
- ▶ Advanced CAD, Fabrication and Test
- ▶ Research Project.

The programme is presented as a one-year full-time master's programme, and is also available part-time over two years.

A wide range of teaching styles are used to deliver the diverse material forming the curriculum of the programme. Students will attend lectures, participate in examples classes, and group study. All students must complete 120 credits in Stage 1 in

order to progress to the dissertation (stage 2), for which they are allocated a project supervisor. Dissertation topics are normally chosen from a range of project titles proposed by academic staff in consultation with industrial partners, usually in areas of current research or industrial interest. Students are also encouraged to put forward their own project ideas.

## Career Prospects

Career prospects are generally excellent with graduating students following paths either into research or related industry.

In terms of research, we have many electrical, electronic and microwave related research areas that require PhD students, and this MSc will provide you with an excellent platform. With industry, many graduating MSc students achieve excellent employment opportunities in organisations including Cambridge Silicon Radio, Vodaphone and International Rectifier.

## Entry Requirements

A 2:2 Honours degree (or equivalent) from a British or recognised overseas university. Suitable for graduates in Electronic Engineering or a related discipline. Applicants with relevant professional experience are also considered.

For applicants whose first language is not English there is a minimum IELTS score requirement of 6.5.

## Further Information:

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# MSc Wireless and Microwave Communication Engineering with a Research Year

**This two year MSc course has an emphasis on research while also providing taught modules to develop your knowledge and skills to an advanced level.**



**The course will provide a platform to enable you to succeed in the rapidly growing wireless and microwave communication industry, whether that be within industry or in academic research.**

## Special Features

You will be learning in a research-led teaching institution, taught by staff in one of the highest ranked university units in the 2014 Research Excellence Framework (REF), and will be able to work in modern facilities commensurate

with an internationally recognised research university.

The course aims to foster a research group atmosphere where you can enhance each other's learning and feel a part of a vibrant research community.

## Course Description

In terms of content, the course aims to develop your expertise in new and evolving areas of microwave engineering including mobile communications and the medical applications of microwaves. It will focus on areas such as advanced computer

aided design (CAD), measurement and characterisation, micro and nano technology and optoelectronics. You will also cover RF engineering, advanced fabrication and test, and non-linear RF design and concepts.

It will build research skills by supporting you to conduct a major research project in collaboration with our world class researchers or with another academic institution or research institute.

## Course Structure

The course is presented as a two-year full-time Masters level programme, in two stages. In the first year you will attend lectures and take part in lab and tutorial based study and will develop your ideas for the research project. After successfully completing the taught element of the course, you will then move on to a research year of 8 months leading to the submission of a significant research project and dissertation.

## Career Prospects

Upon graduation, you will have the training, skillsets and hands-on experience you need to succeed in this dynamic and highly competitive field, and will have a distinct edge when applying for PhD studentships or employment in industry.

## Entry Requirements

A 2:2 honours degree in Electrical or Electronic Engineering or a similar field from a good UK university or an equivalent international degree qualification.

Applicants whose first language is not English will be required to pass IELTS exams. Minimum requirements are an IELTS score of 6.5.

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# MSc Wireless and Microwave Communication Engineering with a Year in Industry

**This two year MSc course will develop your expertise in the latest areas of microwave engineering and mobile communications. It will also provide you with the opportunity to spend a year working in industry while you complete your research project and gain valuable professional experience.**

**You will also develop technical, intellectual and research skills that will enhance your general engineering competency and employability, providing you with an excellent platform for career development, whether that be within industry or academic research.**

## Special Features

This course will give you the basic knowledge and skills you require in the areas of wireless and microwave communication engineering while allowing you the opportunity to spend a year working in industry while you hone your professional skills and develop your research project.

You will also have the opportunity to receive a salary during the second year of the course to help fund your studies.

You will have access to well-equipped modern facilities commensurate with a world class research university. Your teaching will be complemented by guest lectures from industrial professionals and you will receive specialist academic support from your designated MSc Tutor during the course.

The School aims to foster a research group atmosphere where you and your fellow MSc candidates can enhance each other's learning and feel part of our vibrant research community.

This MSc meets the Bologna requirements for a 2 year Master's programme.

## Course Description

The course comprises a taught element in the first two semesters in which you will acquire expertise in mobile communications, medical applications of microwaves, computer aided design, measurement and characterisation, and communication systems engineering. You will learn about advanced engineering management in addition to RF engineering and non-linear RF design and concepts. You will also study micro and nano-technology along with optoelectronics.

## Course Structure

The course is a two year full-time programme which comprises two semesters of taught modules in the first year.

After successfully completing this first taught stage you will then undertake a 10 month industrial placement which will lead to the submission of a portfolio of work worth 120 credits. We will support you to find a placement which will allow you to experience a professional working environment and you will be paid a salary while working in industry. This experience will give you the training and practical industrial experience you need to gain employment in this fast growing field and will enhance your employability skills.

At the conclusion of your placement year, as part of your portfolio, you will also submit a dissertation based on your research project.

## Career prospects

Career prospects in this field are generally excellent, with graduating students following paths either into research or related industry.

If you are interested in working in industry, many of our graduating MSc students achieve excellent employment opportunities in organisations including Infineon, Huawei, Cambridge Silicon Radio, Vodafone and International Rectifier.

## Entry Requirements

A 2:2 honours degree in Electrical or Electronic Engineering or a similar field from a good UK university or an equivalent international degree qualification.

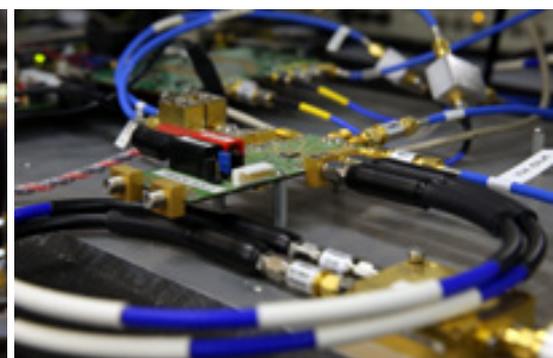
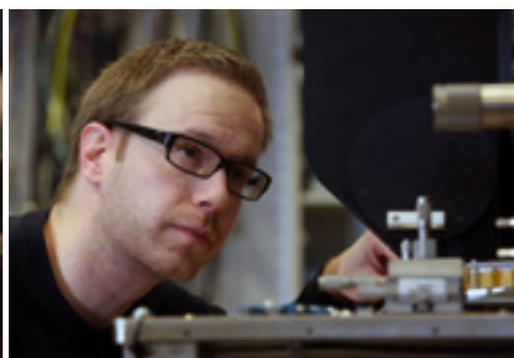
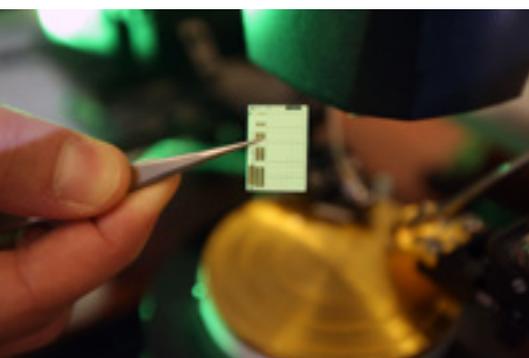
Applicants whose first language is not English will be required to pass IELTS exams. Minimum requirements are an IELTS score of 6.5.

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# What our students say about our courses

## Kat Page

MSc in Civil and  
Geoenvironmental Engineering

"The Geoenvironmental Engineering MSc appealed to me because there was a broad range of topics I was interested in, but I also had flexibility to focus on areas of interest through optional modules and the dissertation project.

I continue to use these skills in my current role as a consultant. The postgraduate study helped me to gain employment and I have since progressed quickly in my field. My employer supports postgraduate study and finds graduates that have completed master's or PhDs 'have developed their research skills, have tested their knowledge and developed their communication abilities."

## Javier Rodriguez Corral

MSc in Civil Engineering

"In October 2015, just after finishing my MSc in Civil Engineering at Cardiff, I started a PhD in Newcastle University in the School of Architecture, Planning and Landscape.

One thing I will always be grateful for to Cardiff University is the amount of resources and expertise you are provided with during the execution of research projects. Cardiff University is one of the best universities in the UK in terms of research, and this helped me a lot when applying for my PhD.

Finally, besides the academic quality of Cardiff University and the excellent facilities, the best thing about studying in Cardiff is the number of international students you constantly meet, which enriches you culturally, and the friendliness and kindness of Welsh people."

*One thing I will always be grateful for to Cardiff University is the amount of resources and expertise you are provided with during the execution of research projects.*

## Daniel Clifford

MSc in Electrical Energy  
Systems

"I found the course particularly interesting as most of the coursework has practical applications and is relevant to what is currently occurring within the electricity industry. The staff are very approachable and helpful. I was lucky enough to be recruited by Alstom Grid during my studies and started working pretty much as soon as I handed in my dissertation. I enjoyed the diversity of the students at the School of Engineering and met students from Brazil, Greece, Germany, Nigeria, China, Japan and my home country Ireland."

## Abbas Ibrahim

MSc in Communication Technology  
and Entrepreneurship

"I am currently working as a Software Developer for the Ministry of Commerce and Industry, Oman. I successfully studied for the MSc in Communication Technology and Entrepreneurship, which naturally awakened entrepreneurial ambitions in me. When I started off with my Master's project of designing a business plan, it armed me with the tools of running, managing and scaling growth of a business. As I graduated with the proof of concept in my hand and theoretical knowledge by my side, I embarked upon my own start-up journey. Currently, I am midway through the business plan development for a LAN Gaming Centre.

Studying at Cardiff University was a life-changing experience for me. Cardiff is a vibrant, dynamic and safe city in Wales where you are sure to bump into friendly people and enjoy all the best perks of living in a modern European metropolis!"

*The postgraduate study helped me to gain employment and I have since progressed quickly in my field.*

## Elango Nagasundaram

MSc in Wireless and Microwave  
Communication Engineering

"I studied the MSc in Wireless and Microwave Communication Engineering part-time whilst working as a Senior Test Technician. Thanks to this engineering degree I have secured a position as an engineer in the same firm. Cardiff University has a very stimulating learning atmosphere. Everyone is really friendly and lecturers are always there to help. I would recommend this course to anyone interested in RF/microwave engineering and research."



*Cardiff University has a very stimulating learning atmosphere.*

# International students

Cardiff University has a long tradition of welcoming international students. Over 4,000 students from 100 countries enjoy the many benefits of a diverse student population.

## Supporting International Students

Once you have been made an offer, you will receive advice on matters such as immigration, visas, healthcare, climate and living and studying in Cardiff.

Before you arrive at the University you may be worried about settling in, making friends and life in the UK. The International Office aims to make your transition as smooth as possible with an induction programme in September and January.

### The September induction programme includes:

1. A free collection service from Cardiff and Heathrow airports. International Office staff will provide a warm welcome at the airport and take you and your luggage to your accommodation.
2. Practical information and fairs to help you settle quickly into living and studying in Cardiff.
3. Tours of the University and the city of Cardiff to help you find your way around.
4. Social events and parties including traditional Welsh dancing. These are a great way to make friends.
5. A bank letter service to help you open a bank account when you arrive in the UK.
6. A coach tour of South Wales. Visit some of Wales' historic monuments with the International Office.

## International Office

Throughout your studies, support and advice is available from a number of sources both within your School and the University as a whole. These include your academic tutors and supervisor, the Student Advisory Service and the Careers Service.

## English Language Support

Our English Language Programmes Section provides English language courses to full-time international students studying, or intending to study, at Cardiff University. Language and study skills courses are offered throughout the year for periods from a few weeks to a full year to improve your level of general and academic English.

Our Pre-sessional Programme in English for Academic Purposes is particularly popular. These are full-time, intensive summer courses of between 8 or 11 weeks in length and are designed specifically to prepare students starting degrees at Cardiff University for academic study. Places on the courses are limited so students holding conditional offers are encouraged to apply as soon as possible.

Once you are enrolled as a full fee-paying international student, you can select from a range of free and optional English language support classes. The courses run part-time so you can fit language development around your studies. We are an IELTS Test Centre.



## Further Information:

### International Office

Email: [international@cardiff.ac.uk](mailto:international@cardiff.ac.uk)

Tel: +44 (0)29 2087 4432

Fax: +44 (0)29 2087 4622

[www.cardiff.ac.uk/study/international](http://www.cardiff.ac.uk/study/international)

### English Language Programmes Section

Email: [elt@cardiff.ac.uk](mailto:elt@cardiff.ac.uk)

Tel: +44 (0)29 2087 6587

Fax: +44 (0)29 2087 6141

[www.cardiff.ac.uk/elt](http://www.cardiff.ac.uk/elt)



# Funding your postgraduate study



**Securing funding is an important consideration for many postgraduates. Most funding sources are highly competitive, so it is essential to start researching your funding options as early as possible.**

**In most cases, you will need to have been offered a place to study in order to obtain financial support; therefore it's important that you apply for your chosen programme of study well in advance of the deadlines for any funding applications you intend to make.**

You should research your funding options early to ensure that you can meet application deadlines. Even if you can't find full funding for your programme, you may be able to find funding from a number of different sources.

In fact, many of our students have funded their programmes through a combination of the sources listed below.

- ▶ Through our Master's Excellence Scholarship scheme, we are committed to investing up to a total of £500,000 in this competitive scheme, to support high calibre home students.
- ▶ We run a highly prestigious international scholarship scheme to support exceptional international students
- ▶ International students are also advised to investigate funding opportunities offered within their own country, the British Council and other external funding providers
- ▶ Our Unistaff Jobshop can help you secure part-time, casual and regular employment
- ▶ UK government postgraduate loans for master's programmes are available for those home students who fulfil the eligibility criteria
- ▶ Charities, trusts and foundations offer a wealth of funding for postgraduate study.
- ▶ Many course websites offer scholarship competitions to prospective students
- ▶ Crowdfunding and peer-to-peer loans are new, innovative means by which other postgraduate students have funded their studies.

## Further Information:

### Cardiff University websites:

(UK/EU students):

[www.cardiff.ac.uk/postgradfunding](http://www.cardiff.ac.uk/postgradfunding)

(International Students):

[www.cardiff.ac.uk/study/international](http://www.cardiff.ac.uk/study/international)

### External websites:

Graduate Prospects:

[www.prospects.ac.uk](http://www.prospects.ac.uk)

British Council:

[www.britishcouncil.org/learning](http://www.britishcouncil.org/learning)

Professional and Career

Development Loans:

[www.direct.gov.uk/cdl](http://www.direct.gov.uk/cdl)

Students' Union Jobshop:

[www.cardiffstudents.com](http://www.cardiffstudents.com)

# Making your application

## When should I apply?

Applications will be considered throughout the year. However, early application is advisable especially if you are seeking funding. Many funding opportunities have early deadlines and will require you to have an offer from your chosen institution.

## Submitting your application

Postgraduate taught programmes start in September each year but applications are considered as they arrive throughout the year.

You can apply online, or you can download paper application materials from the website. It is recommended that you apply online as it is quicker, you can upload all your supporting documents and you can track your application. Full guidance notes are available and can be accessed at each stage of your application.

## Postgraduate Research (PhD/MPhil)

The application procedure for postgraduate research is the same as above, however you will also need to include a research proposal. You should also make contact with a member of academic staff who could act as a potential supervisor to your studies.

### To do this:

- 1 Look at the School website to see if there is a member of academic staff who matches your area of research.
- 2 Send an email to: [engineering-pgr@cardiff.ac.uk](mailto:engineering-pgr@cardiff.ac.uk) outlining your research interest and the name of the academic staff who could potentially act as a supervisor for your research project.

## International Students (non-EU countries)

We recognise qualifications from all over the world. Our web pages for international students has a dedicated section for many countries where you will find an overview of qualifications we consider.

Our International Office offers a personal and dedicated service to help international students with the application and transitional process to studying (see page 33). In addition to making your application, you must ensure that you have a valid visa to enter the UK prior to the start of your course.



## Your Offer

Most applicants will receive a decision within four weeks of applying. If you apply online, you can track the progress of your application via the applicant portal.

### There are two types of offer:

**Conditional:** you have been offered a place but something is missing from your application, e.g. you may need to provide evidence that you have completed a qualification. Once you have submitted evidence that you have met the conditions, your offer will become unconditional.

**Unconditional:** If you have received an unconditional offer, in most cases all you need to do is accept the offer to secure your place.

It is important that you keep us informed of any changes to your email or home address otherwise important correspondence may not reach you.

## Equality and Diversity

Whether you're thinking about coming to Cardiff University or you're already a student here, we want to ensure that we provide the best support to all our students. We are committed to promoting equality and diversity in all of our practices and activities, including those relating to student recruitment, selection and admission.

We aim to establish an inclusive culture which ensures equality of opportunity on the grounds of age, disability, gender, pregnancy and maternity, race (including ethnic or national origin, colour or nationality), religion or belief (including lack of belief), and sexual orientation.

## Disabilities/Special Needs

We are committed to providing an accessible environment for all students. You are encouraged to make contact prior to submitting an application to discuss individual requirements or to arrange a visit to assess the suitability of facilities. Please note disclosing a disability will not affect your chances of receiving an offer to study except where courses are subject to fitness to practice criteria.

For further advice please contact  
Email: [disability@cardiff.ac.uk](mailto:disability@cardiff.ac.uk)  
Tel: +44 (0)29 2087 0004

## Further Information:

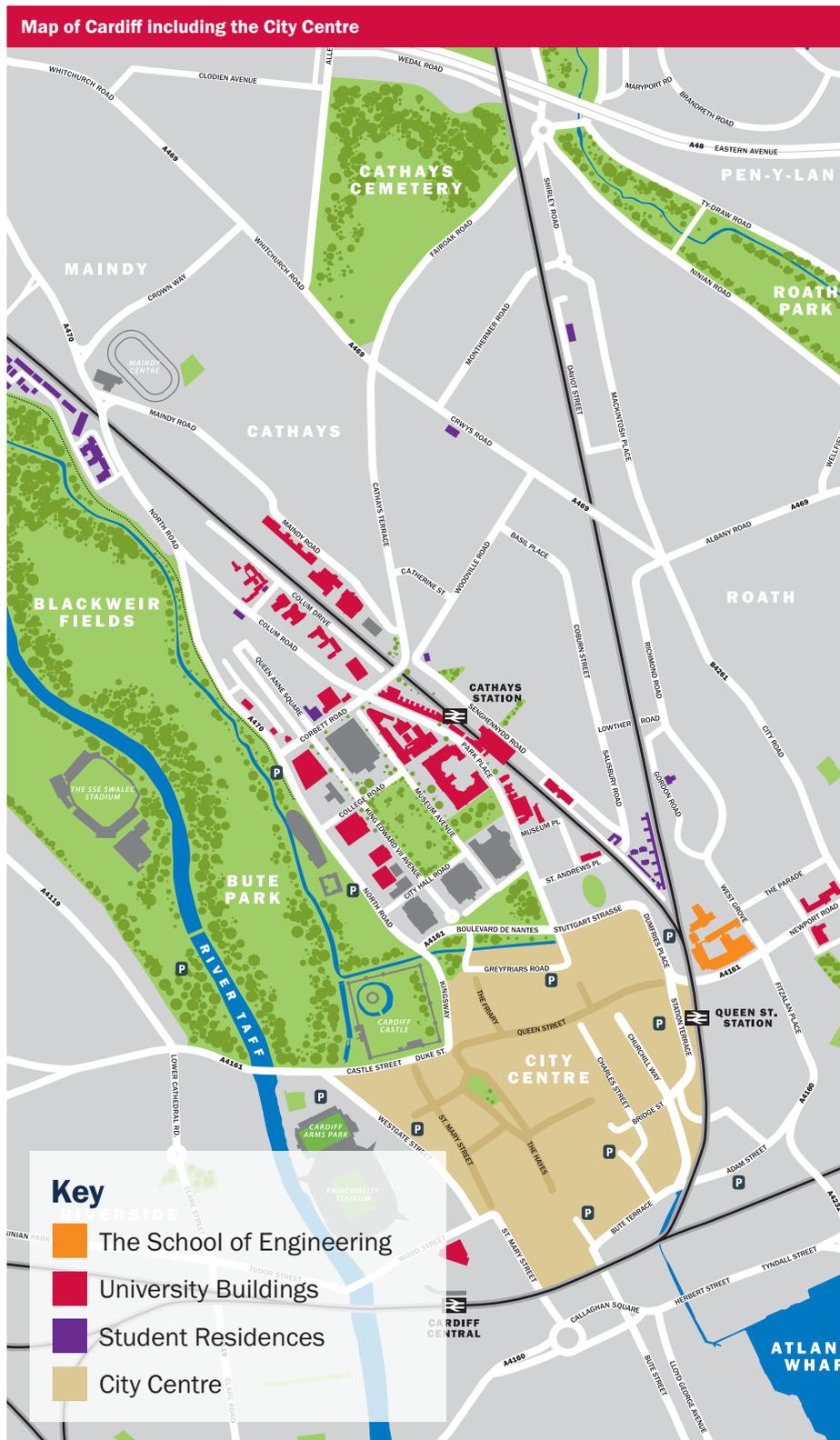
### Admissions Team

Email: [admissions@cardiff.ac.uk](mailto:admissions@cardiff.ac.uk)  
Tel: +44 (0)29 2087 9999

### Postgraduate Recruitment Office

Email:  
[postgradenquiries@cardiff.ac.uk](mailto:postgradenquiries@cardiff.ac.uk)  
Tel: +44 (0)29 2087 0084

# How to find us



## How to find us

The School of Engineering shares the £35 million Queen's Building complex with the School of Physics and Astronomy and the School of Computer Science and Informatics. The Queen's Building is located just off Newport Road at the centre of Cardiff; a short walk from Queen Street railway station and the city's main shopping and entertainment area.

### Terms and Conditions

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Tel: +44 (0)29 2087 4455

Email: [RobertsL9@cardiff.ac.uk](mailto:RobertsL9@cardiff.ac.uk)

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## School of Engineering

For further information contact:

Cardiff University School of Engineering,  
Queen's Buildings, The Parade, Cardiff,  
CF24 3AA, UK

Tel: +44 (0)29 2087 9999

Fax: +44 (0)29 2023 4716

Email: [engineering-pg@cardiff.ac.uk](mailto:engineering-pg@cardiff.ac.uk)  
[engineering-pgr@cardiff.ac.uk](mailto:engineering-pgr@cardiff.ac.uk)

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