



University of
Strathclyde
Glasgow



faculty of **engineering**

POSTGRADUATE PROSPECTUS 2011





Students relaxing in the Campus Village

Why Strathclyde?

EVERY YEAR, hundreds of postgraduate students make Strathclyde their first choice. It's largely because of our international reputation for world-class research facilities and the excellence of our teaching staff. But it's also because Strathclyde is a friendly and forward-thinking university based in the heart of Glasgow, one of Europe's finest cities.

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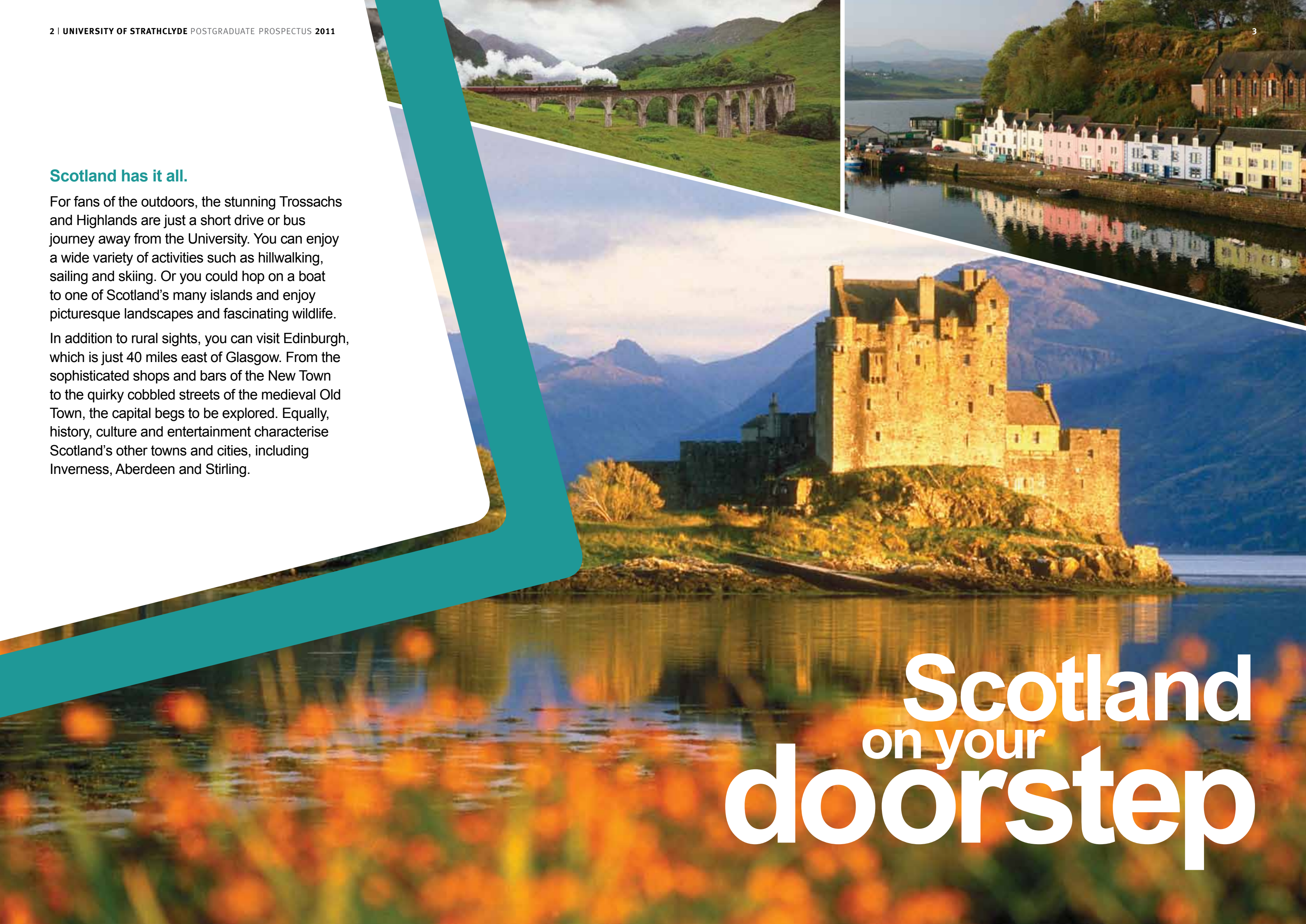
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We would like to thank Duncan A McPhee and Bethany Weeks for the use of their photos found on flickr.com (Strathclyde Business School sign and Royal College corner).

Scotland has it all.

For fans of the outdoors, the stunning Trossachs and Highlands are just a short drive or bus journey away from the University. You can enjoy a wide variety of activities such as hillwalking, sailing and skiing. Or you could hop on a boat to one of Scotland's many islands and enjoy picturesque landscapes and fascinating wildlife.

In addition to rural sights, you can visit Edinburgh, which is just 40 miles east of Glasgow. From the sophisticated shops and bars of the New Town to the quirky cobbled streets of the medieval Old Town, the capital begs to be explored. Equally, history, culture and entertainment characterise Scotland's other towns and cities, including Inverness, Aberdeen and Stirling.



Scotland on your doorstep

Glasgow is a place that you will quickly call home.

Scotland's largest city is well known for its friendliness and its sense of style. Elegant buildings, outstanding art collections, a flourishing music scene and fashionable bars, restaurants and shopping mean that you will never be at a loss for something to do and see.

Many of Scotland's arts organisations are based in Glasgow – the National Theatre of Scotland, Scottish Ballet, Scottish Opera and Royal Scottish National Orchestra, to name but a few. Glasgow is also home to the Mitchell Library, the largest public library in Europe, and Kelvingrove Art Gallery and Museum, Scotland's most popular visitor attraction.

Glasgow may buzz with life and activity, but it also provides plenty of opportunity to unwind. Did you know that 'Glasgow' means 'dear green place'? With more than 70 parks and green spaces, you can easily discover a haven away from the rush of modern urban life.

welcome to Glasgow



our vision

Solid foundations, modern thinking.

More than two centuries ago, Professor John Anderson shared his vision for a 'place of useful learning' and in doing so laid the groundwork for the University of Strathclyde.

We remain committed to Anderson's vision to this day. Strathclyde is a technological university, a leader in finding solutions to the challenges facing society. We are international in outlook, but locally grounded: we believe that the University must play an essential role in society through education, research and the development of new technologies and policies.



Our research underpins our education and knowledge exchange to make a significant impact on today's world.

Our research power and its continuing growth in areas of strategic importance – engineering, science, business and social sciences – were confirmed by the 2008 Research Assessment Exercise. The Strathclyde Business School was rated top in Scotland by a wide margin and in the UK top 10; we achieved the highest 'research power' rating for engineering in Scotland; and our performance was impressive in areas from across the sciences and social sciences.

Find out more on our website at
www.strath.ac.uk/research



our research



The University of Strathclyde has been established in the heart of Glasgow for over 210 years.

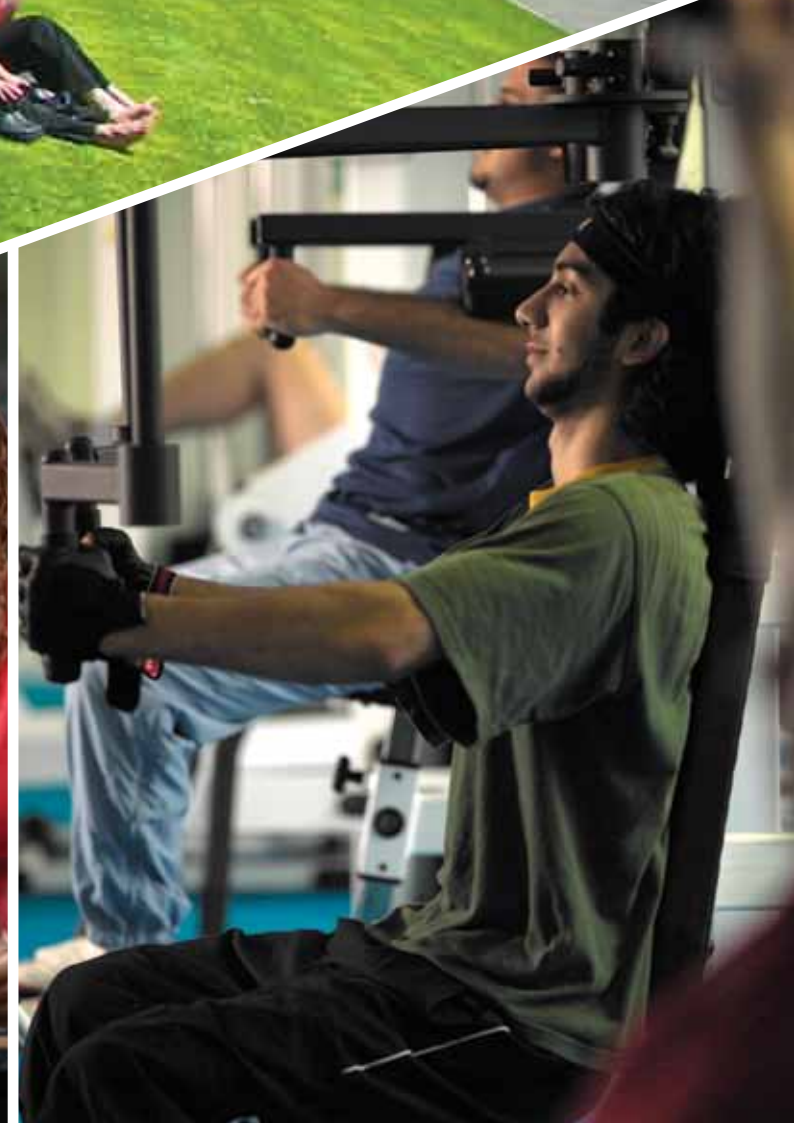
In choosing Strathclyde, you join a vibrant community of over 15,000 students from more than 100 countries, attracted by our academic reputation and stimulating environment.

Our students' Strathclyde experience is at the heart of what we do. During your time here, you will benefit from a range of support services, whatever your field of study and whatever type of degree you choose. We offer mentoring and support for early career researchers, training events and careers assistance for all students and targeted support and English language instruction for overseas students.

You will enjoy life on campus and in Glasgow, thanks to the many sports clubs and cultural activities available at the University and to the restaurants, shopping and nightlife available on your doorstep in the city centre.



your experience at Strathclyde



welcome to Strathclyde

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Information for prospective students



Choosing a university is an important decision. Before making that decision you will want to gather as much information as possible. The following should be among your first choices for advice and assistance:

THE UNIVERSITY WEBSITE www.strath.ac.uk

Here you will find a comprehensive range of information. Whatever your interest or field of expertise, whether you want to enrol in a taught course or undertake research, full-time, part-time, distance or open learning, our website provides the answer to many of your questions. And if you don't find what you are looking for right away, you will at least be guided to someone who can help.

INTERNATIONAL & GRADUATE OFFICE www.strath.ac.uk/igo

If you are interested in studying at Strathclyde as a postgraduate student, staff from the University's International & Graduate Office can give you all the help and advice you need to make your decision – from information about applying and courses to information specifically relevant to you, whatever your circumstances, wherever you're from.

If you live outside the UK, the University also has representatives in many countries around the world. You can find a list on the International & Graduate Office website (see above).

We know that you may have queries about the course you are applying to and about life in Glasgow. Throughout the year, University staff attend education exhibitions in the UK and abroad at which you can find out more about the University and about studying at Strathclyde. The International & Graduate Office

website lists the dates of these events and we can send you details of opportunities to meet staff or, if you wish, to visit the University. If you would like to visit the University, please contact us.

CONTACT

International & Graduate Office, University of Strathclyde
50 George Street, Glasgow UK, G1 1QE
t: +44 (0)141 548 2913
e: pgenquiries@strath.ac.uk (within UK/EU)
e: international@strath.ac.uk (non-UK/EU)

If you have any queries regarding your proposed course of study, please see the departmental contact information listed in each course description in this prospectus.

BRITISH COUNCIL www.britishcouncil.org

The British Council represents British higher education around the world. Contact a British Council office in your home country.

DID YOU KNOW?

If you are an overseas student paying full-time international student fees, you are entitled to four weeks pre-session English language tuition and four hours per week in-session tuition – all for free.

Before you apply

ENTRY REQUIREMENTS

The University admits students with a range of both academic and professional qualifications. In addition to an appropriate academic qualification (generally a strong undergraduate degree, or equivalent qualification), some courses require relevant professional or work experience.

The University welcomes applications from candidates with degrees or other qualifications from overseas institutions. If you are unsure whether your qualification is acceptable to the University, please contact the International & Graduate Office for further advice. You can also check the International & Graduate Office website for entry requirements specific to your country at: www.strath.ac.uk/igo/prospective

APPLICATIONS

Applications can be made online. The applications process is detailed at: www.strath.ac.uk/prospectus/postgraduateapplications

There is no formal closing date for most postgraduate applications but we advise you to apply as soon as possible, preferably by the end of March for entry in September. Applications are considered and decisions given on a rolling basis by most Departments; exceptions to this will be specified in the relevant course entry.

If you wish to be nominated by the University for any scholarship or funding, we recommend that you apply as early as possible.

ENGLISH LANGUAGE REQUIREMENTS

If English is not your first language, you must provide evidence of your proficiency in English before starting your course. We accept a number of English language qualifications, but the IELTS (International English Language Testing Service) or the TOEFL (Test of English as a Foreign Language) exams are the most widely accepted:

- > **IELTS:** Overall score required for postgraduate study is generally IELTS 6.5 or equivalent. For information about taking the IELTS exam, contact the local British Council Office in your own country or look at the IELTS website at: www.ielts.org
- > **TOEFL:** Overall score required is 90-95 in the IBT (internet-based test). For information on the TOEFL, contact the US Embassy in your own country or look at the TOEFL website at: www.ets.org
- > Other tests and grades may be acceptable to the University and you should contact English Language Teaching or look on the International & Graduate Office website for advice on alternative English language tests.

Pre-study English tuition

If your proficiency in English is not at the required level, English Language Teaching (ELT) runs programmes to help, including the Postgraduate Diploma in English Pre-Entry Language Preparation and the summer English for Academic Purposes Pre-session module. The final four-week Pre-session module is offered free of charge to students who register for a degree programme at the University and who pay full international student fees for at least one academic year.

Ongoing English tuition

The ELT runs classes throughout the year to help you continue to improve your English. Students on full-time programmes paying international student fees can benefit from free tuition of up to four hours per week for as long as they are at Strathclyde. For details of these courses and other English language support services, visit our website.

CONTACT

t: +44 (0)141 548 3065/4478
e: elt@strath.ac.uk
w: www.strath.ac.uk/elt



UK'S POINTS-BASED SYSTEM OF IMMIGRATION

Tier 4 (students) from non-European Economic Area (EEA) countries and Switzerland who normally require a visa to study in the UK need to obtain 40 points in order to be given an Adult (General) Student Visa. Points are gained as follows:

- > A Visa letter (worth 30 points) will be issued by the University of Strathclyde when you accept our Offer of Study, meet any conditions mentioned in our Offer of Study and pay the University's standard deposit of £2,000. This is an advance payment and will be offset against the amount of your tuition fees. If you have an official financial sponsor you will not have to pay this deposit. You should send a copy of your sponsorship letter to the University's Finance Office and your Visa Letter will be issued.
- > You will be given the remaining 10 points when you provide evidence to the Entry Clearance Officer who is considering your visa application that you have:
 - > the full amount of your tuition fee for your first year of study and maintenance of £600 per month for the first nine months of your study
 - > an additional £400 per month for the same period for every dependent who may accompany you

You can keep up-to-date by checking these websites:

International & Graduate Office
www.strath.ac.uk/igo/pbs
UK Council for International Student Affairs
www.ukcisa.org.uk

Your Strathclyde experience



DID YOU KNOW?

- **Strathclyde was the first UK Business School to offer a one-year full-time MBA (in 1966). It was also the first to offer a distance-learning MBA.**
- **Strathclyde Law School was the first in Scotland to offer the LLB by part-time study.**
- **Strathclyde's postgraduate course in Environmental Entrepreneurship was the first in Europe, and its postgraduate course in Environmental Forensics was the first in the UK.**

Our Courses

OUR DEGREES

Strathclyde is one of the largest providers of postgraduate education in the UK. Taught Master's degrees (MSc, MBA, LL.M, MLitt, MArch, MEd) and Postgraduate Diplomas and Certificates (PgDip/PgCert) are offered in most departments, as are research degrees of PhD, MPhil, MRes, DBA, DEdPsy, EdD and EngD.

Taught Courses

The duration of most taught courses is one year normally starting in late September, at the beginning of the academic year. Taught courses involve a combination of formal lecture and/or seminar programmes and a great deal of emphasis is placed on individual study. As well as attending classes, you will be expected to spend time studying on your own, either working on group or individual assignments or developing your knowledge through reading. You will be assessed at various points throughout the academic year through examinations, assessed coursework, group work and seminars.

Many courses conclude with a project on a relevant topic of your choice. These courses are intended to provide advanced knowledge or techniques in specialised aspects of subjects you studied more generally at undergraduate level. Some taught courses also serve as conversion courses for those who wish to change disciplines, upgrade their knowledge within a discipline or prepare for further study.

Research Degrees

Registration for research degrees normally takes place in September, although it is possible to start at other times. The aim of a research degree is to provide a thorough training in a particular subject area through original exploration and experiment, culminating in the preparation of a thesis setting out the conclusions of the research you have undertaken. You will be working on your own under the guidance of an academic supervisor and your progress will be monitored through regular meetings and submission of your research findings.

COURSE STRUCTURE

Many of our programmes can be undertaken full-time, part-time, or on a modular basis. Distance or open-learning options are also available on some courses. Please note that non-EEA (European Economic Area) international students are not eligible for part-time study programmes based in the UK due to visa restrictions.

Careers & Work Experience

Whatever your reasons for embarking on postgraduate study, your career development is an integral part of your postgraduate education. Undertaking a postgraduate course at Strathclyde means that you will be able to benefit from one of the UK's best university careers services. Our Careers Service has been awarded the Government's Charter Mark for the quality of its service five times and in 2009 came joint 2nd in the UK in an employer-commissioned student satisfaction survey. Its resources and advisers can help you to make the most of your qualification, whether you are in a taught or research degree.

The Careers Service can help you to plan for the future by:

- > thinking through your career options
- > finding out about vacancies in our careers resource centre or via our website – we have information on hundreds of graduate occupations and national and international employers
- > improving your presentation to employers in applications, interviews and assessment centres through seminars or with individual assistance from experienced, professional careers advisers

The Careers Service maintains close links with a wide range of employers who advertise vacancies on our website and meet students at presentations in the autumn and spring.

Some courses provide a work placement experience; these are noted in the relevant course entries in this prospectus.

CONTACT

Careers Service
t: +44 (0)141 548 4320
e: yourcareer@strath.ac.uk
w: www.strath.ac.uk/careers

Money Matters

COST OF LIVING

Glasgow is one of the most affordable places to live in the UK. Your living costs will depend on your lifestyle and the type of accommodation you choose, but on average the weekly costs as a student in University accommodation are approximately £140-170. These figures are based on the costs of self-catering accommodation and other weekly expenses of around £75. You should also budget for up to £500 for items such as books, bedding, stationery, clothing. In the private sector you might pay £65-85 per week for a room in shared accommodation, usually excluding heating. If you are looking for a place to house your partner and/or family, you would pay between £110-£150 per week, depending on the size and location of the apartment. A total estimate for a postgraduate academic year based on 12 months/50 weeks is between £7,000 and £9,000.

TUITION FEES

Please note that your tuition fees will depend on what course you are studying and where you are from. The fees shown in the box (see pg 18) are an average and intended as a guide only. Fees for 2011/2012 may be up to 3% higher and will be confirmed in March 2011. The cost of your course will be available from the Department contact included in each course listing.

Several courses, particularly within the Strathclyde Business School, have non-standard fees and you should contact the relevant Department or the IGO to clarify the tuition fees for your course.



POST-STUDY WORK

Non-EEA students who study in Scotland and graduate from a Scottish university or further education college and gain a Higher National Diploma (HND), first degree, Master's degree or PhD can apply under the Tier 1 (Post-study work) scheme for a two-year extension of their leave to remain (visa) in order to look for work in the UK. A post-study work visa offers you a bridge to either the highly skilled or skilled work categories and you are expected to switch into one of these categories as soon as possible.

The Relocation Advisory Service is a one-stop-shop information centre offering a seamless service that simplifies the process for people to relocate to Scotland to live and work. For further information please visit: www.scotlandistheplace.com

SCHOLARSHIPS & FINANCIAL HELP

The University offers a range of scholarships for UK, EU and overseas students. The University has a searchable database of scholarships and bursaries:

www.strath.ac.uk/search/scholarships

The University's Careers Service has various information resources to help with postgraduate study and funding enquiries. Funding information includes the Grants Register, scholarship and sponsorship information:

www.strath.ac.uk/careers/postgradstudy

There are also many funding opportunities available through individual Departments or tied to specific courses and made available from industry sponsors or partners, research councils, etc. Check with the Department responsible for your course. If you are a research student, you may be able to supplement your income by undertaking paid work within your Department.

Applying for Scholarships

In order to apply for a scholarship, you must first have applied for a course of study. Information on how to apply for each scholarship is listed on the scholarship database under each scheme. Contact us if you have any questions on the scholarship database or applications for scholarships: **scholarship.enquiries@strath.ac.uk**

Your Strathclyde experience



Other sources of funding – EU and European Economic Area (EEA) Students

If you are an EU national, you are eligible to apply for the same awards as UK students to cover your tuition fees. You may be eligible to receive maintenance support if you have been living in the UK for three years excluding for study purposes, immediately prior to the study period. You should consult the Course Director or Head of Department to find out if funding is available for the course or research area you are interested in, as such awards are limited.

There is general information for EU students available at: <http://ec.europa.eu/ploteus>

Other sources of funding – international students

If you are an international student from a non-EU/EEA country, you should explore funding opportunities in your home country at the same time as applying for funding in the UK. Contact your Ministry or Department of Education, local British Council Office, British Embassy or High Commission.

Some international agencies such as UNESCO, the World Bank, the World Health Organisation and the European Commission operate funding schemes, usually for students from developing countries. Voluntary organisations such as religious bodies and charities sometimes award modest scholarships. The following websites have details on scholarships and funding sources:

- > www.prospects.ac.uk/links/fundstudy
- > www.ukcisa.org.uk
- > www.iefp.org
- > www.studentmoney.org
- > www.acu.ac.uk
- > www.InternationalScholarships.com
- > www.unesco.org
- > www.postgraduatestudentships.co.uk

Funding Enquiries

UK students

The University's Student Finance Office offers information and advice to UK students considering postgraduate study or who encounter financial difficulties during their studies. The

office monitors the financial support available from Government and other sources. Assistance is available through the Discretionary and Childcare funds for students experiencing financial hardship.

CONTACT

e: s.finance@strath.ac.uk

w: www.strath.ac.uk/finance/student



TUITION FEES 2010/2011 FULL-TIME POSTGRADUATE TAUGHT COURSES

Overseas students (non-UK, non-EU)

> Faculty of Engineering	£12,600
> Faculty of Humanities & Social Sciences	£9,800
> Faculty of Science	£12,600
> Strathclyde Business School	£9,800

Home Students (UK & EU)

> All Faculties	£3,400
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Academic and Study Support

To enhance the learning experience at Strathclyde students can expect support from their Department, but also from services provided across the University.

INFORMATION TECHNOLOGY

www.strath.ac.uk/its

The University enjoys world-class IT facilities, with over 30 computer labs, most operating on a 24-hour basis and supplied with a vast range of industry-standard and academic software relevant to your studies.

- > John Anderson Campus – over 810 PCs with Microsoft Office software in 22 central PC labs and two SunRay labs of 20 terminals each, all with Internet and email access. There are also over 350 PCs available in the Library, in addition to generous laptop areas, for drop-in use. All labs except those in the library are available 24 hours a day
- > Jordanhill Campus – two central teaching labs with 66 PCs and Apple Macs, all with Internet and email access. There are also 50 PCs available on a drop-in basis in the Library

All students are provided with a University User Account which includes free email, web access, access to various online learning environments, and 50MB of backed-up disk space for the duration of your studies. You will also enjoy access to:

- > IT support facilities on both campuses
- > network connection points in all student residences and a Virtual Private Network allowing access to off-campus users
- > a Virtual Learning Environment in which learners and tutors participate in online interactions of various kinds, including online learning and assessment
- > 400 wi-fi zones keeping you contacted, when and where you need it – in teaching rooms, cafés, libraries, and even in the gardens!
- > serviced laptop user areas for both individual and group study
- > a secure web-based portal giving access to personal, individual curriculum and academic information
- > university-run retail facilities on both campuses providing a vast range of computer consumables at preferential prices.

LIBRARY FACILITIES

www.lib.strath.ac.uk

The University has two libraries, one on each campus, providing a total of 2,000 reader places.

The Andersonian on the John Anderson campus caters for the majority of subjects studied at Strathclyde and is particularly strong in science, engineering, technology, language and literature, business studies and management. The Jordanhill Library mainly serves courses in education, community and social work, speech and language therapy, music, sport and journalism studies.

The Library as a whole holds 1,012,500 volumes, including increasing numbers of electronic books and receives more than 7,000 periodicals in print and electronic form. Electronic items can be accessed at any time from any suitably-enabled computer.

There is an open-access print Short Loan Collection, as well as e-books and digitised collections of exam papers and other learning materials. Other digital services include online access to British Standards and Codes of Practice, as well as databases in a range of subject areas with links to full-text electronic



sources. The Library holds an important collection of Government publications and documents published by other international agencies. It is responsible for the historical archives of the University and also contains the special collections of rare books and other materials.

FACT FILE: ACADEMIC SUPPORT



The Centre for Academic Practice & Learning Enhancement provides services tailored for postgraduate students, including seminars and workshops in areas such as oral presentation and academic writing, personal effectiveness and critical information handling. For details visit www.strath.ac.uk/caple

Your Strathclyde experience

Accommodation

www.strath.ac.uk/accommodation

Glasgow is one of Europe's most exciting and beautiful destinations, combining the energy and sophistication of a great international city with some of Scotland's most renowned spectacular scenery on its doorstep. Served by two international airports and with easy connections from London, Edinburgh or other major cities, Glasgow is very accessible.

The University sits in the heart of Glasgow, only a short walk from the city's main railway stations, 20 minutes drive from Glasgow International Airport and 45 minutes by train from Glasgow Prestwick International Airport.

University Accommodation

The University has accommodation for around 2,000 single students in self-catering flats in the heart of Glasgow. Most students live on campus in the Student Village, with a further 400 in University accommodation within five minutes walking distance of the campus.

> Accommodation eligibility

Full-time students who are new to Glasgow and live at least 25 miles outside the city are given priority for a place in University accommodation. University accommodation is guaranteed for all single students paying fees at the overseas rate provided they apply before the application deadline. If we cannot offer University accommodation, we will help you to find accommodation in the private rented sector.

> Couples/families

The University leases two flats suitable for couples in the city centre and owns and manages 23 flats for families in Cumbernauld, about 12 miles east of Glasgow.

> How to apply for accommodation

Applications will be accepted from January. Places will be confirmed after firm offers of academic admission have been made.

CONTACT

Barbara Manson,
Accommodation Services Manager
t: +44 (0)141 548 3454/3561
e: student.accommodation@strath.ac.uk

The Private Rental Sector

There has been a dramatic increase in the availability of rented accommodation in the private sector in Glasgow, particularly in areas close to the University. There are three main types of accommodation generally available – shared furnished flats (apartments), self-contained flats or rooms within family homes. The University's Accommodation Office operates PAD (Private Accommodation Database), a web-based service putting students and landlords in contact. Although private flats are not inspected by the University, generally the quality is reasonable and the price affordable.

If you plan to bring your family to Glasgow, we advise you to do so only after you have found suitable, affordable accommodation. As a guide, the cost of a reasonable flat in the private rented sector is £450 to £600 per month, depending on the size of the property. Our Accommodation Office can provide help and advice about contracts, tenancy agreements, and the relevant gas safety and multiple occupancy requirements.

Information and assistance can be obtained from the Accommodation Office website (see above).

Student Experience Service

www.strath.ac.uk/studying/prospective

The University provides a range of support services to help ensure that all of our students enjoy their time here. We can offer practical advice and support in every aspect of student life, from finance to faith, throughout your time at Strathclyde. You can access more detailed information on our website (above).

INTERNATIONAL COMMUNITY

The University's lively and varied international student population comes from over 100 countries and is fully integrated into university life.

We provide expert advice and support to our international community and can help with student visa extensions, immigration advice, advice on working in the UK, financial queries, advice on travelling outwith the UK, general welfare issues and general support.

CONTACT

e: international.adviser@strath.ac.uk

STUDENT COUNSELLING SERVICE

Confidential support and counselling is available to all students. We have specialised staff to address any University matters or student welfare issues and who can provide individual assistance with your personal or academic concerns.

CONTACT

e: scs@strath.ac.uk

STUDENT FINANCE AND WELFARE

www.strath.ac.uk/finance/student

The Student Financial Support Team offers information and advice, including details of the latest changes in Government policy on student finance. If you have questions regarding fees, bursaries or scholarships, please contact us.

If you encounter financial difficulties during your time at University, there is a Discretionary Fund for students with serious money problems, and a Childcare Fund, which may be used to help with childcare costs, as well as other possible sources of assistance. The University can make short-term loans to students in difficulty or assist with Career Development Loans, welfare benefits or budgeting advice, and we also provide assistance or information relevant to students in particular categories (ie part-time or mature students).

CONTACT

Student Financial Support Team
Student Experience Service
t: +44 (0)141 548 2753
e: s.finance@strath.ac.uk

HEALTH

The University's Student Health Service has regular clinics and specialist advice is readily available in all fields of medicine. All students register with a local doctor. International students on courses longer than six months are eligible for benefits of the National Health Service, which means consultations with a doctor and hospital treatment will not cost you anything.

If your course is less than six months long, you may still be eligible for treatment under the NHS if you are from a country that



has a reciprocal health agreement with the UK.

Check www.dh.gov.uk for details.

To receive any treatment through the NHS you have to be registered with a doctor (GP). The Student Health Service can give you information about local GPs. Students from some countries are required to have a TB screening test at registration and the SHS will arrange this.

If you are not entitled to NHS treatment you will have to pay the full cost of any treatment you receive in the UK. This can be expensive, therefore we would advise you to have medical insurance that covers you while you're living abroad.

Student Health Service

The Student Health Service helps students with any physical or emotional problems. Hospital-based doctors run a clinic on the John Anderson Campus twice daily during term and a family planning/healthcare clinic weekly return.

CONTACT

e: studenthealth@strath.ac.uk

DISABILITY SERVICE

The Disability Service offers advice, support and practical assistance to students and University staff so that students with any medical condition or disability (seen or unseen) can derive equal benefit and enjoyment from studying at Strathclyde.

Disability advisers identify effective strategies, assistive equipment or software, facilities or services which can support you during your time at Strathclyde. This might include mentoring, study skills sessions, or accessing support with communication or note-taking in lectures. The University's Assistive Technology advisers can help identify appropriate technology to support you, and can provide ongoing advice, assistance and training.



Your Strathclyde experience

The Disability Service can formally communicate any reasonable adjustments to your department about your teaching and assessment requirements, such as extra time in exams or advance copies of lecture handouts. The department is not informed of the nature of your disability. There is also a disability contact within each department.

The Disability Service also provides courses, such as the Effective Learning Programme and training in the use of assistive software, such as Mind Genius and Read and Write. These help you to make the most of university facilities and teaching, as well as providing an opportunity for you to meet other students.

Students with mobility difficulties or problems relating to stamina may find the steep hills and busy roads of the John Anderson campus a challenge, but most classes can be timetabled in rooms that are accessible, and the Disability Service will identify the most accessible routes or provide help in the event that a class is not in accessible premises.

You can read about support on the Service's website, where you can also access the University's Disability Policy. Please ask if you would like any of this information in another format.

CONTACT

Disability Service

t: +44 (0)141 548 3402

Minicom: +44 (0)141 548 4739

e: disabilityservice@strath.ac.uk

w: www.strath.ac.uk/disabilityservice

CHILDCARE

For children under five there are childcare facilities, playgroups, nurseries and after-school care throughout the city. These can be very expensive and the Hardship Fund receives money from the UK government which can be used by UK students with children who find it difficult to meet the cost of childcare. The funding does not extend to international students; however, the financial support team in the Student Experience Service would be happy to discuss your situation with you.

All children between the ages of 5 and 16 must attend school while they are in Glasgow. The children of all students (UK and non-UK) will be given places, at no cost, in a primary or secondary school in the area in which you are living. Contact the Head Teacher to check if there is a place available. In the case of non-UK students, the Head Teacher will assess your child's English language and make arrangements for them to be given assistance if required.

CONTACT

t: +44 (0)141 553 4125

CHAPLAINCY CENTRE

The Chaplaincy centre offers a welcome to all students. The atmosphere is relaxed and comfortable; the lounge is a great meeting point or a place to make new friends and the Ark Café



offers great value for lunch. You can study in the library, have quiet contemplation or worship in the chapel, or just relax in the television room. The Chaplaincy is a place where people of different faith traditions can exchange ideas and learn from each other.

The Chaplaincy Centre is opposite the Students' Union building on our main campus. There is a Chaplaincy base on the Jordanhill Campus with similar drop-in space where all are welcome.

CONTACT

t: +44 (0)141 548 4144

e: chaplaincy@strath.ac.uk

w: www.strath.ac.uk/chaplaincy

MUSLIM STUDENTS' FACILITIES

There is a Muslim Students' Association representing the interests of the Islamic community at Strathclyde. Prayer rooms for men and women and space for other activities are provided in the lower level of the Chaplaincy building on John Street, opposite the Students' Union.

Sports

Sports Union

Joining the Sports Union is a great way to meet people. The Sports Union provides competitive and recreational sport for the whole University community. It organises and coordinates the running of around 40 affiliated clubs and provides financial support, travel, coaching, equipment, catering and encouragement. All clubs cater for both the serious competitor and those who play just for fun, and all can offer tuition.

CONTACT

e: sportspresident@sportsunion.strath.ac.uk

w: www.sportsunion.strath.ac.uk

Centre for Sport & Recreation

The Centre for Sport & Recreation provides excellent facilities for a wide range of sports, as well as fitness classes, martial arts and weight training. There is a cardiovascular suite with more than 50 machines and a swimming pool, as well as facilities for outdoor sports such as football and hockey. Also available are fitness testing, health and lifestyle consultation, sports coaching classes and swimming and lifesaving classes. The Centre also provides facilities for many of the sports clubs run by the Students' Sports Union.

CONTACT

t: +44 (0)141 548 2784

w: www.strath.ac.uk/sport

University Sports Bursaries

The University, in conjunction with Glasgow City Council, offers a number of Sports Bursaries each year to gifted athletes who wish to develop their sporting careers in conjunction with their academic studies. Bursaries, worth up to £1,000 each, are intended to help with costs such as coaching, competition travel and equipment. Bursars also enjoy additional sports science and lifestyle management support.

CONTACT

Anne-Marie Hughes

t: +44 (0)141 548 2449

e: a.m.hughes@strath.ac.uk

Golf Bursaries

Royal and Ancient Golf Club Bursaries are available to full-time students on the basis of golfing merit. Each bursary is worth £1,500 annually and will be awarded for a maximum of four years, subject to satisfactory academic and golfing progress. A programme of coaching sessions to current Scottish Golf Union standards is an integral part of the Bursary Scheme.

CONTACT

Niall Sturrock

t: +44 (0)141 548 2782

e: n.sturrock@strath.ac.uk



Students' Association

www.strathstudents.com

Strathclyde Students' Association represents students both within the University and to the wider community. Facilities and activities on offer include bars, films, ceilidhs, comedy and band nights, access to over 40 sports clubs, 50 other clubs and societies, shop, bank, printing facilities, and more. There are many ways for you to become involved in the Union's activities, and this is a great way to meet like-minded people and make new friends.

In addition to the social events on offer, the Union offers a wide range of services and opportunities for students. Our Students' Association has spearheaded initiatives such as the Alternative Careers Fair, Green Week and the Booktrader Service, and has won numerous awards for offering a safe and socially responsible environment. Postgraduate students have a dedicated social space within the Union.

The Students' Association operates its own Advice, Support and Knowledge service (ASK), a student-run, staff-supported facility where you can get help with academic appeals, financial problems and personal matters, as well as general enquiries. The Union's welfare team also administer a confidential Nightline Service staffed by trained student volunteers.

The Students' Association also runs campaigns to improve the lives of students of all backgrounds especially those represented by the Union's liberation groups. These groups provide support for students and are a strong movement for challenging attitudes and pushing forward positive change.

Students play an important role in terms of the University's development, and there are opportunities to become involved in the Students' Association and as a Class Representative, participating in staff-student committees to discuss issues of relevance to students in your course. Visit the Student Union website and see what is on offer and how you can get involved.

CULTURAL ACTIVITIES

If you are interested in music and the arts, the University offers a number of opportunities for participation. Art exhibitions run free of charge throughout the year at the **Collins Gallery**, featuring a wide range of international and local artists in a variety of exciting media and including regular seminars and artist-run workshops.

www.strath.ac.uk/collinsgallery

The **Strathclyde Theatre Group** is open to anyone interested in theatre, regardless of experience, and operates as an informal academy for theatre and film arts in Glasgow. The Group is based in the University's Ramshorn Theatre, which hosts a full programme of music, comedy and theatrical productions and is a major venue in Glasgow's festival calendar.

www.strath.ac.uk/culture/ramshorn

The University's **Music Society** boasts an impressive range of large-scale musical groups open to all students of the University. These include a full symphonic wind band and big band, two choirs and a full-scale symphony orchestra, as well as a number of smaller groups and ensembles. The Society hosts weekly lunchtime concerts in the Ramshorn Theatre offering the best of live classical, jazz and traditional music.

www.strath.ac.uk/music

DID YOU KNOW?

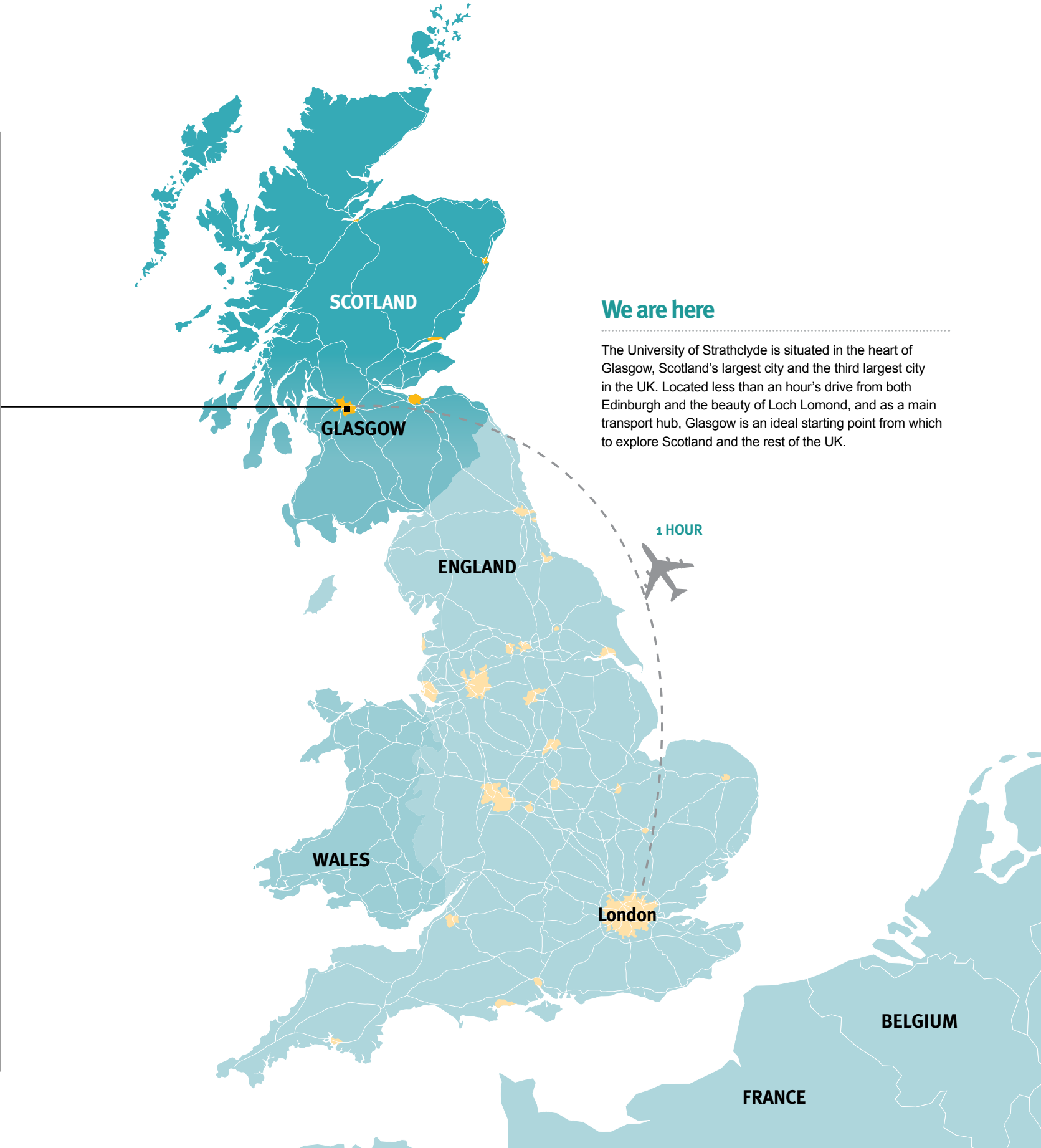
Our Postgrad Community website offers you online communication, information and resources. For everything you need to know about postgrad life at Strathclyde, from events to training and career opportunities, visit: www.strath.ac.uk/postgrad

Visiting

www.strath.ac.uk/visiting

There are several ways to visit or find out more about the University. You can take a virtual campus tour on our Visiting website (above), or you can visit the University. If you are based in the UK and wish to visit, contact pg-enquiries@strath.ac.uk or or **+44 (0)141 548 2913**.

If you are based outside of the UK, there may be a Strathclyde representative in your area. For information on overseas representatives, see www.strath.ac.uk/igo/prospective or, if you are in the UK and want to visit the University, contact international@strath.ac.uk or **+44 (0)141 548 2913**.



We are here

The University of Strathclyde is situated in the heart of Glasgow, Scotland's largest city and the third largest city in the UK. Located less than an hour's drive from both Edinburgh and the beauty of Loch Lomond, and as a main transport hub, Glasgow is an ideal starting point from which to explore Scotland and the rest of the UK.

Course list

Below is a list of postgraduate taught courses offered at the University of Strathclyde.
To download or request a copy of the Prospectus for any of our four Faculties, visit www.strath.ac.uk/prospectus

COURSE	DEGREE
ADULT GUIDANCE	MSc/PgDip/PgCert
ANALYSIS of MEDICINES	MSc/PgDip
ARCHITECTURAL DESIGN, ADVANCED	MArch/PgDip
ARCHITECTURAL STUDIES, ADVANCED	MSc/PgDip
AUTOMATED PLANNING FOR AUTONOMOUS SYSTEMS	MRes
AUTISM	MSc/PgDip/PgCert
BIOENGINEERING	MSc/PgDip/PgCert
BIOMEDICAL ENGINEERING	MRes
BIOMEDICAL SCIENCES	MRes
BUILDING DESIGN & MANAGEMENT FOR SUSTAINABILITY	MRes
BUSINESS ADMINISTRATION, Master of	MBA
BUSINESS ADMINISTRATION, Doctor of	DBA
BUSINESS ANALYSIS & CONSULTING	MSc/PgDip/PgCert
BUSINESS & MANAGEMENT, Master of	MSc/PgDip
BUSINESS & MANAGEMENT, Research Methodology in	MRes/PgDip/PgCert
BUSINESS INFORMATION TECHNOLOGY SYSTEMS	MSc/PgDip
CHARTERED TEACHER STUDIES	MSc/PgDip/PgCert
CHEMICAL PROCESSING (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
CHEMICAL TECHNOLOGY & MANAGEMENT	MSc/PgDip/PgCert
CLINICAL PHARMACY	MSc/PgDip
COACHING & MENTORING	MSc/PgDip/PgCert
COMMUNICATIONS, CONTROL & DIGITAL SIGNAL PROCESSING	MSc
COMMUNICATIONS MANAGEMENT, Master of	MSc/PgDip
COMMUNITY CARE	MSc/PgDip/PgCert
COMPUTER AIDED ENGINEERING DESIGN (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
COMPUTER SCIENCE, ADVANCED	MSc/PgDip
COUNSELLING	MSc/PgDip
COUNSELLING PSYCHOLOGY	MSc/DPsych
COUNSELLING SKILLS	PgCert
CREATIVE WRITING	MRes
CRIMINOLOGY & CRIMINAL JUSTICE	MSc/PgDip/PgCert
DIGITAL CREATIVITY	MSc/PgDip/PgCert
DIGITAL FORENSICS	MSc/PgDip
DIGITAL MULTIMEDIA & COMMUNICATION SYSTEMS	MSc
DRUG DELIVERY SYSTEMS	MRes
EARLY CHILDHOOD STUDIES	MSc/PgDip/PgCert
ECONOMIC MANAGEMENT & POLICY	MSc
EDUCATION	EdD/MEd
EDUCATIONAL COMPUTING	PgCert
EDUCATIONAL RESEARCH, APPLIED	MSc/PgDip
EDUCATIONAL SUPPORT	MSc/PgDip/PgCert
ELECTRICAL POWER ENGINEERING with BUSINESS	MSc

COURSE	DEGREE
ELECTRONIC & ELECTRICAL ENGINEERING	MSc
ENGINEERING, ADVANCED	MSc/PgDip/PgCert
ENGINEERING DESIGN (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
ENGLISH STUDIES	GradDip
ENVIRONMENTAL ENGINEERING	MSc/PgDip
ENVIRONMENTAL ENTREPRENEURSHIP	MSc/PgDip
ENVIRONMENTAL FORENSICS	MSc/PgDip
ENVIRONMENTAL HEALTH	MSc/PgDip
ENVIRONMENTAL SCIENCE	MSc/PgDip
EQUALITY & DISCRIMINATION	MSc/PgDip
EXECUTIVE COACHING	PgCert
FINANCE	MSc/PgDip
FORENSIC SCIENCE	MSc/PgDip/PgCert
GEO-ENVIRONMENTAL ENGINEERING	MRes
GEOTECHNICS	MSc/PgDip
GLOBAL INNOVATION MANAGEMENT	MSc
GLOBAL WATER SUSTAINABILITY	MSc/PgDip
HEALTH HISTORY	MSc/PgDip/PgCert
HIGH-POWER RADIO FREQUENCY SCIENCE & ENGINEERING	MSc/PgDip
HISTORICAL STUDIES	MSc/PgDip
HUMAN RESOURCE MANAGEMENT	MSc/PgDip
HYDROGEOLOGY	MSc/PgDip
INFORMATION & LIBRARY STUDIES	MSc/PgDip
INFORMATION MANAGEMENT	MSc/PgDip
INFRASTRUCTURE ADAPTATION FOR CLIMATE CHANGE	MRes
INTERNATIONAL ACCOUNTING & FINANCE	MSc/PgDip
INTERNATIONAL BANKING & FINANCE	MSc/PgDip
INTERNATIONAL HOSPITALITY & TOURISM	MSc/PgDip
INTERNATIONAL HUMAN RESOURCE MANAGEMENT	MSc/PgDip
INTERNATIONAL LAW & SUSTAINABLE DEVELOPMENT	LLM/PgDip/PgCert
INTERNATIONAL MANAGEMENT, Master of	MSc/PgDip
INTERNATIONAL MARKETING	MSc/PgDip
INVESTMENT & FINANCE	MSc/PgDip
JOURNALISM	MLitt/PgDip
JOURNALISM, INTERNATIONAL	MLitt/PgDip
JOURNALISM, INVESTIGATIVE	MSc/PgDip
JOURNALISM, LITERARY	MLitt/PgDip
LAW, GRADUATE ENTRY	LLB
LAW, CONSTRUCTION	LLM/PgDip
LAW, HUMAN RIGHTS	LLM/PgDip/PgCert
LAW, INFORMATION TECHNOLOGY & TELECOMMUNICATIONS	LLM/PgDip/PgCert
LAW, INTERNATIONAL ECONOMIC	LLM/PgDip/PgCert

- Engineering
- Humanities & Social Sciences
- Science
- Strathclyde Business School

COURSE	DEGREE
LAW (Pre-qualification Courses)	
LEAN DESIGN & PRACTICE MANAGEMENT	PgCert
LEGAL PRACTICE	Diploma
LITERATURE, CULTURE & PLACE	MLitt/PgDip/PgCert
MANAGEMENT & LEADERSHIP in EDUCATION	MSc/PgDip/PgCert
MANAGEMENT of COMPETITIVE MANUFACTURING (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
MARINE ENGINEERING	MSc/PgDip
MARINE TECHNOLOGY (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
MARKETING	MSc/PgDip
MATHS RECOVERY	PgCert
MECHANICAL ENGINEERING, ADVANCED	MSc/PgDip/PgCert
MEDIA & COMMUNICATION RESEARCH	MSc/PgDip/PgCert
MEDIATION & CONFLICT RESOLUTION	PgCert
MEDICAL DEVICES	EngD/MSc/PgDip/PgCert
MEDICAL TECHNOLOGY	MRes
NANOSCIENCE	MSc
NORTH ATLANTIC WORLD, c900-c1800	MSc/PgDip
NORTHERN RENAISSANCE STUDIES	MLitt
OFFSHORE FLOATING SYSTEMS	MSc/PgDip
OFFSHORE RENEWABLE ENERGY (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
OPERATIONAL RESEARCH	MSc/PgDip/PgCert
OPERATIONS MANAGEMENT in ENGINEERING	MSc/PgDip/PgCert
OPTICAL TECHNOLOGIES	MSc
PHARMACEUTICAL ANALYSIS	MSc/PgDip
PHARMACEUTICAL QUALITY & GOOD MANUFACTURING PRACTICE	MSc/PgDip
PHILOSOPHY WITH CHILDREN	PgCert
PHOTONICS & DEVICE MICROFABRICATION	MSc
POLITICAL RESEARCH	MSc/PgDip
POLLUTION PREVENTION CONTROL, INTEGRATED	MRes
POWER PLANT TECHNOLOGIES	MSc/PgDip/PgCert
PRIMARY EDUCATION	PGDE (Primary)
PROCESS ENGINEERING & MANAGEMENT	MSc/PgDip/PgCert
PROCESS TECHNOLOGY & MANAGEMENT	MSc/PgDip/PgCert
PRODUCT DEVELOPMENT, INTEGRATED (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
PROFESSIONAL STUDIES, ADVANCED	MSc/PgDip/PgCert
PSYCHOLOGY, EDUCATIONAL	DEdPsy/MSc
PSYCHOLOGY, RESEARCH METHODS in	MRes
PUBLIC POLICY	MSc/PgDip
PUBLIC POLICY, EUROPEAN	MSc/PgDip
PUBLIC POLICY, INTERNATIONAL	MSc/PgDip
QUANTUM INFORMATION & COHERENCE	MSc

Our course list is available online at:
www.strath.ac.uk/courses/postgraduate

Why not visit our postgraduate community website at:
www.strath.ac.uk/postgrad

COURSE	DEGREE
REFUGEE & MIGRATION STUDIES (SOCIAL RESEARCH)	MSc/PgDip/PgCert
RENEWABLE ENERGY SYSTEMS & the ENVIRONMENT (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
RESIDENTIAL CHILDCARE, ADVANCED	MSc/PgDip/PgCert
SECONDARY EDUCATION	PGDE (Secondary)
SHIP & OFFSHORE STRUCTURES	MSc/PgDip
SOCIAL HISTORY	MSc/PgDip
SOCIAL RESEARCH	MSc
SOCIAL WORK	Master/PgDip
SOCIAL WORK MANAGEMENT	MSc/PgDip/PgCert
SUBSEA ENGINEERING	MSc/PgDip
SUPPLY CHAIN & OPERATIONS MANAGEMENT	MSc/PgDip/PgCert
SUPPORTING BILINGUAL LEARNERS	PgCert
SUSTAINABLE ENGINEERING, Postgraduate Training Programme in	MSc/PgDip/PgCert
SUSTAINABILITY & ENVIRONMENTAL STUDIES	MRes/PgDip
TECHNICAL MANAGEMENT of SHIP OPERATIONS	MSc/PgDip
TECHNOLOGY MANAGEMENT (Sustainable Engineering Training Programme)	MSc/PgDip/PgCert
URBAN DESIGN	MSc/PgDip/PgCert

TERMS AND CONDITIONS OF MATRICULATION

All students will be required as a condition to abide by and to submit to the procedures and rules of the University's Statutes, Ordinances, and Regulations as found in the University Calendar, as amended from time to time. A copy of the Calendar is available, on request, from the University or may be downloaded from the link at www.strath.ac.uk/corporateservices/gmpt/academicaffairs

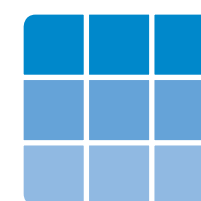
The University will use all reasonable endeavours to deliver courses in accordance with the descriptions set out in this Prospectus. Matters such as industrial action and the death or departure of staff may adversely affect the ability of the University to deliver courses in accordance with the descriptions. Also, the University has to manage its funds in a way which is efficient and cost-effective, in the context of the provision of a diverse range of courses to a large number of students.

The University therefore:
a) reserves the right to make variations to the contents or methods of delivery of courses, to discontinue courses and to merge or combine courses, if such action is reasonably considered by the University in the context of its wider purposes. If the University discontinues any course, it will use its reasonable endeavours to provide a suitable alternative course.

b) cannot accept responsibility, and expressly excludes liability, for damage to students' property, transfer of computer viruses to students' equipment, and changes to teaching arrangements and similar activities.

This Prospectus, published August 2010, is for use by those interested in entering the University in the academic year beginning in September 2011. The contents of the Prospectus are as far as possible up-to-date and accurate at the date of publication. Changes are made from time to time and the University reserves the right to add, amend or withdraw courses and facilities, to restrict student numbers and to make any other alterations as it may deem necessary and desirable. The descriptions of courses in this Prospectus are intended as a useful guide to applicants and do not constitute the official regulations which are available in the current edition of the University Calendar.

A guide to the admission requirements for the University's degree courses is given in each course entry, but please consult the University website for the most up-to-date information.



9
Academic
departments



Postgraduate students
(research)

400



Postgraduate students
(taught)

600



Research
staff

200



Academic
(teaching) staff

185

1,385
Postgraduate
Staff and
students

faculty of engineering

www.strath.ac.uk/engineering

welcome

Internationally renowned for our high quality teaching, innovative research and extensive links with industry, you can be sure that Strathclyde is the ideal place to support and develop your engineering career.

The Graduate School of Engineering

The Graduate School of Engineering is one of the largest postgraduate schools in the UK, providing high quality advanced engineering training with an unrivalled portfolio of innovative, industrially focused postgraduate taught courses and leading research programmes.

As a student in the Graduate School of Engineering, you will be part of a supportive international community working with academic experts in some of the very best facilities. Our programmes are designed to also give you softer employability skills such as team-working, communication and presentation skills sought after by employers. Similarly, through industrial lectures and careers seminars, you will have opportunities to network with our extensive industrial contacts, giving you invaluable access to potential employers.

You will enjoy access to the Master Class series of personal development and management workshops, enabling you to meet and work with other students across the range of engineering disciplines.

ENGINEERING RESEARCH EXCELLENCE

From heart surgery devices to powering the world with more efficient renewable energies and greener transport, Strathclyde engineering researchers are at the forefront of solving some of the major problems facing society.

As a researcher in the Faculty, you will be able to participate in some of the best leading international research in engineering supported by a research portfolio of over £80M with contributions from Research Councils, government and industry. Multimillion pound investments in specialist research labs and study suites mean that our students have access to the very best facilities.

We are committed to helping the personal development of our research students. Induction days and writing and presentation skills training allow you to meet researchers from across the Faculty. Our annual Research Presentation Day, with its poster and oral sessions, is an established event which allows you to showcase your work to colleagues and industrialists. You will also benefit from the continuous support of two supervisors to help you publish your first paper and provide opportunities to attend and present at international conferences.

The Faculty's multimillion pound research portfolio and the most recent Research Assessment Exercise (RAE 2008) confirmed Strathclyde as achieving the highest engineering 'Research Power' measure in Scotland and in the top 10 within the UK. Three major interdisciplinary themes bring together academic expertise across departments:

- > **Advanced Materials & Manufacture:** including core competencies in materials science, forming, nano-materials, advanced energy materials and computational engineering.
- > **Health:** including core competencies in medical devices and diagnostics, cell and tissue engineering, rehabilitation engineering, biomolecular engineering, neuro-degenerative diseases, safety engineering, and photonics and micro systems.
- > **Infrastructure & the Environment:** including earth and environmental science and engineering, geophysics and geotechnical engineering, water engineering, and sustainable structural engineering.
- > **Energy:** including renewable power generation and distribution, renewable energy (low carbon) technologies, power electronics, drives and energy conversion, advanced electrical systems and power systems.
- > **Sustainability and Systems Design:** including low impact fully integrated sustainable built environment and systems design, technology and sustainability and building integrated energy systems.

These integrated themes are underpinned by additional core competencies in areas such as aerospace, marine technologies, telecommunication technologies, control systems, signal and image processing, non-destructive testing and enabling engineering. Please contact the Faculty for details.



RESEARCH DEGREES

PhD, EngD, MPhil, MRes

CONTACT

Faculty Office (Engineering)
t: +44 (0)141 548 2749
e: andrea.laroche@strath.ac.uk

TAUGHT COURSES

In addition to courses offered within Engineering departments which are detailed on the following pages, the Faculty offers the following taught postgraduate courses. For more information or to apply online, see www.strath.ac.uk/courses/postgraduate

Advanced Engineering Postgraduate Training Programme in Sustainable Engineering

Advanced Engineering MSc/PgDip/PgCert

This course has been developed following requests from graduate engineers and industry for opportunities to access a broader training across postgraduate engineering skills. It provides a unique opportunity for engineers to shape their learning by selecting from different subject disciplines across the Faculty.

Benefits for students include:

- > multidisciplinary tailored learning to suit individual needs and interests
- > flexible modes of delivery permitting part-time study
- > business and management modules

providing transferable skills – a key requirement to attain Chartered Engineer (CEng) status

- > opportunities to network across industries and with engineers of different disciplines

This course is particularly suitable for graduate engineers working in the following sectors:

- > Chemical, Petrochemical and Process
- > Design Engineering
- > Energy and Power Generation
- > Manufacturing
- > Oil and Gas
- > Power Plant
- > Renewable Energies

Course Structure

Students can select from a range of technical instructional modules offered by departments across the Faculty, in consultation with the Programme Director. Students also choose from a range of business and management classes available. Identify subject areas of interest to you from those on offer in this prospectus before contacting the Programme Director.

Applicants should include a personal statement detailing the engineering sector they are most interested in, and an indication of the technical classes they are interested in by referring to the modules listed across the Faculty's course listings.

Instructional classes include lectures, practical exercises and site visits. The course is credit-based and modular in design. The MSc requires 180 credits, the PgDip 120 and Certificate 60. The MSc industry-based project or research thesis carries 60 credits. MSc students will also complete an individual project that may be work-based or allied to one of the many areas of research strengths within the Faculty.

EXAMPLES OF TECHNICAL CLASSES (select seven)

- > Computer Aided Engineering Design Systems
- > Product Design Techniques
- > Energy Resources and Policy
- > Energy Modelling and Monitoring
- > Process Design
- > Modelling and Simulations
- > Air and Water Pollution Control
- > People, Organisations and Technology

Consult individual course entries for further examples.

BUSINESS AND MANAGEMENT CLASSES (select three)

- > Design Management
- > Project Work and Project Management
- > Environmental Impact and Sustainability

FACT FILE: INDUSTRY-UNIVERSITY COLLABORATION

The Advanced Forming Research Centre (AFRC) is a partnership comprising Strathclyde's Departments of Design, Manufacture and Engineering Management, and Mechanical Engineering, and global industrial manufacturing companies. Current industrial members range from multinationals such as Rolls-Royce, Boeing, Mettiss Aerospace, Timet and Aubert and Duval, to specialist suppliers such as GKN, Bodycote, EKES and Fanuc. The AFRC's activities range from blue-sky projects which will lay the foundations of future forming technology to trouble-shooting on established industrial processes.



The new £16M purpose-built facility for the Centre, located near Glasgow airport and now fully operational, reflects the status of this internationally significant research centre. The wide range of members and supporting industry enables the AFRC to engage effectively with multi-scale problems in which researchers need to relate macro process parameters (such as tool geometry and loading rates) with micro-characteristics of the form material (such as grain size and structure).

- > Information Management
- > Financial Engineering
- > Risk Analysis

Course Duration

MSc: 12 months full-time; 24 months part-time
PgDip: 9 months full-time; 21 months part-time

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent in engineering.
PgDip: Normally a first degree, but other applicants will be considered.

Funding

Funded studentships may be available for MSc or PgDip candidates. Please contact Faculty Office for information (details left).

Careers

This course offers graduate engineers

the opportunity to upgrade their technical skills across a range of engineering disciplines, supplemented by business and management training. The programme is designed to make students more employable and also satisfy the further learning requirements necessary to obtain CEng status.

CONTACT

Brian Dickson
t: +44 (0)141 553 4131
e: brian.dickson@strath.ac.uk

Postgraduate Training Programme in Sustainable Engineering

www.strath.ac.uk/engineering/sustainableengineering

MSc/PgDip/PgCert

This flexible, multidisciplinary programme combines study in specialist, advanced engineering technologies underpinned with training in sustainability. Sustainable engineering involves the responsible use of energy and resources at a rate and in a manner which does not compromise the environment, or the ability of future generations to meet their own needs. Examples include better and more effective renewable energy sources, reduced energy loss in buildings, new energy-efficient production processes, improved product life-cycle assessment procedures, and more effective transportation systems and urban planning instruments.

The course examines such concepts through specialist and generic taught modules and industry-relevant projects. With input from industry and a range of Engineering departments, the course is a cross-disciplinary collaboration relevant to students seeking careers in industry and to industry staff seeking to further their professional development.

SPECIALIST THEMES

The programme has been developed with industrial input to provide you with a solid understanding of modern, sustainable engineering. You can achieve an MSc, PgDip or PgCert in one of the specialist themes listed in the table to the right and described on the following pages.

Course Structure

The course consists of three related components: instructional modules; group project; and individual project.

GENERIC MODULES

You will take three generic modules which meet employers' requirements for comprehensive engineering skills and satisfy key requirements to attain Chartered Engineer status.

SPECIALIST MODULES

You also take a number of modules (two for the Postgraduate Certificate award, four for the Postgraduate Diploma/MSc) relevant to your selected specialist theme. Successful completion of five instructional modules leads to the award of a Postgraduate Certificate.

GROUP PROJECT WORK

The second semester allows you to apply your learning by working within a group



PROGRAMME STRUCTURE

Step One: Select Your Specialist Theme

- > Chemical Processing
- > Computer Aided Engineering Design
- > Engineering Design
- > Integrated Product Development
- > Management of Competitive Manufacturing
- > Marine Technology
- > Offshore Renewable Energy
- > Renewable Energy Systems and the Environment
- > Technology Management

Step Two: Select Three Generic Modules

- > Design Management
- > Environmental Impact and Sustainability
- > Financial Engineering
- > Information Management
- > Project Management
- > Quantitative Risk Analysis

Step Three: Complete Your Group Project

Step Four: Complete Your Individual Project

Teaching Structure

Sept-Dec	Jan-April	April-Sept
> Specialist Modules > Generic Modules > Field Trips/Workshops	> Group Project > Sustainable Engineering Annual Conference	> Individual Project

of students from different specialist themes to produce sustainable solutions for real-life industry problems. Site visits, field trips and regular progress reports to industrial partners are an integral part of the process and you will develop valued skills in team-working, problem-solving, report-writing and presentation.

Successful completion of seven instructional modules and a group project leads to the award of a Postgraduate Diploma.

INDIVIDUAL PROJECT ASSIGNMENT

MSc students undertake an individual project which allows you to study a selected topic in depth and submit a thesis. There is also substantial industry input at this stage in the form of project ideas that bring engineering graduates and business representatives together.

Successful completion of seven instructional modules, a group project and an individual project leads to the award of an MSc.

Course Duration

MSc: 12 months full-time; 24 months part-time (minimum)
PgCert/PgDip: 9 months full-time; 18 months part-time

DR STEPHEN THOMSON
Resource Strategist,
Laing O'Rourke



There are four good reasons for getting involved with student projects: kudos, new innovations, new angles and gems of ideas which come from the different perspectives of international and home students working together with fresh minds to challenge industrial assumptions. Students gain a sense of realism from working with industry and are encouraged to both 'think like an academic and an accountant'.



Entry Requirements

First degree or other qualification equivalent to an Honours degree in a relevant engineering, technology or science discipline.

Entry may be possible with other qualifications provided there is evidence of relevant experience, and of the capacity for postgraduate study.

A limited number of competitive Engineering and Physical Sciences Research Council studentships are available to UK and EU students.

Careers

Sustainability is increasingly important as business and industry acknowledge the need to account for the social and environmental impact of their activities. Employers place a high value on job candidates whose expertise in their chosen field is underpinned by a comprehensive understanding of sustainable approaches and practices.

This programme facilitates access to and networking with industry representatives from across the spectrum of small- and medium-sized businesses to large corporations. Graduates have gone on to work for ScottishPower, Shell, ExxonMobil, BAE Systems and Accenture, among many others.

Contact

Engineering Faculty Office
t: +44 (0)141 548 2749
e: sustainable-engineering@strath.ac.uk

SPECIALIST THEMES

Chemical Processing

This course is open to full- and part-time students wishing to take up careers in industry and to industrial staff seeking continuing professional development. It is particularly relevant to those interested in studying chemical engineering within a framework of sustainable practice.

Our chemical engineering specialists are at the forefront of emerging technologies such as alternative fuels, nano-materials for use in advanced chemical reactors and separation processes. Chemical engineering at Strathclyde receives consistently high student satisfaction ratings for teaching quality and the Department is among the best in the UK, with staff experienced in key areas such as environmental protection, process design, safety and advanced chemical processes.

Curriculum

You undertake an integrated programme of both generic and specialist taught modules along with industry-relevant projects. The generic modules are detailed on the

preceding page; the specialist modules for Chemical Processing may include:

- > Particle and Colloid Engineering
- > Safety Management
- > Process Design
- > Modelling and Simulation
- > Advanced Separations (Membrane Technologies)
- > Advanced Process Control
- > Air Pollution Control
- > Water Pollution Control
- > Emerging Technologies

Contact

Brian Dickson
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Computer Aided Engineering Design

This course aims to produce a new generation of product design engineers who combine sustainable engineering expertise with the confidence to work with, develop and manage knowledge-based computer-aided engineering systems (CAED) to support engineering design.

You gain a thorough understanding of the methods, techniques and tools used in computer-supported product design and development, enabling you to make significant contributions to wealth generation by developing better products in a shorter time at a lower cost. These skills can be applied to and practised in industry-based design projects offered on the course.

The course will appeal to graduates with career interests in the application, development, research and management of CAED systems. This includes graduates and engineers from small- and medium-sized enterprises, consultancies, large manufacturing companies, college lecturers, and designers educated in an engineering or computer science discipline who wish to enhance their professional ability, enter computer-aided support for engineering design in engineering industries, or improve general IT skills.

Curriculum

You undertake an integrated programme of both generic and specialist taught modules along with industry-relevant projects. The generic modules are detailed on the preceding page; the specialist modules for Computer Aided Engineering Design are:

- > CAED Systems
- > Product Modelling and Visualisation
- > Systems Integration

plus one optional module from the following:

- > CAED Software Systems Design
- > Product Design Techniques
- > Knowledge Engineering and Management for Engineers
- > Modelling of Manufacturing and Business Systems

Contact

t: +44 (0)141 548 2091
e: pgadmissions@dmem.strath.ac.uk

Engineering Design

Engineering design focuses on the process of designing a product and is of central importance to all types of product development organisations, including small and medium-sized enterprises, design consultancies and large manufacturing organisations.

This course gives graduates a thorough grounding in the use of product design methods and techniques which can help companies produce products with improved functionality, performance, quality and ease of manufacture at lower cost.

The course enhances the professional and creative abilities of graduates from a variety of 'design-centred' disciplines, from mechanical, mechatronic and electrical functions to IT.

Curriculum

You undertake an integrated programme of both generic and specialist taught modules along with industry-relevant

projects. The generic modules are detailed on pg 32; the specialist modules for Engineering Design are:

- > Design Methods
- > Product Design Techniques

plus one optional module from the following:

- > CAED Systems
- > Knowledge Engineering and Management for Engineers
- > Manufacturing Systems
- > Product Modelling and Visualisation
- > Risk Management of Projects

Contact

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e: pgadmissions@dmem.strath.ac.uk

Integrated Product Development

Integrated Product Development (IPD) focuses on the effective integration of all 'process-centred' aspects of product development, from the identification of a need to the conception, realisation, operation and disposal of the product. This course emphasises IPD within a business environment and provides an insight into the effective use of supporting software technologies.

Graduates gain a thorough grounding in the use and integration of design methods, processes and technology for careers in developing, managing, leading and researching design projects in engineering.

Graduates with an understanding of IPD can help reduce time to market, improve the quality of a product, save costs, and provide process improvement.

IPD is relevant to all types of product development organisations, including small- and medium-sized enterprises, consultancies, large manufacturing companies and design offices. It enhances the professional ability of graduates and engineers from mechanical, electrical, civil, mechatronic, architectural and chemical disciplines.

Curriculum

You undertake an integrated programme of both generic and specialist taught modules along with industry-relevant projects. The generic modules are detailed on pg 32; the specialist modules in Integrated Product Development are:

- > Design Methods
- > Systems Integration
- > Manufacturing and Business Strategy

plus one optional module from the following:

- > CAED Systems
- > Logistics
- > People, Organisations and Technology
- > Risk Management of Projects

Contact

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e: pgadmissions@dmem.strath.ac.uk

Management of Competitive Manufacturing

This course is aimed at graduates wishing to broaden their expertise, for example those with a technological first degree, or who wish to work within the manufacturing industry. You will gain an in-depth understanding of the strategic, tactical and operational issues related to manufacturing industries worldwide. On completion, you will be equipped with state-of-the-art concepts, methods, techniques and tools to allow you to contribute to the competitiveness of manufacturing organisations as well as certain types of service organisations.

The course starts off with a focus on the wider strategic and global issues facing manufacturing organisations and then moves on to examine the use and application of enabling technologies that facilitate competitiveness and sustainability, followed by a focus on operational areas. Throughout, there is an emphasis on integration, enhanced by group assignments, team projects, industrial visits and case studies.

Curriculum

You undertake an integrated programme of both generic and specialist taught modules

along with industry-relevant projects. The generic modules are detailed on pg 32; the specialist modules in Management of Competitive Manufacturing are:

- > Logistics
- > Manufacturing and Business Strategy

plus two optional modules from the following:

- > E-business and Supply Chain Management
- > Management of Total Quality and Continuous Improvement
- > Manufacturing Systems
- > Modelling of Manufacturing and Business Systems
- > People, Organisations and Technology

Contact

t: +44 (0)141 548 2091
e: pgadmissions@dmem.strath.ac.uk

Marine Technology

The structure of this course allows you to specialise in any one of the wide range of subject areas within the diverse discipline of Marine Technology. The course is designed for experienced or newly-qualified engineers in Naval Architecture, Marine Engineering, Mechanical Engineering, Civil Engineering or other related disciplines.

This course will prepare you for a wide range of challenging and rewarding positions in the marine and related industries, including design and construction of all types of marine vehicles; project management; systems design; safety management; support services; classification societies and consultancy services.

Facilities available include a small hydrodynamics laboratory, custom-built research areas and a major hydrodynamics laboratory facility and racing yacht offsite. The University is unrivalled in Europe for its teaching and research expertise in naval architecture and related disciplines.

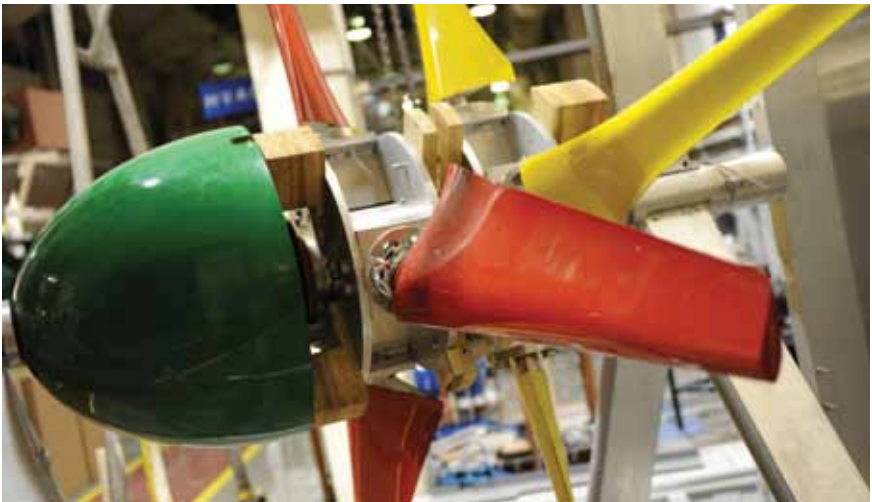
Curriculum

You undertake an integrated programme of both generic and specialist taught modules along with industry-relevant projects. The generic modules are detailed on pg 32; the specialist modules in Marine Technology are:

- > Risers and Mooring Lines
- > Advanced Marine Structures
- > Waterborne Transportation Systems
- > Aero-Hydrodynamics of High Speed Craft
- > Computational Free Surface Hydrodynamics
- > Maritime Safety and Risk
- > Modelling and Optimisation in Design

During the first two semesters, you will work in a team to tackle projects on

FACT FILE: RENEWABLE ENERGY



A team of renewable energy experts led by Cameron Johnstone at the Department of Mechanical Engineering's Energy Systems Research Unit has developed a new generation of marine turbines that could harness energy from the sea even in the very deepest waters.

The turbine's innovative design enables it to be placed in the depths of the sea where the current is strongest, allowing engineers to reap the full benefits of the sea's natural resources. Unlike conventional turbines, the Strathclyde machine has two rotors, turning in opposite directions, which make it very stable and removes the need for expensive, fixed foundations.

Unlike conventional turbines, the Strathclyde machine has two rotors, turning in opposite directions, which make it very stable and removes the need for expensive, fixed foundations. Instead, it can be connected to the sea bed by a cable that moves with the flow of the tide, much like a kite flying on a windy day.



a relevant subject and present findings to an industrial panel.

Contact

Professor Shan Huang
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Offshore Renewable Energy

Global warming and environmental protection are the biggest challenges facing the human race. Sustainable engineering solutions are increasingly important, particularly the search for offshore renewable energy sources. Graduates of this

course will be expected to play a significant role in exploiting this crucial resource.

The course is designed for experienced or newly-qualified engineers in Naval Architecture, Marine Engineering, Mechanical Engineering, Civil Engineering, Electrical Engineering or other related disciplines.

Curriculum

You undertake an integrated programme of both generic and specialist taught modules along with industry-relevant projects. The generic modules are detailed on pg 32; the specialist modules in Offshore Renewable Energy are:

- > Energy Resources and Policy
- > Electrical Power Systems
- > Marine Renewable Energy Systems
- > Finite Element Analysis of Floating Structures

Contact

Professor Shan Huang

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e: shan.huang@strath.ac.uk

Renewable Energy Systems and the Environment

Aimed at graduates with an engineering, technology or science background, the course responds to the growing awareness that quality of life must be balanced by the need for conservation of world resources, especially energy, and the protection of the environment. Focusing on the design and operation of the energy systems that provide the environments in which people live and work, the course produces professionals who understand this balance and who seek to harness energy resources in a sustainable and environmentally-friendly manner.

You will be introduced to the different energy resources (conventional, nuclear and renewable) and the systems which can be employed to harness these resources. This enables you to have a good technical understanding of the different energy technologies and to learn about the impact of energy on the environment and how that impact can be reduced. Working with students from other sustainable engineering courses, you will develop the multidisciplinary industrially-relevant skills necessary in the energy sector.

Curriculum

You undertake an integrated programme of both generic and specialist taught modules along with industry-relevant projects. The

generic modules are detailed on pg 32; the specialist modules for Renewable Energy Systems and the Environment are:

- > Energy Resources and Policy
- > Energy Systems Analysis
- > Electrical Power Systems
- > Energy Modelling and Monitoring

Your group project will focus on the evolution of an energy system from inception to completion, including an assessment of cost effectiveness and environmental impact.

Contact

Christina Rossi

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Technology Management

The course is aimed at early/mid-career managers in industry and/or technologists seeking to explore the role of technology in company competitiveness. The course gives technologists a view of the role of technology in company strategy and the contribution of technology management to competitiveness. It emphasises the relevance and usefulness of its content and uses examples from local and global companies. A special feature is a comparison of strategic technology management in various centres.

Curriculum

You undertake an integrated programme of both generic and specialist taught modules along with industry-relevant projects. The generic modules are detailed on pg 32; the specialist modules in Technology Management are:

- > People, Organisations and Technology
- > Strategic Technology Management

plus two optional modules from the following:

- > Risk Management of Projects
- > Logistics
- > Knowledge Engineering and Management for Engineers
- > Modelling of Manufacturing and Business Systems
- > Management of Total Quality and Continued Improvement
- > Management and Finance

Contact

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Department of Architecture

www.strath.ac.uk/architecture

The Department of Architecture – one of the first Schools of Architecture in the UK – has a vibrant postgraduate community and an undergraduate population of over 300. Staff specialise in a variety of disciplines and together with visiting staff provide a wide range of academic and professional expertise.

Described by the Royal Institution of British Architects (RIBA) as having a research portfolio of outstanding range and quality, the Department has achieved high gradings in successive Research Assessment Exercises (RAEs), with 40% of our research at 4* and 3* levels, putting Strathclyde in the top three or four architecture schools in the UK.

There is a clear identity for the Department's research activities within four broad research groupings, described below. These groups allow the diversity of students' interests to be focused within a Departmental research strategy aimed at enhancing architectural knowledge, while having a transformative impact on the built environment and contemporary architectural culture.

RESEARCH

We receive research funding from the Engineering and Physical Sciences Research Council (EPSRC), the Economic and Social Research Council (ESRC), the Arts and Humanities Research Council (AHRC), government, the EU, industry and the construction professions.

Research in the Department offers a laboratory for informing education, research and knowledge exchange in the fields of Architecture and Urban Design through collaborations within the Faculty of Engineering, across the University, and by engagement with practice and links with specialists both inside and outside the University.

Research falls within four broad areas: Architectural Design, Urban Design, Sustainability and Technology, and Cultural Studies. Within these identified areas of expertise, the Department of Architecture is home to the following specialist research groups:

ABACUS (advancing buildings and concepts underpinning sustainability)

The group focuses on the application of technology to help deliver a more sustainable built environment in response to government, industry and society needs. Research is closely linked with international and national targets for reducing social and environmental



impacts (including carbon reduction, waste minimisation and reducing pollution), and promoting energy and resource efficiencies in an attempt to improve quality of life for all. The group operates clusters within which staff and postgraduate research students focus on design, technology and sustainability aligned with the University's research strategy.

Cultural Studies – Within the context of an architecture department and through teaching and research, Cultural Studies aims to embrace differing definitions of culture, at the core of which lies the history and theory of buildings and cities. The group explores how and why buildings and cities are produced and used, how they are represented and the meanings we attach to them and explores the relationships between architecture and fields as diverse as music, painting, literature, politics, economics, critical theory, media and visual culture.

Design Research Unit (Practice) is the Department's design research group which works on live projects and offers advice and consultation as well as design guidance. The Unit encourages critical debate and the testing of new ideas, taking them from the studio to architectural practice and industry. It is committed to sharing the lessons learnt from research and development in order to inform positive change in the architectural design process.

Urban Design Studies Unit (UDSU)

The Unit focuses on issues of the city, its history and morphology and approaches and strategies to its rehabilitation, renewal and restructuring. Its mission is to advance



the discussion on the city and city region and evolve theories, programmes and design frameworks for sustainable urban development, living and form. The USDU is actively involved in research on the city and its origin, its development, form and structure and its impact on people and the environment. Members of this group come from different nationalities, adding to an in-depth knowledge of local circumstances, an invaluable network of experiences that make research, teaching and consultancy vibrant and international.

RESEARCH DEGREES

MPhil; PhD; MRes

CONTACT

Research Support

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e: nina.baker@strath.ac.uk

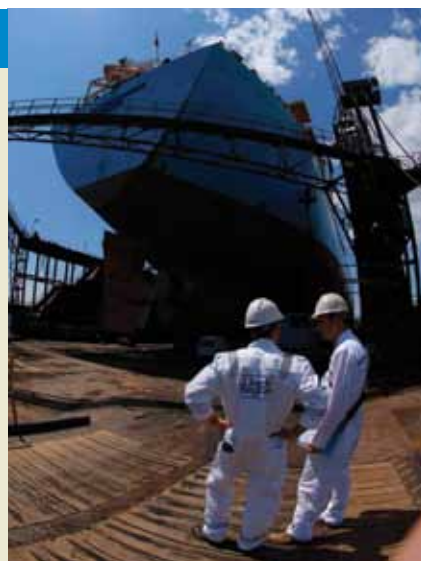
Postgraduate Research Secretary

t: +44 (0)141 548 3021

e: j.dick@strath.ac.uk

DID YOU KNOW?

- Since 2000, there have been over 500 graduates from the Sustainable Engineering programme.
- Sustainable Engineering students can take advantage of 'Succeeding for the Workplace – Careers Workshops' and the Sustainable Engineering Annual Conference to develop their industrial networks.



TAUGHT COURSES

Apply online:

www.strath.ac.uk/courses/postgraduate

Advanced Architectural Design

Advanced Architectural Studies

Building Design and Management for Sustainability

Digital Creativity (with the Department of Design, Manufacture and Engineering Management, see pg 58)

Lean Design and Practice Management

Urban Design

Contact

contact-architecture@strath.ac.uk

Building Design and Management for Sustainability

MRes

This research degree is aimed at recent graduates who may be interested in pursuing research in this area (perhaps moving on to doctoral studies), as well as early to mid-career building and urban design-related professionals who are seeking a competitive edge in the workplace and the opportunity to bring strategic sustainable design and management thinking into their own modes of practice.

The course involves advanced knowledge of social, environmental and economic sustainability relating to the built environment, principles of lean design, construction and project management, and discusses current design, management and practice methods.

Curriculum

COMPULSORY CLASSES

- > Ecology, Sustainability and the Built Environment
- > Environmental Impact and Sustainability
- > Inception and Briefing
- > Lean Design and Construction 1
- > Lean Design and Construction 2
- > MRes Group Project
- > MRes Dissertation

Course Duration

12 months full-time; 36 months part-time

Entry Requirements

Honours degree, or equivalent, in a relevant architecture, engineering, technology, or science discipline. Entry may be possible with other qualifications provided there is evidence of relevant experience and of the capacity of postgraduate study.

Careers

The course will enhance postgraduates' preparations for their future careers, whether this is in research, industry or



practice and help them work towards more effective and efficient career development.

Advanced Architectural Design

MArch/PgDip

ARB and RIBA Part 2 Course

The PgDip in Advanced Architectural Design represents the final stage of academic architectural education en route to Part 2 professional qualification. Subject to approval by the Course Director, satisfactory completion of all diploma work, and presentation of a clear and ambitious programme of work, students may extend their study for an additional three months in order to convert their Diploma into an MArch.

Curriculum

The course covers current theoretical approaches to urban issues and architectural design. You will:

- > develop formal and technical architectural ability
- > undertake a comprehensive urban and/or architectural design project
- > demonstrate awareness of management procedures relevant to design practice
- > carry out a detailed examination of an issue or issues of particular architectural and/or urban significance

The course comprises studio design work, lectures, special projects and workshops. Classes include urban history and theory, mapping architecture, digital media, sustainability and environmental assessment and landscape design. Studies are predominantly project-based and demand a high level of design ability. The course carries ARB/RIBA Part 2 Exemption for students who have already

completed at least four years of full-time architectural study.

Course Duration

MArch: 12 months full-time

PgDip: 9 months full-time

Entry Requirements

First- or upper second-class Honours degree, or equivalent, in Architectural Studies, and also a design studio portfolio to the satisfaction of the Course Director or Head of School. Students with a three-year Honours degree must register for the two-year PgDip in Architectural Studies in order to qualify for RIBA Part 2 exemption.

Advanced Architectural Studies

MSc/PgDip

This one-year course offers students a unique opportunity to broaden and deepen their architectural education unencumbered by professional examinations. It provides an open and creative learning environment that embraces historical, theoretical and practical work. This course is not prescribed by the ARB nor validated by RIBA.

Course Structure

The course comprises a core curriculum, optional classes and a student-led thesis, project or dissertation where you have the opportunity to specialise in one of the Department's renowned research areas such as architectural computing, urbanism, history and theory, and sustainability. Modules are supported by a lecture series at which notable architects and commentators set out the boundaries of the social, political, economic and architectural environment. Each part of the course is designed to provide an opportunity to develop projects related to your own interests at the frontier of architectural debate. Studies are seminar, lecture and project-based and demand a high level of academic and design ability.

Curriculum

The core curriculum comprises:

- > design studio modules from the studio options available in Year 5 of the MArch course
- > two lectures series, Mapping Architecture 1 and 2, introducing a wide range of contemporary ideas about the built environment
- > field trip (in recent years to Berlin, London, Amsterdam, Florence and Marseille)
- > special projects introducing contextual ideas in fields such as Computing, Urbanism, Art, Engineering and Anthropology
- > taught course in Professional Studies

Course Duration

MSc: 12 months full-time

PgDip: 9 months full-time

Entry Requirements

First- or second-class Honours degree, or equivalent and also a design studio portfolio to the satisfaction of the Course Director or Head of School.

Lean Design Practice and Management

PgCert

This course has been designed to meet the needs of architecture professionals, to help prepare students for successful careers in design management and it reflects one of the research strengths of the Department of Architecture. The course explores the processes and techniques developed in lean thinking and how to apply these to the process of design and practice management. Student learning is framed around the RIBA Plan of Work, which remains the defining way an Architect carries out the sequential service to clients.

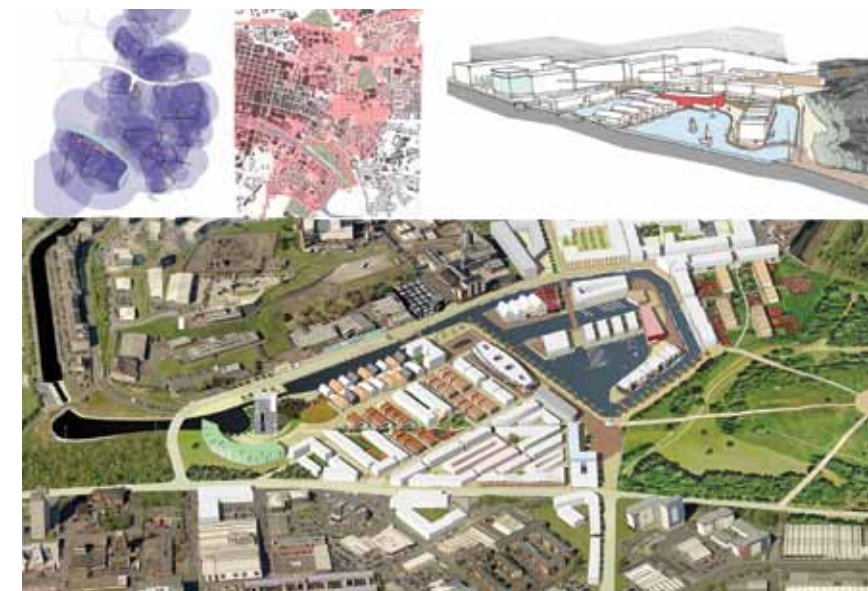
Course Structure

The programme is credit-based and modular in design. The certificate requires the successful completion of the following five modules:

- > Inception and Briefing
- > Feasibility
- > Lean Design and Construction Management 1
- > Lean Procurement
- > Lean Design and Construction Management 2

Course Duration

Six months full-time; 21 months part-time



Entry Requirements

A good degree in Architecture or a related discipline or equivalent professional qualifications. Applicants may also be accepted with significant and relevant work experience and if they can satisfy the Course Director that they have the ability to undertake postgraduate training.

Urban Design

MSc/PgDip/PgCert

This course is designed for both practitioners and students to enhance the understanding of the city as a complex and dynamic system and to advance the skills of practical urban design. While the focus is on physical planning and the design of urban spaces and buildings, the various influencing factors are also carefully considered. The major topic is the European metropolis, or city region, within the context of globalisation.

Course Structure

The course is delivered through studio work, lectures and seminars. The studio involves work on the urban design of a complex urban area, including the levels of the entire city, the neighbourhood and the individual public space defined by urban architecture. The Department and the course have an established partnership with Glasgow City Council which enriches its programme with challenges and realism. Lectures and seminars, delivered as compulsory and optional taught classes, normally run over two and a half days to allow for flexible booking by CPD and part-time students, and cover the following topics, relevant to the studio's design project:

MOUZHAN MAJIDI

Chief Executive of Foster + Partners



Mouzhan Majidi studied Architecture at Strathclyde in the 1980s. He is currently Chief Executive of Foster + Partners, one of the world's largest and most respected architecture practices. He joined the company straight from university, working on the Stansted Airport Terminal project and then on two competition-winning schemes for the Cambridge Law Faculty building and Fréjus School in France. He subsequently moved to Hong Kong to direct the design of Hong Kong International Airport at Chek Lap Kok before returning to London to lead the design team for the new Wembley Stadium.



Like most of my senior colleagues I joined the office as a new graduate, straight from Strathclyde. I was struck by how close the two places were in spirit. Our studio is a very busy environment where everything happens, from formal meetings to model making and design work to 'crits'. It's very much a creative hub and the same was true at Strathclyde. As students we worked in the studio all day – sometimes at night too – because it was a great working environment. With that great communication came a strong feeling of community.



- > typology and architecture
- > economics and real estate
- > politics and policy
- > building laws and design codes
- > transportation and infrastructure
- > landscape and recreation
- > history and theory
- > implementation methods and management
- > representation and visual communication

Course Duration

MSc: 12 months full-time; 24 months part-time
PgDip: 9 months full-time; 18 months part-time
PgCert: 5 months full-time, 9 months part-time

Entry Requirements

An Honours degree, or equivalent, in a discipline related to the built environment and the city (eg architecture, planning, engineering, landscape architecture, sociology, history). Candidates with alternative professional experience may also be considered.

Funding

Scholarships are offered on a competitive basis to well-qualified UK/ EU graduates. See www.strath.ac.uk/cta for details.

JULIE PIERCE

PgDip Advanced Architectural Design



The PgDip at Strathclyde was an exciting experience that prepared me well for my career as an Architect. Teaching staff, tutors and students work together to create a close-knit atmosphere that is not dissimilar to a working studio, where ideas are shared and expressed openly in a dynamic and vibrant environment. There

are frequent visits from external consultants throughout the design process, who assist in making students' ideas come to life.

There was also the opportunity to attend lectures and workshops, which are held in the department throughout the year. These introduced us to a variety of styles and periods of architecture and helped to enrich ideas and set precedents for designs.

The social life was also great, largely due to the fact that we were encouraged to work in teams throughout the course and frequently went on site visits both locally and abroad, where team-building was high on the agenda.

All of this made my experience at Strathclyde an unforgettable one, teaching me independence and many skills that I now use everyday.



Department of Bioengineering

www.strath.ac.uk/bioeng

Bioengineering takes a multidisciplinary approach to solving problems in medicine and biology, based on the application of advances in science, engineering and technology. A major focus is to improve the quality of life of people with medical conditions that restrict independent living and integration within the community.

Bioengineering operates at the interface between engineering, medicine, and the life and physical sciences. This Department is a key centre for the development of multidisciplinary research projects in biomedical engineering. The last Research Assessment Exercise (RAE 2008) reconfirmed the Department's reputation for world-class research, encompassing early career researchers through to established staff. Sixty percent of research-active staff are rated at 4* and 3* (world- and internationally-leading).

The Department has developed a rich translational research environment which enables new talent to thrive and offers opportunities to develop innovative research programmes that will be supported through our established clinical and industrial multidisciplinary networks. This approach provides Bioengineering with the capability to continue to prosper in a rapidly evolving and competitive research landscape where world-class research in health care can flourish.

The work of our research groups is underpinned by facilities and expertise in the enabling technologies of sensors and transducers, signal and image acquisition and analysis, materials testing and development, and design.

The Department hosts the following;

- > Doctoral Training Centre (DTC) in Medical Devices
- > The Strathclyde Institute of Medical Devices (SIMD)

The Department is also a major partner in the following collaborative ventures:

- > HealthQWest
- > Health Technologies Knowledge Transfer Network
- > Research Academy of Bioactive Molecules and Materials
- > The Glasgow Health Technology Cooperative

RESEARCH PROFILE

The Department is an international centre of excellence for postgraduate research which is directed at applying the methods and ideas of engineering and the physical and biological sciences in medicine and surgery. There is particular emphasis on clinically-related research, ranging from basic investigations to direct clinical applications.

Academic and academic-related staff, including five Professors, are supported by visiting and honorary staff from industry and health care. The multidisciplinary expertise of staff underpins teaching and research; their

original disciplines and expertise range from cell biology to mechanical engineering. The synergy produced by such staff diversity is crucial to the teaching and research success of the Unit. There is a fluctuating number of research assistants and research fellows supported on external grants.

Postgraduate education includes instructional MSc and research degrees of one year (MPhil, MRes), three years (PhD), and four years (EngD) duration.

External research is supported by funding from the Research Councils, the Scottish Government, charities and

RESEARCH FACT FILE



Professor Phil Rowe of the Department of Bioengineering is the lead researcher in a £1.5 million project that could aid the rehabilitation of stroke victims and the diagnosis of complex health issues, and improve the health and wellbeing of older people. This major research initiative will convert powerful biomechanical data into simple, computer-generated animations enabling healthcare professionals to show patients information about their movement that was previously only available in graph or table form.

commerce and industry within the UK, EU and internationally in countries such as the US and Japan.

RESEARCH GROUPS

There are three major research groups:

REHABILITATION ENGINEERING

Rehabilitation Engineering is the application of scientific and engineering principles to research which is related to the musculo-skeletal system. Within Rehabilitation Engineering there are three main areas of research:

- > Biomechanics
- > Prosthetics and Orthotics
- > Motor Control and Neuroprosthetics

MEDICAL DIAGNOSTIC DEVICES AND INSTRUMENTATION

Within Medical Diagnostic Devices and Instrumentation we are concentrating on a portfolio of projects that allow minimally invasive patient monitoring or rapid POC diagnosis. In many projects these are being coupled to new approaches in interventions or therapy. The main areas of research are:

- > Minimally-invasive Diagnostics
- > Sensors for Cell and Tissue Engineering/Implanted Devices
- > Point of Care (POC) Patient Monitors

CELL, TISSUE AND ORGAN ENGINEERING

Within Cell, Tissue and Organ Engineering there are four main areas of research:

- > Cellular Interactions with Material/Chemicals
- > Cell/Tissue Engineering
- > Hybrid Artificial Organs
- > Modelling of Artificial Organs

RESEARCH DEGREES

Apply online at: <http://pgr.strath.ac.uk>
MRes; MPhil; PhD; EngD

Candidates with qualifications in engineering, science, medicine and paramedical subjects are considered

DID YOU KNOW?

Sixty per cent of Bioengineering researchers were rated as ‘world-leading’ or ‘internationally excellent’ in the latest comprehensive rating of research, the Research Assessment Exercise 2008.

for courses of study which lead to the MPhil, MRes and PhD postgraduate research degrees.

Course Duration

MPhil/MRes: 12 months full-time;
21 months part-time
PhD: three years full-time;
55 months part-time
EngD: four years full-time

Entry Requirements

MPhil/PhD: Normally an Honours degree but those with other qualifications, eg unclassified medical and paramedical degrees, may also be admitted.
MRes/EngD: See following course entries.

Biomedical Engineering

MRes

This conversion course is offered to graduates with an interest in developing a research career in an academic, industrial or clinical setting. It introduces biomedical engineering and provides extensive training in research methodology and practice.

Curriculum

This credit-based modular degree comprises assessed instructional modules and project work.

COMPULSORY CLASSES

- > Engineering Science OR Medical Science
- > Bioengineering and Health Care
- > Research Methodology

ADVANCED CLASS OPTIONS

- (minimum of one)
- > Biomedical Electronics
 - > Materials and their Biomedical Application
 - > Medical Device Technology for Organ Replacement
 - > Biomechanics

PROJECT

Students also undertake a research/development project, chosen from a pool of relevant industrial or clinical projects, and submit a thesis.

Course Duration

12 months full-time

Entry Requirements

First- or second-class Honours degree, or equivalent, in engineering, physical science, life science, medicine, or a profession allied to medicine.

Funding

Some funding may be available. Please contact the Department for latest details.

CONTACT

Professor Helen Grant
t: +44 (0)141 548 3438
e: m.h.grant@strath.ac.uk

Medical Devices

EngD

The Doctor of Engineering (EngD) in Medical Devices is a higher degree providing engineers and physical scientists with full research training at the life sciences interface (LSI) that is relevant to medical devices and related technologies. The course is delivered by staff of the EPSRC-funded Medical Devices Doctoral Training Centre (DTC). With colleagues from Engineering, the Life Sciences and Physical Sciences, and with input from clinical advisers from the NHS and elsewhere, the DTC offers a world class research and training programme for some of the best graduate students in the UK.

Curriculum

In addition to compulsory classes, students choose from a series of elective modules in Year 1, and undertake a short individual research project working in the laboratory and research group of their choice. On completion of these modules students progress to project work on a full-time basis. The programme includes a Strathclyde Postgraduate Enterprise course which enables students to explore issues in technology transfer, spin-out companies and fundraising. Participation in industry days and events in Medical Devices in the UK is also a feature of the course.

COMPULSORY CLASSES

- > Medical Science
- > Research Methodology
- > Bioengineering and Healthcare
- > Bioinformatics
- > Advanced Molecular Technology
- > Introductory Pharmacology

ELECTIVE CLASSES

- > Biomechanics OR Medical Device Technology for Organ Replacement
- > Materials and their Biomedical Application OR Biomedical Electronics
- > Assessment of Biomedical Materials OR Prosthetics and Orthotics
- > Biomedical Instrumentation OR Orthopaedic and Cardiovascular Devices
- > Clinical Biochemistry OR Case Studies in Medical Devices

INDIVIDUAL DOCTORAL RESEARCH PROJECT (Years 2–4)

A key feature of DTC research projects is their interdisciplinary nature: each project is co-supervised by academic staff

from different scientific disciplines with expertise on a wide range of topics including drug delivery and bioimaging, cell and tissue engineering and microdevices, and many involve interaction with clinical groups or companies in the medical industries sector.

Course Duration

Four years full-time

Entry Requirements

First- or upper second-class Honours degree, or equivalent, in engineering or physical sciences.

Funding

A number of studentships are available via an EPSRC training package.

Careers

Graduates find employment in academic, medical devices research or in industry.

CONTACT

Carol McInnes
t: +44 (0)141 548 3781
e: carol.b.mcinnnes@strath.ac.uk

Medical Technology

MRes

(online learning)

The course provides full training in research for those involved in the medical technology sector. It equips students with the basic knowledge and training in medical technology research and will enable them to apply this knowledge in their own research project. The research project is undertaken in the workplace with full supervision from University staff, supported by local supervisors.

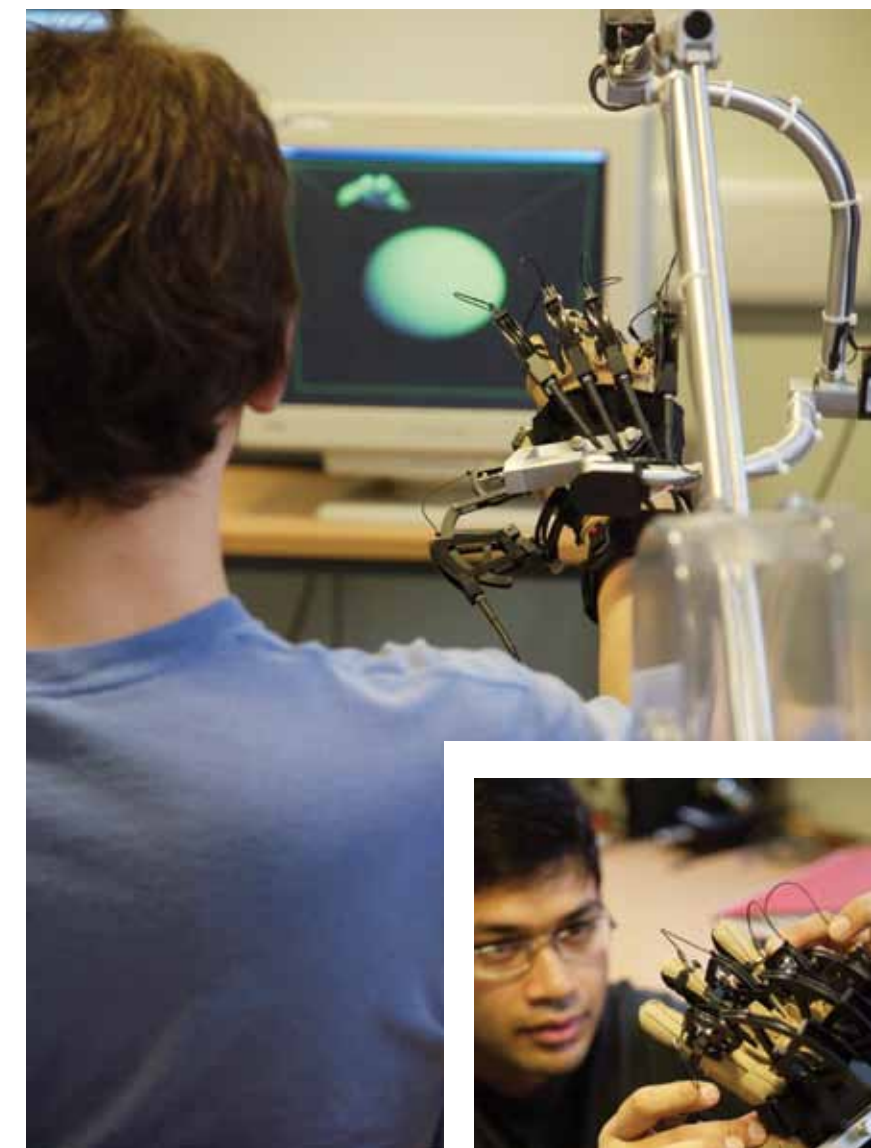
This course is ideal for clinicians, scientists and engineers involved in the application, design and manufacture of medical technology, these include: medical doctors, surgeons, nurses, other professionals allied to medicine, life scientists, design and product engineers.

Curriculum

This credit-based modular degree comprises assessed instructional modules and project work. The course is available by distance learning with web-based delivery of the instructional modules. Instructional classes are selected from the following compulsory classes and advanced study class options:

COMPULSORY CLASSES

- > Case Studies in Medical Technology
- > OR Elements of Medical Science
- > Research Methodology in Healthcare
- > Project



ADVANCED CLASS OPTIONS

(choose minimum of two)

- > Orthopaedic and Cardiovascular Device Technology
- > Biomaterials and their Applications
- > Artificial Organ Technologies
- > Diagnostic Instrumentation

Course Duration

12 months full-time; 24 months part-time

Start date

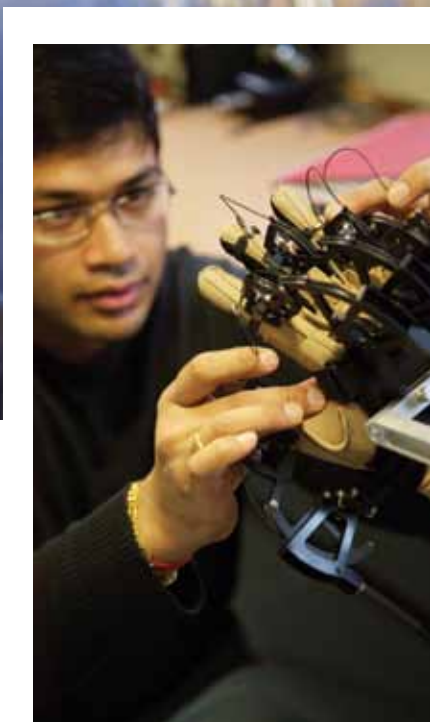
Open

Entry Requirements

First- or second-class Honours degree, or equivalent, in engineering, science, medicine or a profession allied to medicine. Where possible, prospective students will be invited for interview.

CONTACT

Professor Terry Gourlay
t: +44 (0)141 548 2005
e: terry.gourlay@strath.ac.uk



TAUGHT COURSES

Apply online:
www.strath.ac.uk/courses/postgraduate

Bioengineering Medical Devices

Bioengineering MSc/PgDip/PgCert

This credit-based modular conversion course is designed to provide students with a broad training in bioengineering, a field

of expertise bringing together engineering, medicine and the life and physical sciences.

It is accredited by the Institute of Physics and Engineering in Medicine (IPEM). An IPEM-accredited MSc is normally required for those wishing to pursue careers as Clinical Scientists in the National Health Service.

Curriculum

All students take instructional classes in the first two semesters; MSc students then complete a research or development project reported by a thesis. You also have the opportunity to visit local clinical centres and attend research seminars presented by visiting experts from the UK and overseas.

COMPULSORY CLASSES

- > Engineering Science OR Medical Science
- > Bioengineering and Health Care
- > Biomedical Electronics
- > Biomedical Instrumentation
- > Anatomy and Physiology (for students taking Engineering Science but who do not have the prerequisite background in Anatomy and Physiology)
- > Research Methodology

ADVANCED CLASS OPTIONS (minimum of six)

- > Materials and their Biomedical Application
- > Medical Device Technology for Organ Replacement
- > Biomechanics
- > Biosignal Processing and Analysis
- > Assessment of Biomedical Materials
- > Prosthetics and Orthotics
- > Orthopaedic and Cardiovascular Devices
- > Biomedical Engineering Case Studies

Course Duration

MSc: 12 months full-time;
24 months part-time
PgDip: 9 months full-time;
21 months part-time

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in engineering, physical science, life science, medicine, or a profession allied to medicine. Candidates with other qualifications, or who may benefit from a longer period of study, may take the MSc over 21 months. PgDip: Normally a first degree, but other applicants will be considered.

Funding

Some funded studentships may be available for MSc or PgDip candidates. Please contact the Department for details.

CONTACT

Professor Helen Grant
t: +44 (0)141 548 3438
e: m.h.grant@strath.ac.uk

Medical Devices MSc/PgDip/PgCert

Delivered by staff of the Doctoral Training Centre (DTC) in Medical Devices this course provides engineers and physical scientists with knowledge and understanding of the medical devices used in diagnosis and treatment of patients, to enable them to pursue a career in the Medical Device industry.

Curriculum

Participants take compulsory and advanced class options offered by DTC staff, followed by a short research project carried out under the supervision of academic staff, often in collaboration with clinical groups or with industry.

Course Duration

One year full-time or part-time

Entry Requirements

First- or upper second-class Honours degree, or equivalent, in engineering or physical science.

Funding

Funding for scholarships may be available. Please contact the Department for details.

Careers

Graduates are expected to find employment in medical devices research or in the medical industry.

CONTACT

Carol McInnes
t: +44 (0)141 548 3781
e: carol.b.mcinnnes@strath.ac.uk

RICHARD BOYLE EngD in Medical Devices (2004-2008)



I chose to study at Strathclyde because of its excellent reputation for Engineering. I enjoyed working on a multidisciplinary project and also the variety of interesting subjects that are available, such as Biomedical Science, Neural Networks and Electronics. There are also classes in areas including Accounting, Business Management and Technology Commercialisation. I had great opportunities to learn from technical experts and medics, and also to gain invaluable commercial experience.

I am currently carrying out an Enterprise Fellowship through The Royal Society of Edinburgh and Scottish Enterprise, which is based in the university. Through this, I intend to start up a small business based on the Electronic Stethoscope technology I am developing.

I would thoroughly recommend Strathclyde as it has provided me with a wealth of technical knowledge and also given me the opportunity to make lifelong contacts that have been useful not only for work, but also as friends.



Department of Chemical and Process Engineering

www.strath.ac.uk/chemeng

The Department has an excellent reputation for its research output, its close links with industry and for its innovative approach to developing undergraduate and postgraduate courses for industry-based students.

There are excellent computing facilities based on access to the high-performance computing cluster shared within the Faculty of Engineering. Purpose-built, state-of-the-art research laboratories are fully equipped to provide a first-rate working environment and excellent research facilities. We will also have access to Faculty's new £3 million Advanced Materials Lab. The Department is justifiably proud of its close liaison with industry, through company sponsors of our award-winning distance learning programmes and a number of KTP projects (Knowledge Transfer Partnership), both of which ensure that our research is industrially relevant. With extensive facilities for testing and analysis, the Department has the knowledge and capability to produce a variety of new materials for a wide range of applications.

RESEARCH AREAS

The Department of Chemical and Process Engineering is a centre of research excellence in nanoscale science and engineering, specialising in Nanostructured Materials, Biomolecular Engineering and Low Carbon Technology. These themes are interdisciplinary, involving collaboration across several Engineering and Science departments, and are supported by underpinning strengths in multi-scale modeling, and optical and adsorption measurement. They are recognised as being of key strategic importance at both national and international level in the quest to meet the challenges of energy provision, healthcare and nutrition. Research is concerned with major issues of chemical, energy and life science industries.

NANOSTRUCTURED MATERIALS

Key areas of research include the development, characterisation, measurement and modeling of novel nanostructured materials. Specific research areas include:

- > Nanostructured carbon, silicon and framework materials
- > Nanomaterials at the bio-interface
- > Adsorption fundamentals and measurement
- > Optical diagnostics of nanostructures
- > Interfacial nanostructures
- > Nanoparticle engineering



- > Polymer membranes
- > Molecular modeling

BIOMOLECULAR ENGINEERING

Key areas of research include bioanalytical technologies, biotherapeutics engineering, protein aggregation and assembly. Specific research areas include:

- > Protein aggregation
- > Crystallisation process technology
- > Bioprocess analytical technology
- > High pressure processing
- > Colloidal and soft matter engineering
- > Molecular modeling

LOW CARBON TECHNOLOGY

Key areas of research include low carbon energy devices, and gas processing. Specific research areas include:

- > fuel cells, batteries and supercapacitors
- > hydrogen storage
- > carbon capture

RESEARCH ENVIRONMENT

Chemical engineering research is inherently interdisciplinary, focused at recent developments at the interface of science and engineering. The aim is to improve knowledge transfer between science, engineering and industrial RandD to enable developments in fundamental sciences, such as physics, chemistry and biosciences, to be translated into rapid developments in engineering of new processes and products.

The Department has a comprehensive suite of experimental facilities which includes:

- > Thermogravimetric analysis
- > Differential scanning calorimetry
- > High-pressure DSC
- > Temperature programmed desorption and mass spec
- > Spectrophotometer
- > 3D DLS/SLS
- > UV-vis spectrometer
- > FTIR
- > Cavity ring-down spectrometer
- > Optical microscopy and image analysis
- > Cell test systems
- > Gas adsorption and gas separation
- > Gas chromatography
- > Facilities for the large-scale production of hollow polymer fibres
- > Membrane bioreactor
- > Very high isostatic presses
- > High-temperature furnaces
- > High-pressure viscometer
- > Rheometers

Our research students come from all over the world to participate in our active research programme in a vibrant culture of creativity, scholarship and innovation. During their research study, students have the opportunity to select credits in specialised scientific and engineering subjects and to develop their managerial skills through interaction with the Department's highly successful IGDS (Integrated Graduate Development) programme.

SCHOLARSHIP PROGRAMME

Bioengineering is pleased to offer 10 scholarships of up to £2,000 for international applicants to all our postgraduate taught programmes. The scheme is open to all well-qualified overseas students. Home applicants may apply for PSAS awards, contact Professor Helen Grant (details above).

A number of studentships are available for well-qualified applicants, including Faculty studentships and training packages funded by the Engineering and Physical Sciences Research Council.

RESEARCH DEGREES

MPhil; PhD

CONTACT

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TAUGHT COURSES

Apply online:
www.strath.ac.uk/courses/postgraduate

Chemical Processing* Chemical Technology and Management Process Engineering and Management Process Technology and Management

* Part of the Faculty's Sustainable Engineering Programme (see pg 33 for details).

Contact for Taught Courses
contact-chemeng@strath.ac.uk

Chemical Technology and Management MSc/PgDip/PgCert (part-time distance learning)

This part-time distance learning programme is based on a partnership between the Department of Chemical and Process Engineering and the Royal Society of Chemistry (RSC). It will be equally attractive to younger graduates at an early stage in their careers and to more experienced graduates who wish to update their technical knowledge and skills. Students may find the mix of technology and management an attractive and more relevant alternative to MBA-type qualifications.

The course is directed at people working as chemists in RandD, and to those in manufacturing and business management roles in the UK and overseas. The programme meets the management development needs of members of the RSC and those working in the chemical, pharmaceutical and process industries. The overriding objective is to enable students to perform better in their jobs by continuing their professional development; the courses are designed not only to impart relevant technical knowledge, but also the management skills necessary to make the most of that knowledge.

Curriculum

The MSc requires 12 taught modules and a work-based project (equivalent to three modules). The Diploma requires 10 modules and the Certificate five modules. Each module requires a study time of around 120 hours, inclusive of workshop attendance, over a six-month period. You will study the basics of finance, marketing and people management alongside the technical disciplines. A typical study programme would include modules in:

- > Management of Technological Innovation
- > Laboratory Management
- > Intellectual Property Rights
- > Process Design
- > Project Management
- > Safety and Loss Prevention
- > Accountancy and Finance
- > General and Strategic Management
- > Manufacturing Technology
- > IT Strategies

There are also a small number of intensive workshops which provide direct contact between tutors and participants and enable you to use University laboratory and computing facilities.

Course Duration

MSc: three years; PgDip: two years;
PgCert: one year

Entry Requirements

Honours degree from a relevant engineering, technology or science discipline. Entry may be possible with other qualifications provided there is evidence of relevant experience and capability of advanced study.

Careers

This course will enable you to enhance your career progression by extending your knowledge and understanding in key aspects of technology, management and business, and information technology and to apply this expertise to the early benefit of your employer.

Process Engineering and Management MSc/PgDip/PgCert

This modular programme is primarily aimed at engineering students from the UK and overseas who wish to develop careers in the oil, gas, process and chemical industries. The programme meets accreditation requirements for the Institute of Chemical Engineers. It focuses on Process Engineering with opportunities to develop core multidisciplinary and soft skills expertise from the Faculty's successful generic skills programme.

This programme can also meet the development needs of graduates from

FACT FILE



The Department offers an MSc in Chemical Processing which is part of the Postgraduate Training Programme in Sustainable Engineering (see pg 32-33). This course is of particular interest to students seeking careers in industry and to industrial staff seeking continuing professional development. The course is particularly relevant if you are interested in studying Chemical Engineering within a framework of sustainable practice. Our Chemical Engineering specialists are at the forefront of emerging technologies such as alternative fuels, nano-materials for use in advanced chemical reactors and separations processes.

a range of engineering, technology and science disciplines (eg mechanical engineers, control engineers, chemists). It uses a strong project-based approach and is relevant to the recruitment needs of a broad range of employers throughout the chemical and process sectors.

Curriculum

The MSc requires 10 taught modules and a project (equivalent to five modules). The Diploma requires 10 modules and the Certificate five modules. The key areas of the programme content are weighted as follows:

- > Process Technology 70% (Process Design, Safety Management, Multi-phase processing)
- > Management and Business 20%
- > Information Technology 10%

For graduates in disciplines other than chemical engineering, foundation or bridging modules in chemical engineering are available as pre-course reading.

Candidates wishing to cover the same scope of subjects but be involved in a multidisciplinary Sustainable Engineering programme should apply for the MSc Chemical Processing (see pg 33).

Course Duration

MSc: one year full-time
PgDip: nine months full-time
PgCert: six months full-time

Entry Requirements

An Honours degree, or equivalent, in a relevant engineering, technology or science discipline. Entry may be possible with other qualifications provided there is evidence of relevant experience and ability to study at an advanced level.

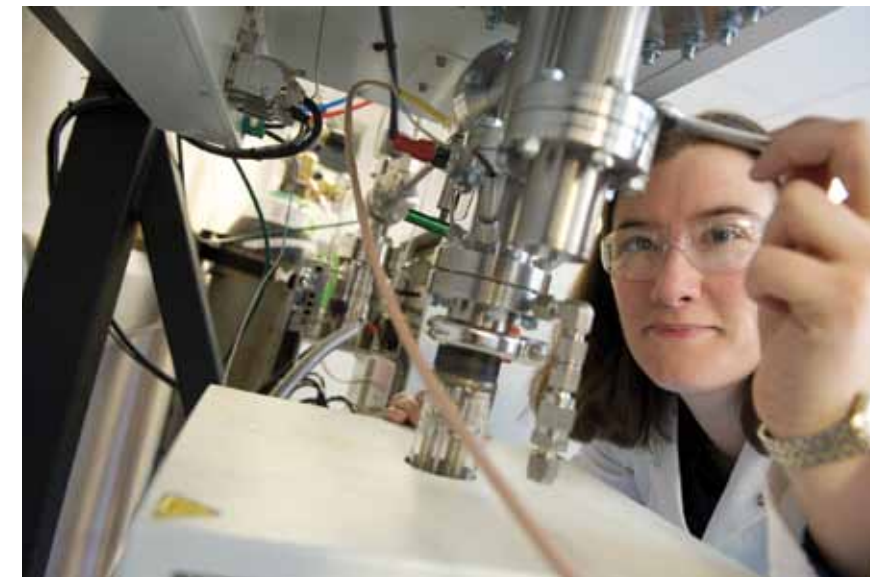
Careers

The continued success of the chemical and process industries means there is growing demand for high-calibre graduates who can develop and apply advanced process technologies in a highly competitive business environment. This programme is particularly relevant to graduates in the early stages of their careers.

Process Technology and Management MSc/PgDip/PgCert (part-time)

This part-time modular programme is primarily for industry-based students from the UK and overseas focusing on Process Technology/Management and Business/IT. The programme meets accreditation

FACT FILE: RESEARCH LABORATORY



A state-of-the-art research laboratory in one of the largest chemical engineering departments in the UK has a range of experimental facilities from light scattering to spectroscopy and adsorption measurement.

requirements for the Institute of Chemical Engineers. It uses a strong project and work-based approach and operates mainly by distance learning to provide a wide coverage and to enable delegates to spend the minimum time off-the-job.

This programme meets the development needs of graduates from a range of engineering, technology and science disciplines (eg chemical engineers, mechanical engineers, control engineers, chemists) and is relevant to a broad range of type and size of company throughout the chemical and process sectors.

Curriculum

The MSc requires eight core and four elective taught modules and a work-based project (equivalent to three modules). The Diploma requires 10 modules and the Certificate five modules. The key areas of the programme content are weighted as follows:

- > Process Technology 50%
- > Management and Business 30%
- > Information Technology 20%

For graduates in disciplines other than chemical engineering, foundation or bridging modules in chemical engineering are available.

This programme is only available on a part-time basis. Candidates wishing to

cover the same scope of subjects on a full-time basis should apply for the MSc Process Engineering and Management or MSc Chemical Processing (see pg 33).

Course Duration

- > MSc: three years part-time
- > PgDip: two years part-time
- > PgCert: one year part-time

Entry Requirements

Honours degree, or equivalent, in a relevant engineering, technology or science discipline. Entry may be possible with other qualifications provided there is evidence of relevant experience and ability to study at an advanced level.

Careers

The continued success of the chemical and process industries means there is growing demand for high-calibre graduates who can develop and apply advanced process technologies in a highly competitive business environment. This programme is particularly relevant to younger graduates in the early stages of their careers, but it is also an excellent option for more experienced graduates wishing to update their technical expertise or who find the mix of technology and management a more relevant alternative to MBA-type qualifications.

Department of Civil Engineering (including the David Livingstone Centre for Sustainability)

www.strath.ac.uk/civeng

The Department provides the highest quality professional training linking the built environment with the natural environment, combining the strengths of Civil Engineering, Environmental Health and Environmental Studies. Our multidisciplinary Department has a large international student population and global research profile.

The success rate of graduates from the Department of Civil Engineering at Strathclyde has always been excellent. Many of our courses relate to areas where there are skill shortages and career prospects remain very good even in times of economic downturn.

The Department leads the Joint Research Institute (JRI) in Environmental, Infrastructure and Transportation Engineering formed under the Glasgow Research Partnership in Engineering (GRPE). The GRPE was funded to promote multidisciplinary collaboration between the leading research groups in the West of Scotland and provide world-class joint research facilities. Member universities of the GRPE include Strathclyde, Glasgow, Glasgow Caledonian and the University of the West of Scotland. The Department is also an active member of the JRI in Mechanics of Materials, Structures and Bioengineering.

THE DAVID LIVINGSTONE CENTRE FOR SUSTAINABILITY

www.strath.ac.uk/dlcs

Civil Engineering is the main sponsor of the David Livingstone Centre for Sustainability (DLCS), which promotes cross-disciplinary programmes in teaching and research in the areas of environment and sustainability.

The David Livingstone Centre for Sustainability operates at postgraduate level across all the Faculties. It has created a multidisciplinary framework for the research, training and practice of sustainability – MSc programmes allow classes to be taken from other Faculties across the University.

The Centre's teaching and research programmes aim to enhance the longstanding international reputation of the University as 'the place of useful learning'. Its diverse expertise profile, comprising staff from social sciences, science and engineering, provides a robust basis for its evolution as a centre of excellence in sustainability studies.

The Centre builds on a long-established record since 1992 of producing top-quality graduates to meet the demands of the



environmental agencies, businesses, education and the construction industry both in the UK and internationally. In addition the Centre provides Open Access to its classes on an individual basis for those wishing to undertake professional development.

There is a vibrant cohort of postgraduate and PhD students. DLCS is a unique gateway to postgraduate programmes which draw on the wealth of expertise and research on various aspects of sustainability that are available in all Faculties of the University: Business; Engineering; Science and Humanities & Social Sciences.

We offer a friendly, supportive study environment with conference, lecture and fully networked personal computing facilities. Access to laboratories, resource libraries and administrative support services is provided. Students coming to DLCS join an enthusiastic and dynamic team in a postgraduate centre of international reputation.

The DLCS newsletter – Sustainability Matters – is published three times a year, covering feature articles, news and events and other relevant information relating to sustainability. It aims to promote discussion on the cross-disciplinary aspects of sustainability, inform the wider scientific, research and policy communities about the activities of the DLCS and promote the DLCS inter-disciplinary network within and outwith the University.

UNDERTAKING A RESEARCH DEGREE

The Department's research and knowledge exchange activities come under two multidisciplinary research groups:

INFRASTRUCTURE RESEARCH GROUP
Research in the group is focused on the following interdisciplinary areas:

- > Modelling the mechanical behaviour of soils and rocks
- > Understanding deep flow systems for carbon sequestration, hydrocarbon exploitation and radioactive waste disposal
- > Assessment of flood defences
- > Performance of structures
- > Design of improved tools and strategies for monitoring and analysis of ground and structural deformations

ENVIRONMENT RESEARCH GROUP
Research in this group is clustered around the following key themes:

- > Water Resources
- > Environmental Engineering, Sustainability and Biotechnology
- > Environmental Health and Sanitation
- > Transport Planning and Sustainability
- > Environmental Forensics

MPhil and PhD are research degrees involving independent research within these two multidisciplinary groups. The research in these groups lies not only within the traditional fields of civil engineering, but also in environmental health, contaminant transport, environmental remediation, climate change, hydrogeology, environmental forensics, sustainable development, environmental policy, Strategic Environmental Assessment

(SEA), environmental microbiology and international studies.

Both research groups are involved in a number of international and national research training initiatives. Current examples are the EC-funded Marie Curie Research Training Network, AMGISS coordinated by the Department, ALERT Geomaterials and the Malawi Millennium project.

RESEARCH ENVIRONMENT

The Department offers research training in a truly international setting and many research students benefit directly from links with a number of international and national research training initiatives.

In addition to research training, MPhil and PhD candidates benefit from training in complementary skills, such as presentation, writing and computing. Furthermore, research students can attend specialist classes, lectures and training courses across the University, as well as Departmental Research Seminars. Each student is assigned two supervisors for the duration of their degree (a PhD takes three years on average and MPhil one year).

The Department has a diverse and dynamic community of research students and assistants, representing over a dozen nationalities. It regularly attracts research studentships from industry, the Research Councils, the EC, charitable institutions and government departments. The Department is active in basic and applied research – the latter supported by strong links with industry and public bodies. Facilities include modern laboratories with highly-trained personnel and sophisticated equipment.

The recently updated microbiological laboratory is provided with items to perform molecular analysis of microbial communities from engineered and natural systems. The facility has equipment to perform nucleic acid purifications, denaturing gradient gel electrophoresis (DGGE), gel visualisation, quantitative PCR and DNA cloning. We are also supported by other services within the University, such as DNA sequencing.

In 2010, the Faculty of Engineering invested £2M in a state-of-the-art Advanced Materials Facility, including a geomaterials laboratory led by Civil Engineering. The Advanced Materials Laboratory will enable materials analysis from the atomic-scale through to the macro scale.

DLCS RESEARCH

The Centre is active in theoretical and applied research, the latter supported by strong links with industry and public bodies. Much of the research is supported by the Research Councils and the EC. It has a strong profile in industrial and publicly-funded research and has undertaken several Knowledge Transfer Partnership Programmes.

FACT FILE: AWARD-WINNING ENVIRONMENTAL ENGINEERING



Professor Bob Kalin, overseeing the installation of PRB (permeable reactive barrier)

Professor Robert Kalin, the course manager for the MSc in Environmental Forensics, is a leading international figure in this subject area. His research interests are focused on Environment Science and Engineering to underpin the global sustainability agendas. His work ranges from site specific biogeochemistry of contaminated land and groundwater (including engineering design of sustainable remediation methods), development of new enhanced in-situ remediation methods that manage sustainable risk, to hydrogeology and palaeohydrology of local to regional scale groundwater systems, and study of global biogeochemical cycles and climate change.

An investment of over £1 million was recently made by the University to upgrade research laboratory facilities for Environmental Forensics to the highest international standard. Most recent advances of analytical chemistry, biogeochemistry, hydrogeology, atmospheric pollution and microbiology are now being applied to Environmental Forensics by researchers and scientists at Strathclyde.

Examples of research themes include environmental resource management and quality, infrastructure, environmental microbiology, geotechnics, radioactive waste control, contaminant remediation, hydrogeology, structures, environmental health, environmental forensics, Strategic Environmental Assessment (SEA), environmental justice, economics and sustainable development.

RESEARCH DEGREES

Apply online at: <http://pgr.strath.ac.uk>
MPhil; PhD

Entry Requirements

Candidates with first- or upper-second class Honours degree (or equivalent) in any discipline, who are able to formulate an innovative research proposal in consultation with their potential supervisors, are invited to apply to the MPhil or PhD programmes. Previous research/industrial experience is an advantage but is not essential.

CONTACT

Lisa Lyons
t: +44 (0)141 548 3277
e: lisa.lyons@strath.ac.uk

MRes PROGRAMMES

(Masters by Research)

Apply online at: <http://pgr.strath.ac.uk>**Geo-environmental Engineering
Infrastructure Adaptation for
Climate Change
Integrated Pollution Prevention
and Control****Geo-Environmental Engineering
MRes**

This course is designed to respond to the engineering community's demand for the multidisciplinary skills required for the successful completion of geoenvironmental engineering projects. The course will appeal to UK graduates in fields such as civil engineering, environmental engineering, environmental science, geography, environmental protection and biological sciences. The course will also appeal to graduates already employed in overseas government ministries and other public bodies related to engineering, earth sciences, environmental protection, sustainable development, environmental impact assessment, ecology, geotechnical engineering, solid waste management, recycling and more.

Curriculum

Students take four compulsory modules, plus a choice of two modules from any of the Department's postgraduate courses and undertake a supervised thesis project on a topic selected in consultation with course leaders.

COMPULSORY MODULES

- > Recycling Urban Land
- > Research Protocols for Science and Engineering
- > Site Investigation and Risk Assessment
- > Waste Management and Landfill Design

OPTIONAL MODULES (examples)

- > Air Pollution Impact Assessment
- > Environmental Impact Assessment
- > Geographical Information Systems (GIS)
- > Hydrogeology
- > Water and Waste Water Treatment Design
- > Any postgraduate-level module offered by the Department

Course Duration

12 months full-time; 36 months part-time

Entry Requirements

First- or second-class Honours degree from a UK University (or equivalent overseas qualification) in an engineering, life science or earth science discipline.

Careers

Graduates are found in industry – there is a global shortage of such graduates particularly in the construction sector and government organisations. The MRes is also showcased as a springboard to PhD and a career in academia.

**Infrastructure Adaptation
for Climate Change****MRes**

This course aims to provide advanced study in infrastructure adaptation for climate change from the perspective of the engineering profession. It is largely research- and project-based but there is also a taught element to it. Students have access to laboratory facilities providing the hands-on experience essential for understanding and designing projects for sustainable development and climate change adaptation. This course is designed mainly for engineering graduates and public and private sector employees who wish to upgrade their skills to be able to tackle the complex issues relating to sustainable development, and to design engineering options for sustainable development climate change adaptation.

Curriculum

All students take four compulsory modules, plus a choice of two modules from any of the Department's postgraduate courses. In addition, MRes students undertake a thesis project on a topic selected in consultation with the course leaders.

COMPULSORY MODULES

- > Climate Change Mitigation and Adaptation
- > Research Protocols for Science and Engineering
- > Strategic Construction Procurement
- > Transport Development and Sustainability

OPTIONAL MODULES (examples)

- > Business Strategy and the Environment
- > Environmental Impact Assessment
- > Environmental Management Systems
- > Principles of Sustainable Development
- > Recycling Urban Land
- > Science, Technology and Innovation Policy
- > Site Investigation and Risk Assessment
- > Any postgraduate-level module offered by the Department

Course Duration

12 months full-time; 36 months part-time

Entry Requirements

First- or second-class Honours degree from a UK University (or equivalent overseas qualification) in an engineering, life science or earth science discipline.

**AUDREY MEIKLE
MRes 2007, part-time PhD student**

The combination of my 10 years' business experience and an MRes in Integrated Pollution Prevention and Control were key factors in obtaining my post of Project Officer for a technology transfer project that includes green tourism and sustainable construction and which has utilised my knowledge in waste management, EIA and air pollution, not to mention my previous business experience.

I am now at the stage that I want to extend my knowledge and I found that the MRes is a fantastic stage towards a PhD. The relationships built at Strathclyde and the help I have received made the decision so much easier and I am now pursuing a PhD part-time at Strathclyde.

**Careers**

Graduates find careers in the construction and related industries, engineering and environmental consultancies, local government and other government organisations. Many successful part-time students seek promotion to managerial posts with their current employer. The MRes is also showcased as a springboard to PhD and a career in academia.

**Integrated Pollution
Prevention and Control****MRes**

With bigger companies routinely employing environmental managers to deal with issues such as the ISO 9001/ISO 14001 and new pollution prevention and control (PCC) legislation, this MRes is extremely relevant. It supplies the multidisciplinary skills required to conduct IPPC projects which are not provided by typical undergraduate courses in Environmental Health, Public Health, Chemistry, Earth Sciences and the Life Sciences. This course will appeal to students from a range of undergraduate programmes including but not limited to civil engineering, environmental engineering, environmental science, chemistry, environmental health, environmental protection and biological sciences.

Curriculum

Students take four compulsory modules, plus a choice of two modules from any of the Department's postgraduate courses and undertake a supervised thesis project on a topic selected in consultation with the course leaders.

COMPULSORY MODULES

- > Atmospheric Pollution Impact Assessment
- > Research Protocols for Science and Engineering
- > Site Investigation and Risk Assessment
- > Waste Management and Landfill Design

OPTIONAL MODULES (examples)

- > Climate Change Mitigation and Adaptation
- > Fundamentals of Environmental Forensics
- > Pollution and Rehabilitation of Degraded Ecosystems
- > Principles of Environmental Microbiology
- > Recycling Urban Land
- > Water and Wastewater Treatment Design
- > Any postgraduate-level module offered by the Department

Course Duration

12 months full-time; 36 months part-time

Entry Requirements

First- or second-class Honours degree from

a UK University (or equivalent overseas qualification) in an engineering, life science or earth science discipline.

Careers

Graduates are found working for the Scottish Environment Protection Agency and other government agencies, environmental management consultancies and industries. The MRes is also showcased as a springboard to PhD and a career in academia.

CONTACT FOR MRes PROGRAMMES

Lisa Lyons

t: +44 (0)141 548 3170

e: lisa.lyons@strath.ac.uk**TAUGHT COURSES**

Apply online:

www.strath.ac.uk/courses/postgraduate**Environmental Engineering
Environmental Entrepreneurship
Environmental Forensics
Environmental Health
Environmental Science
Geotechnics
Global Water Sustainability
Hydrogeology
Sustainability and Environmental Studies****Contact for MSc Taught Courses**e: dlcs@strath.ac.uk

Unless otherwise stated, our Diploma and MSc courses run concurrently, involving core modules and a wide range of optional modules (September – May). MSc students undertake a dissertation after successful completion of the taught component (June – August).

Course Duration

MSc: 12 months full-time; 24 months part-time
PgDip: 9 months full-time; 18 months part-time

**Open Access/Continuing
Professional Development**

UK students have the option of undertaking classes on an individual basis. Unless otherwise stated, the MSc or PgDip degrees listed above can be achieved via this study option if the required credits are gained within the maximum part-time study period (five years).

Accreditation

Where applicable our MSc courses are accredited by the Institution of Civil Engineers (ICE) as meeting the requirements for further learning to enable students to achieve professional Chartered Engineer status. These innovative courses (some are unique in the UK and Europe) already involve extensive industrial

collaboration and further partnerships with companies, government agencies and NGOs are being developed.

Funding

Student Awards Agency for Scotland (SAAS) quota funding and other studentships are normally available for some courses.

**Environmental Engineering
MSc/PgDip**

This course meets the needs of Scotland and Europe's urban regeneration, environmental protection, contaminant remediation and infrastructure investment portfolios. It is suitable for graduates from engineering, earth sciences, environmental management or other relevant disciplines. Candidates from industry could continue in employment and complete the MSc in part-time mode. This MSc course is accredited by the Institution of Civil Engineers (ICE) as meeting the requirements for Further Learning, designed to enable students to achieve professional Chartered Engineer status.

Curriculum**COMPULSORY MODULES**

- > Environmental Impact Assessment
- > Hydrogeology
- > Recycling Urban Land
- > Research Methodology with Environmental Monitoring and Analysis
- > Site Investigation and Risk Assessment
- > Waste Management and Landfill Design

OPTIONAL MODULES

(Four or five to be chosen)

- > Air Pollution Control
- > Applied Strategic Environmental Assessment
- > Climate Change Mitigation and Adaptation
- > Ecology, Biodiversity and Sustainability
- > Fundamentals of Environmental Forensics
- > Global Water Policy
- > Ground Improvement and Reinforcement
- > Pollution and Rehabilitation of Degraded Ecosystems
- > Principles of Environmental Microbiology
- > Principles of Sustainable Development
- > Spatial Query and Analysis using GIS
- > Strategic Construction Procurement
- > UK and EU Environmental Law

Entry Requirements

MSc: First- or second-class Honours degree from a UK University (or equivalent overseas qualification) in engineering, earth sciences, environmental management or other relevant disciplines.
PgDip: Alternative academic qualifications, or professional qualifications or experience, may be considered (including successful completion of Open Access classes).

Careers

The career prospects of graduates are excellent because, despite the recent economic downturn, there are significant skills shortages in the environmental engineering field both in the UK and overseas.

Environmental Entrepreneurship MSc/PgDip

This course aims to create a whole new generation of 'ecopreneurs' with the skills to launch new ventures, strategies, products, and technologies that address society's environmental and natural resource problems. The course is not just about green industries. It is also about developing 'win-win' business opportunities, which simultaneously protect the environment and save money, in any kind of organisation. This innovative MSc – the first of its kind in Europe – is the result of a cross-faculty collaboration. The course is offered to students from all disciplinary backgrounds.

Curriculum

COMPULSORY MODULES

Department of Civil Engineering:

- > Business Strategy and the Environment
- > Research Methods and Participatory Approaches
- > Client-Based Environmental Entrepreneurship in Practice

Hunter Centre for Entrepreneurship:

- > Accessing Resources
- > Opportunity Recognition

OPTIONAL MODULES

(Four or five to be chosen)

Department of Civil Engineering:

- > Climate Change Mitigation and Adaptation

- > Ecology, Biodiversity and Sustainability
- > Environmental Management Systems
- > Global Water Policy
- > Principles of Sustainable Development
- > Recent Trends in Technological Progress
- > Science, Technology and Innovation Policy

Hunter Centre for Entrepreneurship:

- > Personal Effectiveness and Entrepreneurship
- > Technology Venture Management

Department of Mechanical Engineering:

- > Energy Resources and Policy

Department of Economics:

- > Environmental Economics

The Law School:

- > UK and EU Environmental Law

Entry Requirements

MSc: First- or second-class Honours degree from a UK University (or equivalent overseas qualification) in any discipline.

PgDip: Alternative academic qualifications, or professional qualifications or experience, may be considered (including successful completion of Open Access classes).

Careers

Graduates may follow a broad range of careers, for example in manufacturing, the food industry, tourism, engineering, retailing, business, energy and technology sectors, in local or central government, or in NGOs. They may follow a consultancy path or choose to start their own business. Graduates can take advantage of practical help from the Strathclyde Entrepreneurial Network (SEN).

STEVEN FINNIE MSc Environmental Entrepreneurship 2009



The course was extremely rewarding and fulfilling. One of the best aspects of the course is that all the modules include students from a variety of different degrees, which facilitates varied and passionate discussions! Another benefit is that some of the modules are taken at the Hunter Centre for Entrepreneurship. Whether intending to start a new business or not, the expertise available at the Hunter Centre is invaluable and provides great advice and support for anyone entering the world of business.

For the client-based module, which involved working directly with a company to implement or improve their environmental credentials, I was lucky enough to work with Scottish Enterprise writing a report on how climate change will affect industries in Scotland. The chance to work in a real-life situation and write a report that would actually be used was invaluable. In addition, this work indirectly led to my current job, which I started before I even graduated



Environmental Forensics MSc/PgDip

This MSc harnesses Strathclyde's world-leading expertise in the emerging discipline of Environmental Forensics which aims to prove, to the satisfaction of a court of law, who is responsible for instances of pollution. The course develops students' ability to make sound judgments, within a legal context, in relation to the impact of human activity on the environment. It is suitable for students from all disciplinary backgrounds and people from industry can complete the MSc in part-time mode. This MSc course is accredited by the Institution of Civil Engineers (ICE) as meeting the requirements for Further Learning, designed to enable students to achieve professional Chartered Engineer status.

Curriculum

COMPULSORY MODULES

Department of Civil Engineering:

- > Fundamentals of Environmental Forensics
- > Recycling Urban Land
- > Research Methodology with Environmental Monitoring and Analysis
- > Site Investigation and Risk Assessment

Centre for Forensic Science:

- > Essentials of Forensic Science

The Law School:

- > UK and EU Environmental Law

OPTIONAL MODULES

(four to be chosen)

- > Atmospheric Pollution Impact Assessment
- > Ecology, Biodiversity and Sustainability
- > Hydrogeology
- > Pollution and Rehabilitation of Degraded Ecosystems
- > Principles of Environmental Microbiology
- > Spatial Query and Analysis using GIS
- > Waste Management and Landfill Design

Entry Requirements

MSc: First- or second-class Honours degree from a UK University (or equivalent overseas qualification) in any discipline. PgDip: Alternative academic qualifications, or professional qualifications or experience, may be considered (including successful completion of Open Access classes).

Careers

Engineering consultants, those in the legal profession and environmental consultants who have a thorough comprehension of this interdisciplinary approach are increasingly in demand. As this is the first MSc in Environmental Forensics in the UK, the career prospects of graduates are excellent.

Environmental Health MSc/PgDip

Environmental Health is the assessment and management of environmental influences on human health. The linkage between Environmental Health, Civil and Environmental Engineering and specialist Environmental Science/Management teaching at Strathclyde represents a globally unique combination that directly addresses many of the changing and emerging threats to public health across the developed and developing world. Students learn about interdisciplinary science and engineering-based approaches for effective management of risks to human health from a wide range of influences in the built and natural environment. This course is accredited by the Royal Environmental Health Institute of Scotland.

Curriculum

COMPULSORY MODULES

- > Atmospheric Pollution Impact Assessment
- > Food Inspection and Control
- > Food Safety and Hygiene
- > Infection and Vector Control
- > Introduction to Health and Safety
- > Occupational Health and Toxicology
- > Public Health Studies
- > Recycling Urban Land
- > Waste Management and Landfill Design

OPTIONAL MODULES

- > Acoustics
- > Air Pollution Control
- > Climate Change Mitigation and Adaption
- > Environmental Impact Assessment
- > Housing Policy and Law
- > Principles of Environmental Microbiology
- > Research Methodology and Techniques

Entry Requirements

MSc: First- or second-class Honours degree from a UK University (or equivalent overseas qualification) in a relevant science or engineering discipline.

PgDip: Alternative academic qualifications, or professional qualifications or experience, may be considered (including successful completion of Open Access classes). Each application is judged on its own merits.

Careers

Many graduates have highly successful careers in environmental consultancy, health and safety management, food industry, public water utilities, waste management, and housing sector. One option is to develop a career as an Environmental Health Officer (EHOs), where the variety and nature of work, salaries, working conditions, job security and fringe benefits compare very favourably with other graduate-level

INTERNATIONAL EXCELLENCE AWARDS

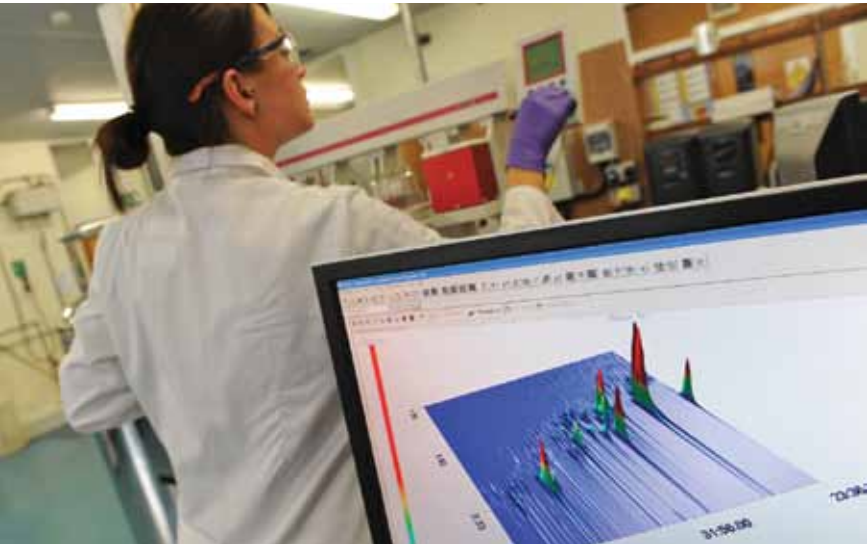
The Department of Civil Engineering/DLCS is offering prestigious £1,000 scholarships to attract the very best international students to our innovative MSc and MRes courses.

For more information and how to apply for the awards visit:
www.strath.ac.uk/civeng/pg/excellenceawards

Contact

Pippa Tawse
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e: pippa.tawse@strath.ac.uk

FACT FILE: FIRST-CLASS FACILITIES



The Environmental Forensics laboratory is the first in the UK to have the facilities for both stable isotopic and comprehensive 3D GCxGC TOFMS analyses enabling researchers to test groundwater, soil, food or air samples for contamination and accumulate evidence to prove liability. The laboratory will become a shared resource and centre for excellence in environmental forensics in Scotland.

disciplines (recent EHO starting salaries in Scotland range from £24K–£32K pa).

Environmental Science MSc/PgDip

This MSc is offered jointly by the Universities of Strathclyde and Glasgow (awards are made in the name of both universities), in collaboration with the Scottish Environment Protection Agency. The course is the only cross-disciplinary, science-based postgraduate course of its kind in Scotland, covering the fundamental scientific concepts of environmental science which will enable graduates to think and act holistically with regard to environmental and sustainability issues. The MSc has a particularly strong scientific underpinning to environmental analysis, with nearly 100 hours of practical and laboratory work.

This MSc course is accredited by the Institution of Civil Engineers (ICE) as meeting the requirements for Further Learning, designed to enable students to achieve professional Chartered Engineer status.

Curriculum

COMPULSORY MODULES

Strathclyde – Civil Engineering

- > Air Pollution Control
- > Atmospheric Pollution Impact Assessment
- > Research Methodology with Environmental Monitoring and Analysis

Glasgow – Chemistry

- > Science of the Natural Environment: Applications
- > Science of the Natural Environment: Fundamental Principles
- > Water Pollution

OPTIONAL MODULES

(All taught by Strathclyde – two to be chosen)

- > Climate Change Mitigation and Adaptation
- > Ecology, Biodiversity and Sustainability
- > Environmental Impact Assessment
- > Environmental Management Systems
- > Fundamentals of Environmental Forensics
- > Global Water Policy
- > Pollution and Rehabilitation of Degraded Ecosystems
- > Principles of Environmental Microbiology
- > Principles of Sustainable Development
- > Spatial Query and Analysis using GIS

Entry Requirements

MSc: First- or upper second-class Honours degree from a UK University (or equivalent overseas qualification) in earth, biological and physical sciences, engineering, mathematics, environmental management, and other relevant disciplines.

PgDip: Alternative academic qualifications, or professional qualifications or experience, may be considered.

Careers

There is a global demand for scientists trained in environmental science, and this course has been designed to produce such individuals.

Graduates jobs include environmental scientists, sustainable development officers, environmental consultants and environmental regulation officers.

Geotechnics MSc/PgDip

This course is offered jointly by the Universities of Strathclyde and Glasgow run in partnership with a range of industrial partners, representing consultants, contractors and site investigation specialists. The academics contributing to the course are international experts in their field, supported by two Visiting Professors from industry. The course is sponsored by PLAXIS BV and by Wilde Analysis Ltd who provide the internationally known PLAXIS finite element code for geotechnical analyses. The innovative feature of the course is the integration of modern techniques for analysis, such as numerical modelling using PLAXIS. This MSc course is accredited by the Institution of Civil Engineers (ICE) as meeting the requirements for Further Learning, designed to enable students to achieve professional Chartered Engineer status.

The course acts as a geotechnical specialisation degree for civil engineering graduates as well as a conversion degree for earth sciences, physics and mathematics graduates wishing to develop skills for an exciting career in geotechnical engineering.

Curriculum

The Diploma and MSc courses run concurrently, involving 120 credits of classes. MSc students undertake a dissertation after successful completion of the taught component. Formal classes are scheduled for two days per week to facilitate part-time study.

Main topics include:

- > Design of Shallow and Deep Foundations
- > Design of Slopes and Walls
- > Fundamentals of Soil Mechanics
- > Geo-environmental Engineering
- > Ground Improvement and Reinforcement
- > Groundwater
- > Rock Mechanics and Tunnelling
- > Site Investigation and Risk Assessment
- > Soil Modelling and Numerical Analysis

Case studies and design projects are based on real projects, developed in collaboration with the industrial partners, and incorporate the recently introduced Eurocodes in geotechnical design. The industry partners also propose topics for industrially-relevant MSc projects.

Entry Requirements

MSc: First- or upper second-class Honours degree from a UK University, or equivalent

overseas qualification, in engineering, earth sciences, physics or mathematics. PgDip: Alternative qualifications may be considered.

Careers

There is a huge skills shortage in the geotechnical industry European-wide and despite the recent economic downturn, this need continues, given that about 50% of the Chartered Engineers in the field are expected to retire within 10 years. There is an increasing need to respond to the demands created by ageing infrastructure, sustainable transport infrastructure and the challenges created by climate change.

Global Water Sustainability MSc/PgDip

This course is offered jointly by the University of Strathclyde and the University of Glasgow (awards are made in the name of both universities). The aim is to understand the nature of the freshwater crisis facing the planet and how this impacts on our lives in terms of pollution, water supply, water for energy, sanitation, wastewater, climate change and groundwater availability. The course explores the idea of 'water footprinting', in a similar manner to 'carbon footprinting', and is geared towards a combination of engineering problem-solving and environmental sustainability understanding, empowering engineers and scientists in a range of methods to analyse and design water schemes.

Curriculum

COMPULSORY MODULES

- > Ecology, Biodiversity and Sustainability
- > Environmental Impact Assessment
- > Global Water Policy
- > Hydrogeology
- > Sustainable River Engineering Management
- > Water and Wastewater Treatment
- > Water Pollution

OPTIONAL MODULES

(five to be chosen)

- > Applied Strategic Environmental Assessment
- > Climate Change Mitigation and Adaptation
- > Coastal and Estuary Processes
- > Environmental Management Systems
- > Financial Engineering
- > Research Protocols in Science and Engineering
- > Science, Technology and Innovation Policy
- > Spatial Query and Analysis using GIS
- > Water Resources in Africa – Case Study

Entry Requirements

First- or second-class Honours degree from a UK University (or equivalent overseas



qualification) in civil engineering, geography/ earth sciences, environmental science or similar discipline. Applications are through the University of Glasgow but students are registered for the MSc at both Universities.

Careers

There is a global demand for scientists and engineers trained in the water environmental area. With the background of the Millennium Development Goals and the International 'Water for Life' Decade (2005 to 2015), this MSc is of great interest to developing countries and the developed world alike.

Hydrogeology MSc/PgDip

Hydrogeology is a key component of the water resources management required to meet the UN Millennium Development Goals and the 'Water for Life Decade, as well as meeting the targets required from the European Water Framework Directive. This new MSc, run in collaboration with the British Geological Survey, will prepare students as functional hydrogeologists to meet the needs of industry, regulators, government, and consultants throughout the UK, Europe and, through linked research and projects, the needs of arid zone countries, such as Malawi, Mozambique, Tanzania and the Middle East.

Curriculum

COMPULSORY MODULES

- > Aquifer Mechanics
- > Global Water Policy
- > Groundwater Flow Modelling
- > Hydrogeology
- > Installation Techniques and Risk

Assessment

- > Research Methodology with Environmental Monitoring and Analysis
- > Treatment Technologies

OPTIONAL MODULES

(four or five to be chosen)

- > Applied Strategic Environmental Assessment
- > Climate Change Mitigation and Adaptation
- > Ecology, Biodiversity and Sustainability
- > Environmental Impact Assessment
- > Environmental Modelling
- > Fundamentals of Environmental Forensics
- > International Environmental Policy
- > Pollution and Rehabilitation of Degraded Ecosystems
- > Principles of Environmental Microbiology
- > Principles of Sustainable Development
- > Solid Waste Management
- > Spatial Query and Analysis using GIS
- > UK and EU Environmental Law
- > Water and Environmental Management

Entry Requirements

MSc: First- or second-class Honours degree from a UK University (or equivalent overseas qualification) in earth sciences, civil engineering, environmental engineering or related disciplines. PgDip: Alternative academic qualifications, or professional qualifications or experience, may be considered (including successful completion of Open Access classes).

Careers

Graduates are in high demand and it is anticipated that the shortage of hydrogeologists in the UK will last for the next decade. In addition, issues of water





scarcity, water security, water economics and health and sanitation throughout the world all rely on high quality hydrogeology knowledge.

Sustainability and Environmental Studies MSc/PgDip

This popular MSc, established in 1992, offers an innovative cross-disciplinary approach to the study of sustainability, environmental management, policy, technology innovation and development. It aims to develop an understanding of the theoretical perspectives associated with the decision tools used to apply sustainable development policy and management.

Curriculum

COMPULSORY MODULES

- > Applied Strategic Environmental Assessment
- > International Environmental Policy
- > Principles of Sustainable Development
- > Research Methods and Participatory Approaches

OPTIONAL MODULES

- (six or seven to be chosen)
- > Air Pollution Control
 - > Business Strategy and the Environment
 - > Climate Change Mitigation and Adaptation
 - > Ecology, Biodiversity and Sustainability
 - > Energy Resources and Policy
 - > Environmental Economics
 - > Environmental Impact Assessment
 - > Environmental Management Systems
 - > Environmental Modelling

- > Fundamentals of Environmental Forensics
- > Global Water Policy
- > Pollution and Rehabilitation of Degraded Ecosystems
- > Principles of Environmental Microbiology
- > Recent Trends in Technological Progress
- > Science, Technology and Innovation Policy
- > Solid Waste Issues
- > Spatial Query and Analysis using GIS
- > Strategic Construction Procurement
- > Sustainable Development Education
- > Transport, Development and Sustainability
- > UK and EU Environmental Law
- > Water and Environmental Management

Entry Requirements

MSc: First- or second-class Honours degree from a UK University (or equivalent overseas qualification) in any discipline.
PgDip: Alternative academic qualifications, or professional qualifications or experience, may be considered (including successful completion of Open Access classes).

Careers

There has been a strong demand for graduates with environmental management and policy-making skills. This programme provides the opportunity to develop applied professional skills and knowledge and graduates are employed in a range of positions in private consultancies, government agencies, local authorities, businesses and industries.

Contact for MSc Taught Courses

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e: dlcs@strath.ac.uk

DOMINIC RWEKAZA MSc in Sustainability and Environmental Studies



As an international student at Strathclyde, I was really impressed with the teaching and interaction on this course, as well as the spirit of cooperation being shown at the University from both international and Scottish students. My degree was useful in advancing my career in my home country of Tanzania, East Africa, as a professional engineer, especially on jobs involving environmental issues which are of great concern for the mining sector.



Department of Design, Manufacture and Engineering Management

www.strath.ac.uk/dmem

The Department of Design, Manufacture and Engineering Management (DMEM) conducts broad-based education and research of relevance to the needs of industry and commerce as well as public sector policy. Underpinning all the postgraduate teaching offered by the Department are active research projects funded by various UK research councils, EU programmes and UK government's Technology Strategy Board (DMEM has the highest number of Knowledge Transfer Partnership programmes in Scotland).

RESEARCH

Our research mission is to bring together product design and development, manufacturing technology and engineering management research. This is a holistic and inclusive 'total engineering' approach to business and manufacturing which aims to provide solutions to a range of multidisciplinary global challenges by applying engineering thinking to those challenges.

The Department's research is integrated under the auspices of the Leonardo Centre for Creating, Making and Managing and is clustered into three main research themes as described below.

MANUFACTURING ENGINEERING

This theme is focused on the research and development of experimental and numerical modeling techniques to improve the economic and technical performance of material forming technologies. The group is well known for the production of computer simulations verified through rigorous experimentation on the Department's unique metal-deformation equipment. The Department's capabilities in this area are dramatically enhanced by the purpose-built Advance Forming Research Centre incorporating state-of-the-art laboratories and forming presses. This group is currently active in the following areas: Net-shape Bulk Metal Forming; New Bulk-forming Processes and Techniques; Micro forming technologies; Design and Analysis of Forming Machinery; Manufacture of Cellular Bio-Materials via Sonication; Remanufacturing.

OPERATIONS MANAGEMENT

Projects under this theme are usually funded through the UK government, EU and industry with a view to creating and testing new technologies, management practices and concepts to improve the performance of



organisations from a broad range of industry and commercial sectors.

Specific interests include: Strategy and Performance Management; Process Excellence; Collaboration and Supply Chain Management; High Value Manufacturing; Design, Manufacture and Supply Chain Management for Renewable Energy; Service Operations Management and Service Innovation.

DMEM also hosts two interdisciplinary research institutes that integrate a number of disciplines across the University and beyond to deliver user-led research and development programmes. These institutes are:

The Advanced Forming Research Centre (AFRC) – a partnership between the University of Strathclyde and global industrial manufacturing companies. The AFRC conducts applied and fundamental research into forming and forging technologies. The current AFRC members range from major multinationals such as Boeing, Mettiss Aerospace and Rolls-Royce, through to specialist suppliers such as Bodycote, Mititoyo and Renishaw. The AFRC will be housed within a purpose-built facility with dedicated staff and equipment close to Glasgow Airport which is due to open in late 2010.

Strathclyde Institute for Operations Management (SIOM) – with a mission to provide thought leadership and facilitate the advancement of the theory and practice of operations management, SIOM brings together the leading experts in Operations

Management from Strathclyde's Business School and Engineering Faculty to establish Operations Management as a strategic resource in the University. For further information visit www.strath.ac.uk/siom

UNDERTAKING A RESEARCH DEGREE

The Department offers the MPhil and PhD research degrees. We welcome research proposals related to our three main research themes described above. We would particularly welcome proposals for interdisciplinary research crossing over these themes.

CONTACT

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TAUGHT COURSES

Apply online:
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Computer Aided Engineering Design*
Digital Creativity
Engineering Design*
Global Innovation Management
Integrated Product Development*
Management of Competitive Manufacturing*
Operations Management in Engineering
Supply Chain and Operations Management
Technology Management*

* Part of the Faculty's Sustainable Engineering Programme (see pg 32 for details).

Digital Creativity MSc/PgDip/PgCert

Digital Creativity has become paramount in our society, influencing all aspects of our life, all industrial sectors and all types of design including industrial, interior, product and graphical.

This course is aimed at developing high-calibre Master's graduates with the skills and knowledge to utilise new digital technologies in the creative process. The course would appeal to a wide range of disciplines including architecture, arts, computer science, design, media and engineering.

Course Structure

The Course Structure and content are based on the digital society needs of the 21st century creative organisations. Core elements focus on the digital medium for supporting creativity. Optional classes allow you to customise the course to suit your particular career aspirations. Throughout the course, there is an emphasis on integration, enhanced by group assignments, team projects, and industrial visits.

Curriculum

COMPULSORY MODULES

- > Digital Media
- > Information Management
- > Product Modelling and Visualisation
- > Virtual Reality and Rapid Prototyping

OPTIONAL MODULES

(up to three can be chosen)

- > Building Information Modelling
- > CAED Software Systems Design
- > CAED Systems
- > Design Methodology
- > Generative Design
- > Knowledge Management
- > People, Organisation and Technology
- > Virtual World for Design
- > Project Work and Project Management

Course Duration

MSc: 12 months full-time; 24 months part-time
PgDip: 9 months full-time; 21 months part-time

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in relevant discipline. Candidates with lesser qualifications who have appropriate professional or industrial experience may also be eligible.
PgDip: Degree or good HND, or equivalent. Relevant industrial experience is valued. Depending on satisfactory progress, students may transfer from the Diploma to the Master's course.

Careers

Graduates may expect careers in a wide variety of sectors and disciplines including

advertising, animation, architectural design, computer graphics, design, film, industrial design, marketing, media, multimedia development, virtual reality, and web development.

Global Innovation Management MSc (Jointly Awarded)

Innovation management is the process of managing the transfer of research output into innovative organisations, processes, products or services. The University of Strathclyde, Aalborg University (Denmark) and Hamburg University of Technology (Germany) developed this programme to help meet the current demands of industry and EU strategy and to provide students with a broad, truly global perspective of Innovation Management. The programme is delivered in English at the institutions and is intended for graduates in engineering, science or technology.

Curriculum

All students undertake a common first year at Strathclyde, with practical experience of working within globally distributed teams and with an industrial client on product/service development briefs.

COMPULSORY CLASSES

- > Innovation Management
- > Strategic Technology Management
- > Design Management
- > Design Methods
- > Supply Chain Management
- > Manufacturing and Business Strategy
- > Product Development Project
- > Global Design

OPTIONAL MODULES

(two can be chosen)

- > People, Organisation and Technology
- > Design for Manufacture and Assembly
- > Total Quality and Continuous Improvement
- > Production Branding and Promotion

The first semester of the second year is spent either studying in Germany or on an industrial internship in Denmark. The course concentrates on market research, cross-functional cooperation within the front end of the innovation process, managing innovation projects and preparing the market introduction of new products and services. The internship provides global innovation management work experience during which students deliver a project to the host Danish company. In the final semester all students undertake a thesis project, supervised jointly between the second-year host institution and another partner institution.

Course Duration

24 months full-time

Entry Requirements

Second-class Honours degree, or equivalent, in an engineering, science or technology subject.

Careers

Graduates may expect to pursue careers as innovation managers, strategic planners, product/programme/design managers, project leaders, and management consultancy. Strong links to the research activities in the participating institutions also enable graduates to obtain positions in high-profile universities and research institutes.



The Department houses the £600,000 Leonard Centre, which provides facilities for researchers in operations management, design and manufacture.

Operations Management in Engineering MSc/PgDip/PgCert

Business performance depends on efficient and effective operations throughout the company through work at operational, tactical to strategic levels and from market need through to customer delivery and service. This course is aimed at graduates wishing to broaden their expertise, eg from a technological first degree, or who wish to work within the engineering industry. On completion, you will be equipped with state-of-the-art concepts, methods, techniques and tools enabling you to analyse and implement solutions to operations management issues in an engineering environment.

Curriculum

COMPULSORY MODULES

- > Ecological and Environmental Impact
- > Management of Total Quality and Continuous Improvement
- > Manufacturing and Business Strategy
- > People, Organisation and Technology
- > Project Work and Project Management
- > Risk Management

OPTIONAL MODULE

(one from the following)

- > Facilities Management
- > Logistics
- > Group Project

Teams of students tackle problems of practical relevance in cooperation with external personnel, participating in field trips and producing regular progress reports. Successful completion of seven instructional modules and a group project leads to the award of a Postgraduate Diploma.

INDIVIDUAL PROJECT

Each student undertakes an individual project assignment in which a selected topic is studied in depth, involving a comprehensive literature review, defining realistic objectives, devising a method of approach, systematically carrying out the work and preparing a thesis. Successful completion of seven modules, a group project and individual project leads to the award of an MSc.

Course Duration

MSc: 12 months full-time; 24 months part-time
PgDip: 9 months full-time; 21 months part-time

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in engineering, technology, business or a similar discipline. Industrial experience is valued and exemptions based on work experience or other similar courses may be possible.



PgDip: Degree or good HND, or equivalent. Relevant industrial experience is valued. Depending on satisfactory progress, students may transfer from the Diploma to the Master's course.

Supply Chain and Operations Management MSc/PgDip/PgCert

Supply Chain Management encompasses everything from initial design to procurement of material and services, processing and delivery to the customer. This course provides high-calibre graduates with an in-depth understanding of strategic, tactical and operational issues relating to management of supply chains. On completion of the course, you will be equipped with state-of-the-art concepts, methods, techniques and tools to allow you to contribute towards the competitiveness of industrial and commercial organisations worldwide. It is delivered in collaboration with the Chartered Institute for Procurement and Supply.

Curriculum

The programme for the course comprises the following modules:

- > Business, Operations and Supply Chain Strategy
- > Strategic Supply Chain Management
- > Leading and Influencing

- > Supply Chain Operations
- > Management of Total Quality and Continuous Improvement
- > Enterprise Resource Planning
- > Advanced Project Management
- > Product Costing and Financial Management
- > Case Studies in Supply Chain Management
- > Master's Project

Course Duration

MSc: 12 months full-time
PgDip: 9 months full-time

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in any discipline. PgDip: Degree, good HND or equivalent. Other qualifications with industrial experience will be considered on an individual basis.

Careers

The knowledge and skills you will gain through the course will make you a valuable resource in any supply chain-based enterprise – where you can contribute immediately – and make a difference!

Contact for Taught Courses

t: +44 (0)141 548 2330

e: pgadmissions@dmem.strath.ac.uk

Department of Electronic & Electrical Engineering

www.strath.ac.uk/eee

The Department has an established record of research excellence, with an international reputation for pioneering work across the broad spectrum of electronic and electrical engineering. Applied engineering innovation is core to the Department's research ethos and is a critical part of its culture.

Our main fields of expertise are electrical power engineering, renewable energy, communications, ultrasonics, microsystems, photonics, industrial control systems and digital signal and image processing. Research activities are driven by six strategically focused research groups, which reflect the scale, diversity and vision of the Department and underpin its teaching programmes. The results of the 2008 Research Assessment Exercise (RAE) affirmed our status for "world-leading and internationally excellent" research, with the Department being rated 1st in Scotland – by a long way – and 3rd in the UK.

OUR RESEARCH GROUPS

- > Centre for Excellence in Signal and Image Processing
- > Centre for Intelligent Dynamic Communications
- > Centre for Microsystems and Photonics
- > Centre for Ultrasonic Engineering (CUE)
- > Industrial Control Centre (ICC)
- > Institute for Energy and Environment

A MAJOR INNOVATOR

The Department is home to several unique and world-leading research facilities, including the British Energy Advanced Diagnostics Centre and the UK's only EPSRC Wind Energy Systems Doctoral Training Centre, specifically created to enable the UK to meet its ambitious renewable energy targets.

Research-led, with a £50 million research portfolio, the Department is supported by a variety of agencies and research centres worldwide, and its success in forming strong partnerships with Industry has resulted in a prestigious scholarship programme and an enviable record of enterprise, entrepreneurship and research commercialisation. We excel at knowledge exchange and technology transfer, developing and integrating novel cutting edge technologies across a range of sectors in the local and global economies. Company successes include Diagnostic Monitoring Systems (DMS), Elimpus Ltd and Industrial Systems and Control (ISC) Ltd.

FACT FILE: FIRST IN THE UK



The Facility for Innovation and Research in Structural Testing (FIRST) is the UK's only academic laboratory dedicated to pioneering research into imaging systems for Non-Destructive Evaluation (NDE). Based in the Department's, Centre for Ultrasonic Engineering (CUE), FIRST offers an unparalleled range of cutting-

edge technologies and an ideal training environment for ambitious students to work closely with world leading ultrasonic engineers.

The Facility conducts revolutionary research into robotic inspection, microstructure testing, advanced imaging techniques and new sensor technologies. As part of the UK Research Centre in NDE (RCNDE – see www.rcnde.ac.uk), through supported EngD and PhD programmes, FIRST provides excellent opportunities to integrate world leading research into key industrial application areas, including energy, oil and gas, aerospace and transport.

AN INTERNATIONAL PERSPECTIVE

We have numerous international partnerships in Europe, the US, China, Malaysia, Singapore and India. With over 230 researchers from across the world, the Department has a vibrant international Graduate School. State-of-the-art equipment and resources, such as Europe's only power station simulator suite, combined with teaching lead by world class scholars, ensures the School is a dynamic, friendly and supportive environment for advanced study.

OUR RESEARCH DEGREES

Opportunities exist within each of the six research groups for MPhil, PhD and EngD study, and the Department welcomes proposals for these all year round.

CENTRE FOR EXCELLENCE IN SIGNAL AND IMAGE PROCESSING

The Centre is internationally recognised for its research activities in Signal and

Image Processing algorithms, architectures and applications. It conducts world-class research in areas of critical importance to the growth and success of the Information and Communications Age. The scope of work ranges from concept development to strategic issues and applications in key industrial sectors. Exciting research opportunities exist with each of the Centre's five areas of expertise:

- > Novel Algorithms for Signal and Image Processing
- > Multimedia Systems and Image Processing
- > Biomedical and Genomic Signal Processing
- > MIMO Radar and Communications Systems
- > RF Signals and Systems

Opportunities include: Information Forensics and Security; Compressed Sensing; Novel FPGA and DSP Architectures and

ADAM BROWN PhD in Electronic & Electrical Engineering



I am a research assistant on a Scottish Enterprise, 'Proof of Concept' project and am completing my PhD in Europe's largest electrical power and energy research group – the Institute for Energy and Environment within the Department. Originally from Lisburn in Northern Ireland, I chose Strathclyde because of its world-class reputation for research and teaching.

My PhD relates to condition monitoring and support systems for the Power Industry. Using artificial intelligence, I am introducing learning into these systems so that they can adapt and tune themselves over time. As a result, they will alert engineers to health and performance issues in real time. Through working in this field, I have the opportunity to travel worldwide, meet, and discuss my work, with leading figures in power and energy research and see first-hand the practical application and impact of my research.



Technologies; Filter Bank Based Transceiver Systems; Defence, MIMO Communications and Radar Systems; Biologically Inspired Signal/Image Processing; Secure Audio and Video Services; Digital Water-marking; Integrity of Data Transmission and Storage; Distributed Video Coding, 3D TV and Digital Holographic Methods; Human Genome-Boolean Models.

The Centre is home to the prestigious Texas Instruments Chair of Signal Processing, the first awarded to a University outside America and host to the China-Scotland Signal Image Processing Research Academy.

CENTRE FOR INTELLIGENT DYNAMIC COMMUNICATIONS

The Centre for Intelligent Dynamic Communications (CIDCOM) is a centre of excellence focusing on communications technologies and is active in determining applications of optical/wireless techniques in future network evolutions. CIDCOM has received substantial external support grants from a variety of funding bodies and industrial organisations that have lead to the development of its international reputation and state-of-the-art research facilities and programmes. Home to the world's first Xilinx Chair in Digital Signal Processing, the Centre's research profile comprises the following four structured areas. Exciting PhD and research opportunities exist within each of these:

- > Mobile Communications
- > Broadband and Optical Networks
- > DSP Enabled Communications
- > Plastic Electronics

In addition to opportunities in optical sub-systems and networking, advanced mobile and wireless communications, and digital signal processing techniques, plastic electronics is a recent addition to the Centre's research portfolio. This is an exciting enabling new technology with a multitude of potential applications. In combination with more mature platforms, all of the above technologies will have a major impact on the way we will live, work and entertain in the future.

CENTRE FOR MICROSYSTEMS AND PHOTONICS

The Centre specialises in optoelectronic and photonic sensors and systems, active and passive photonic devices, MEMS, microsystems and free-space microphtonics.

With over 20 years of research and expertise in these fields, the Centre offers exciting and challenging opportunities for PhD study within its four distinct research groups:

- > Fibre Lasers and Photonics Components
- > MEMS and Microsystems
- > Photonic Sensors and Systems
- > Laser based materials testing

Opportunities include: Modelling of Fibre Lasers and Amplifiers; Fabrication of Optical MEMS; Optical Microsystems; RF MEMS for Filters and Switches; Excimer Laser-based Microfabrication; Photonic Sensors and Systems; Optical Gas Sensing; Laser based materials testing; and Advanced Multiplexing Schemes.

CENTRE FOR ULTRASONIC ENGINEERING

The Centre for Ultrasonic Engineering (CUE), a founding partner in the UK Research Centre for Non-Destruction Evaluation (RCNDE), is internationally recognised in the field of ultrasonic transducers and transducer systems. Globally unique, with unparalleled facilities and expertise, the Centre is well placed to meet the demands of future ultrasonic technology development. CUE addresses markets in underwater sonar, biomedical imaging and therapy, non-destructive testing and industrial process ultrasound. Research opportunities exist within each of these, within the following technical areas:

- > Non-Destructive Evaluation
- > Animal Ultrasound
- > Transducers
- > Industrial Process Control
- > Modelling and Advanced Software
- > Sonar
- > Biomedicine
- > Materials Science for Ultrasonic applications

The Centre collaborates extensively with other universities and industrial institutions, activities that are facilitated by a number of nationally funded collaborative research projects such as BIAS (www.biasweb.co.uk) and RCNDE (www.rcnde.ac.uk). In addition, CUE has recently established a technology transfer laboratory dedicated to NDE research – Facility for Innovation and Research into Structural Testing (FIRST) and the Centre of Excellence in Coded Ultrasound in partnership with the Universities of Virginia and Southern California.

INDUSTRIAL CONTROL CENTRE

Internationally recognised for its theoretical and applied control engineering research, the Centre spans a range of industrial sectors including Metals and Manufacturing, Automotive and Marine, Water, Environment and Power, Renewable Energy, Chemical and Petrochemical, Aerospace and Defence. The primary focus of its research is on the development of system engineering methods and practical algorithms for the control and optimisation of complex and nonlinear systems.

Being at the forefront of its discipline, the Centre offers considerable opportunities for research and PhD study in: Performance

Assessment and Benchmarking of Control Systems; Non-linear Systems Advanced Control; Linear and Non-linear Predictive Control and Modelling; Stochastic Systems: Power Plant Modelling; Embedded and Real-time Systems; Adaptive Control Tuning; Neural Networks; System Biology; Renewable Energy Systems; Aerospace, Automotive, Process and Marine Control Applications; and Power Generation Systems.

INSTITUTE FOR ENERGY AND ENVIRONMENT

The EPSRC International Review of Engineering in the UK placed this Institute in the top five UK engineering groups for scientific excellence and industrial relevance. As the largest electrical power engineering and energy technology university group in Europe, the Institute's extensive research portfolio is underpinned by six core areas:

- > Advanced Electrical Systems
- > Pulsed Power and Electrical Materials
- > Electrical Plant and Diagnostics
- > Renewable Energy Technologies
- > Power Electronics, Drives and Energy Conversion
- > Power Systems Analysis

Strategically-focused research in each of these is concentrated within world-class centres of excellence closely matched to industry and government requirements:

- > Rolls-Royce University Technology Centre in Electrical Power Systems
- > British Energy Advanced Diagnostics Centre
- > ScottishPower Advanced Research Centre
- > GSE Systems Power Station Simulator Suite
- > Robertson Trust Laboratory for Electronic Sterilisation Technologies
- > Scottish and Southern Energy Research Centre
- > EPSRC Wind Energy Systems Doctoral Training Centre

Research opportunities with excellent employment prospects in high-growth sectors include: Renewable Energy; Distributed Generation Systems and Technologies; Electronic Pasteurisation and Sterilisation Technologies; Condition Monitoring; Energy Management; Power Systems Protection, Control and Analysis; Active Network Management; Pulsed Power; Power Electronics; Energy Scavenging; and, Intelligent Systems and Artificial Intelligence.

The Institute also offers an EPSRC four-year EngD programme in Nuclear Engineering, combining technical and management training, with industry-based research.

CONTACT

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EPSRC Wind Energy Systems Doctoral Training Centre

www.strath.ac.uk/windenergy

The EPSRC Wind Energy Systems Doctoral Training Centre (DTC) was established to help develop the UK's global position in the wind energy field and develop the leaders of tomorrow. It brings together pioneering research and advanced skills training to help the UK meet its ambitious renewable energy targets, and address the widely accepted skills shortage in this dynamic and rapidly expanding sector.

The Centre draws on expertise from across the University, involving world class academics from a wide variety of disciplines. It is housed within custom-built research facilities within the Department of Electronic and Electrical Engineering's internationally recognised Institute for Energy and Environment. The Institute is the largest academic centre of electrical power engineering and energy expertise in Europe. Supported by over 30 key UK and global business and industry partners, the Centre

is committed to developing the new wave of highly skilled professionals needed to meet the energy challenge.

Ten prestigious EPSRC four-year PhD studentships are on offer to top class engineering and physical sciences graduates for each of the next 4 years. Students will receive a formal programme of training and research to develop and enhance their technical interdisciplinary knowledge, and broaden their understanding of the social, political and economic contexts of wind power. They benefit from a world-class study environment.

The first year comprises formal classes in all aspects of wind technology, together with training in professional, business and entrepreneurial skills, and research techniques and methodologies. Potential PhD topics are explored with academic supervisors during this year, with the final topic to be agreed for the start of Year 2.

SEMESTER 1 (OCT – JAN)

- > Socio-Economics of Energy Systems
- > Mechanical Systems and Turbine Design
- > Wind Turbine Technology 1
- > Power Systems and Wind Integration 1
- > Weekly guest lectures by invited Industry and Academic experts

SEMESTER 2 (JAN – MAY)

- > Wind Turbine Control
- > Wind Turbine Power Conversion
- > Wind Turbine Technology 2
- > Power Systems and Wind Integration 2
- > Weekly guest lectures by invited Industry and Academic experts



GSE Systems Simulator Suite

SEMESTER 3 (JUNE - OCT)

- > 2 mini-projects (each 8 wks in length)
- > Industrial visits
- > Attendance at Wind Energy Conference

YEARS 2-4

Students undertake a PhD project on a topic of their choice within the wind energy discipline. Project areas available can include:

Medium/Large Machine Design:

aerodynamics and blade design, generators and variable speed drives, power electronics, control and load reduction

Reliability: failure rate analysis, condition monitoring, proactive operation and maintenance systems

Wind Farms: wake interaction, farm layout, lightning protection, radar interference and condition monitoring

Off-Shore Location: sub-sea structures design, logistics of deployment, operational research of maintenance

Wind Farm Design: offshore grids, high voltage AC and DC networks.

Wind Power Integration: grid connection codes, impact on voltage and frequency stability, future power supply scenario planning, load management

Socio-Economics: impact on the environment, planning,

public attitudes and acceptance, impact on the economy, cost, market regulation and impact on rate of deployment, sustainable development in developed and developing economies

Small Machine and Stand Alone Systems:

design of mixed sources systems, stability, control, impact on the rural economy

Demand Side Management:

wind power integration into power systems

Entry Requirements

- > Studentships are available to UK and eligible EU citizens who have, or are about to obtain, a first-class Honours degree, or MSc qualification in a physical science or engineering discipline.
- > Studentships begin on 1 October each year, cover University fees and offer a highly competitive stipend (maintenance grant) for four years.
- > Successful applicants will be invited for interview between March and June.
- > Applications are welcomed between 1 October – 31 August each year.

CONTACT

Academic Enquiries

Professor Bill Leithead
t: +44(0)141 548 2408
e: w.leithead@eee.strath.ac.uk

Admissions Enquiries

Drew Smith, Administrator,
t: +44 (0)141 548 2880
e: drew.smith@eee.strath.ac.uk

DR OLIMPO ANAYA-LARA Senior Lecturer in Electronic & Electrical Engineering



Dr Olimpo Anaya-Lara is a senior lecturer in the Department and a core contributor to the UK's first-ever EPSRC Wind Energy Systems Doctoral Training Centre. His research expertise is in the design of advanced control strategies for wind turbines, and their effective integration and operation within power systems. He has published three technical books for teaching purposes in this field, and his visionary research in tackling technical barriers to the large-scale integration of wind energy in the UK, has received significant funding and support from the UK government, research councils and industry.

Working closely with the Principal's Office and several University departments, Olimpo has led the development of collaborative links in Latin America. These have resulted in the University developing a strong partnership with the Inter-American Development Bank, leading to the establishment of Centres of Excellence in Renewable Energy in Mexico and Colombia. These aim to facilitate interaction between academia, industry and government, and address the complex environmental, social and technical challenges associated with the use of renewable energy technologies, and their role within energy and climate change policy.



TAUGHT COURSES

Apply online:

www.strath.ac.uk/courses/postgraduate

The Department offers a varied and dynamic portfolio of specialist and industrially focused taught postgraduate degrees. All have full accreditation from the professional body, the Institution of Engineering and Technology (IET), enabling students to progress towards Chartered Engineer (CEng) status.

Communications, Control and Digital Signal Processing
Digital Multimedia and Communication Systems
Electrical Power Engineering with Business
Electronic and Electrical Engineering

Communications, Control and Digital Signal Processing MSc

This full-time course covers the theoretical and practical aspects of communications theory and networks, fundamental control technology and digital signal processing (DSP)

Encompassing topics critical to the Information and Communications Age, graduates will gain an advanced knowledge and understanding of the communications, control and DSP domains, enabling them to capitalise on employment opportunities within a diverse range of industries: telecommunications, industrial control, seismic signal processing, aerospace, off- and onshore oil industry, mining, manufacturing and computer industries, software, hardware, electronic and IT user companies.

Several major multinational organisations target the Department for recruitment purposes, including British Energy, Siemens and Texas Instruments.

Curriculum

SEMESTER 1 (OCT-JAN)

- > Communications Theory
- > Fundamental Control Technology
- > DSP Theory
- > Probability and Stochastic Processes
- > Communications Networks

SEMESTER 2 (JAN-MAY)

This semester comprises a mixture of compulsory and elective classes, offered to enable candidates to specialise in specific aspects of communications, control and digital signal processing (DSP).

Compulsory Classes

- > Case Study Assignment
- > Control of Industrial Processes
- > Simulation and Design Software for DSP and Control

Elective Classes

- > Network Design, Performance and Management
- > Computer Control System Methods
- > Adaptive Digital Signal Processing
- > Mobile Communications Systems
- > DSP Implementation

SEMESTER 3 (JUNE – SEPT)

MSc candidates conduct a project to highlight the practical/research aspect of their chosen specialisation. Arrangements can be made for the practical work to be carried out at another EU university or with one of the Department's industrial partners.

Course Duration

12 months

Entry Requirements

A minimum upper second-class honours degree or equivalent overseas qualification in a relevant engineering or numerate science discipline, from a recognised academic institution.

Digital Multimedia and Communication Systems MSc

This full-time course recognises the need for graduates skilled in the new multimedia technologies which are revolutionising the way we live and work. Graduates will be able to analyse, design, deploy and maintain digital multimedia information systems and networks, playing a key role in the evolving digital multimedia communications industry.

The course brings together multimedia concepts and standards, wireless and fixed broadband communication systems and protocols, multimedia programming concepts, Internet and web applications, and programming paradigms. These foundations are unified through system design issues within taught classes, self-directed case study assignments and project work.

The potential applications of, and career opportunities within multimedia and communications are widespread, spanning business, commerce, education, health and entertainment. Several major organisations target the Department for recruitment purposes and our graduates have had considerable success in the job market, gaining positions such as Operations Director of Motorola and being a founding Director of Nallatech Ltd.

Curriculum

The course structure, flexible in design, comprises a mixture of compulsory and elective classes in semesters 1 and 2,

REBECCA CARTER PhD in Electronic & Electrical Engineering



I have recently completed my PhD thesis as part of the SUPERGEN Energy Storage Consortium, which consists of researchers from the Universities of Strathclyde, Bath, St Andrews and Surrey. My work was focused on the use of high power supercapacitors (energy storage systems) in electric vehicles; other consortium members investigated grid applications, modelling and chemistry of supercapacitors and of lithium-ion batteries. The cross-disciplinary nature of this group meant that I had the opportunity to consider the broader implications of my work from many different angles.

Following on from my PhD research, I have recently joined a project, as a research fellow, funded by the Technology Strategy Board, working at Strathclyde with members of Ford Motor Company and Scottish and Southern Energy to explore the impact of charging electric vehicles on the grid. Through Strathclyde I have made many contacts in industry and with other universities, allowing me to expand my research in exciting new directions.



allowing students to tailor their degree to match personal academic and career objectives, followed by a three-month project in semester 3.

SEMESTER 1 (OCT-JAN)

Compulsory Classes

- > Communications Theory
- > Communication Networks
- > Computer Technology and Modern Programming Concepts 1
- > DSP Theory
- > Multimedia Signal and Image Processing

Elective Classes

- > Probability and Stochastic Processes
- > Fundamental Control Technology

SEMESTER (JAN-MAY)

Compulsory Classes

- > Case Study Assignment
- > Mobile Communications Systems
- > Computer Technology and Modern Programming Concepts 2
- > Network Design, Performance and Management
- > DSP Implementation

Elective Classes

- > Adaptive Digital Signal Processing
- > Control of Industrial Processes
- > Computer Control System Methods
- > Image Processing
- > Information Transmission and Security
- > Simulation and Design Software for DSP and Control

SEMESTER 3 (JUNE – SEPT)

MSc candidates undertake a technical project in their chosen specialisation. Arrangements exist to conduct these within a number of EU universities or with one of the Department's industrial partners.

Course Duration

12 months

Entry Requirements

A minimum upper second-class honours degree or equivalent overseas qualification in a relevant engineering, computing or numerate science discipline, from a recognised academic institution.

Electrical Power Engineering with Business MSc

This full-time course recognises the need for graduates skilled to address the world's major issues in electrical energy and power systems. It offers an integrated programme targeted at graduates concerned with the design, operation and analysis of power supply systems, power plant, renewables and industrial electrical equipment, and liberalisation of the power supply industry.

The course provides the advanced level of education required for highly rewarding, well paid and exciting careers in the fast moving and high growth electrical

power and renewable energy sectors. Employment prospects are excellent, with recent graduates operating in power engineering consultancy, global power utilities (generation, supply and distribution), the renewable energy sector and manufacturing.

Curriculum

The course structure, flexible in design, comprises a mixture of compulsory and elective classes in semesters 1 and 2, allowing students to tailor their degree to match personal academic and career objectives, followed by a three-month project in semester 3.

SEMESTER 1 (OCT-JAN)

Compulsory Classes

- > Power Electronics and Control of Electrical Machines
- > Electricity Markets and Power System Economics
- > Instrumentation and Condition Monitoring

Elective Classes

- > Regulation in Network Industries
- > Computer Technology and Modern Programming Concepts 1
- > Power Systems Analysis and Operation
- > Protection Systems

SEMESTER 2 (JAN-MAY)

Compulsory Classes

- > Case Study Assignment
- > Advanced Power Systems Analysis and Design
- > Advanced Power System Protection
- > High Voltage Technology

Elective Classes

- > Power Systems Electromagnetic Compatibility
- > Electronics for Energy Control
- > Computer Technology and Modern Programming Concepts 2
- > Computer Control System Methods
- > Wind Power Technology

SEMESTER 3 (JUNE – SEPT)

MSc candidates conduct a project to highlight the practical/research aspect of their chosen specialisation. Arrangements can be made for the practical work to be carried out at another EU university or with one of the Department's industrial partners.

Course Duration

12 months

Entry Requirements

A minimum upper second-class honours degree or equivalent overseas qualification in electronic and electrical engineering or a related subject, from a recognised academic institution.



Electronic and Electrical Engineering

MSc

This full-time course is specially designed for students who wish to pursue advanced studies across the broad range of subjects relevant to electronic and electrical engineering. Its unique flexible structure allows you to select classes from the range of postgraduate courses taught within the Department, to meet your academic interests and career aspirations.

Classes available include power systems development, communications networks, control theory and renewable energy technologies, offering a wide range of career opportunities, both in the UK and overseas, for graduates of this course.

Recent graduates have joined the electrical supply industries, telecommunications and defence, consulting, design and manufacturing companies, healthcare, IT and aerospace.

Curriculum

SEMESTER 1 AND 2

Classes in Semesters 1 and 2 cover theoretical and practical aspects of the main disciplines. A Case Study Assignment in Semester 2 involves the completion of a technical project and introduces candidates to research and/or experimental techniques. Classes may be chosen from an extensive list which includes:

- > Advanced Power System Analysis and Design
- > Communications Theory

- > Computer Technology and Modern Programming Concepts
- > Instrumentation and Condition Monitoring
- > Multimedia Signal and Image Processing
- > Adaptive Digital Signal Processing
- > Control of Industrial Processes
- > DSP Implementation
- > Communications Networks
- > Power Electronics and Control of Electrical Machines
- > Fundamental Control Theory
- > Regulation in Network Industries
- > Computer Control System Methods
- > Wind Power Technology
- > Protection Systems
- > Technology and Market Interaction

SEMESTER 3 (JUNE – SEPT)

MSc candidates undertake a small research project in their chosen specialisation. Arrangements exist to conduct these within a number of EU universities or with one of the Department's industrial partners.

Course Duration

12 months

Entry Requirements

A minimum upper second-class honours degree or equivalent overseas qualification in electronic and electrical engineering or a related subject, from a recognised academic institution.

Contact for MSc Courses

Elaine Black
Postgraduate Admissions Secretary
t: +44 (0)141 548 2170
e: e.black@eee.strath.ac.uk

SCHOLARSHIP PROGRAMME

The Department boasts the largest Student Scholarship Programme in the UK, with competitive scholarships available for UK, EU and overseas applicants and students. For further details, contact Elaine Black.

Royal College Prestigious Awards

Open to all well-qualified overseas applicants joining any of the Department's full-time MSc programmes. Scholars receive a bursary of up to £2,000.

Department Scholarships for Russia

Open to all well-qualified applicants from the Russian Federation joining any of the Department's full time MSc programmes. Awards of up to £2,000 are available.

Student Awards Agency for Scotland (SAAS)

Open to all well-qualified UK and EU students joining any of the Department's full time MSc programmes. Scholars' tuition fees are paid in full.

ScottishPower/Iberdrola Fundacion Scholarships

The scholarships, available for MSc study and PhD research, focus on the fields of energy and environment. They are open to UK and Spanish undergraduate students, offering payment of tuition fees and a £1,200 monthly living allowance for the duration of study.

Department of

Mechanical Engineering

www.strath.ac.uk/mecheng

The Department's leading-edge research spans a variety of length from understanding the behaviour of nano-fluids for future medical devices to designing large ocean power systems for renewable energy supply and our industrial collaborations encompass a wide range of key engineering sectors including energy, health, aerospace and transportation.

The Department hosts the Energy Systems Research Unit (ESRU), incorporating the Building Research Establishment Trust Centre of Excellence in Energy Utilisation, the Advanced Space Concepts Laboratory and MultiScale Flows Research Group. Close links with industry through contract research and industrial consultancy are enhanced by an Industrial Advisory Group on which local and national companies are represented. Courses for industry are also offered, principally in the areas of Energy Systems and Pressure Systems Design.

The Department is one of the biggest and best such departments in the UK. Successive Research Assessment Exercise (RAE) ratings place the Department in the top 10 in the UK. In the RAE 2008, over 50% of the Department's research was rated 'internationally excellent' or 'world-leading'. Our academic staff and researchers hold qualifications from major universities around the world, publish research in the leading international journals and give invited lectures at international conferences.

RESEARCH CLUSTERS

ENGINEERING SCIENCE

Engineering Science deals with complicated engineering situations in which a number of competing causes lead to manifold effects. Both scale effects and the conditions of practice are important, and in that it often differs from the natural sciences. In Engineering Science at Strathclyde we ask ourselves what we can create that is useful, given the laws of physics and other practical constraints.

ENGINEERING MECHANICS

Research encompasses computational mechanics, CAE, mechanics and dynamics of structures, impact and crash worthiness, pressurised systems, bioengineering, experimental analysis, elasticity, inelastic behaviour of solids and structures, probabilistic methods, properties of materials, advanced composites technology, fracture mechanics, stability of structural elements and systems. In Engineering Mechanics at Strathclyde, the key aim is to channel the results of the fundamentals of

FACT FILE: ENGINEERING OUTER SPACE



The Advanced Space Concepts Laboratory is based in the Department of Mechanical Engineering and is home to some of the UK's leading space engineers carrying out frontier research on visionary space systems. Research projects underway include investigating how the orbits of very large – and very small – spacecraft could pave the way for radically new technologies and services such as massively increasing space telecommunications capacity or enabling continuous environmental monitoring of the arctic.

materials and structures into practical and useful engineering industry solutions.

ENGINEERING SYSTEMS

This encompasses the development and application of new approaches to structural mechanics and dynamics, power generation, heat, mass and fluid transfer. New techniques are applied to the development and optimisation of sustainable engineering systems in the targeted areas of:

- > **Energy and Environment:** Research goals include improving the accuracy of the mathematical models and numerical methods used to represent building heat, mass and power flow; and applying simulation to optimise energy component performance and energy efficiency. Staff are also actively researching energy utilisation and demand side management and control, and low carbon and renewable energy systems.

- > **Health Engineering:** Research encompasses numerical analysis,

computational fluid dynamics, materials, mechanics and latterly auto-associative neural networks. Its scope includes fundamental studies into the loading conditions that exist in arthritic wrists, applied studies to improve the function and design of vascular stents and the development of practical assistive technology devices that can be used to open packages. The work is supported by grants awarded by DTI/ EPSRC, Faraday Partnership, Arthritis Research Campaign, Furlong Foundation, Terumo Vascutek, and the European Commission.

- > **Aerospace and Transportation:** Work spans a range of length scales from experimental low speed aerodynamics to hypersonics and space. Our aerodynamics activities focus on the development of flow visualisation methods and computational modelling of hypersonic flows for re-entry. Our space activities focus on the orbital dynamics of solar sail spacecraft and the distributed control of swarms of micro-spacecraft.

The programme of Aerospace research is funded by EPSRC, the EU and collaborative projects with DSTL, EADS Astrium Ltd and the European Space Agency.

FACILITIES

The Department's large-scale laboratory facilities for teaching and research include:

- > 1.5m low-speed wind tunnel
- > 0.9m environmental wind tunnel
- > solar simulator
- > materials testing machines
- > facilities for carrying out vibration and shock tests to British and ISO standards
- > the latest techniques for diagnosing machinery condition from vibration signals
- > anechoic chamber
- > polymer processing laboratory with state-of-the-art equipment
- > specialised optical strain measurement facility with data logging and instrumentation.

The Department also houses an advanced analytical transmission electron microscope and a scanning electron microscope, together with vacuum and air melting furnaces, a rolling mill, 200-ton press, continuous casting equipment, a range of mechanical testing machines, X-ray diffraction facilities, soft X-ray spectrometers, scanning calorimeters, and a wide range of chemical analysis and metallurgy facilities.

More recent acquisitions are a high-speed digital imaging system, a DANTEC 2D transient PIV system, a fully-instrumented machinery condition monitoring testbed for IC engines, a computer-controlled testing machine specially configured for polymers, testbeds for spark ignition and

diesel engines, and an autoclave facility with pressure capacity of 10 bar and temperatures up to 650°C for composite specimen manufacture.

UNDERTAKING A RESEARCH DEGREE

The Department welcomes research proposals from applicants wishing to undertake an MPhil or PhD degree in areas relevant to our research expertise. For more information or to apply online, please see: www.strath.ac.uk/courses/research

CONTACT

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TAUGHT COURSES

Apply online:
www.strath.ac.uk/courses/postgraduate

Advanced Mechanical Engineering Power Plant Technologies Renewable Energy Systems and the Environment (part of the Faculty Sustainable Engineering Programme, see pg 32 for details)

Advanced Mechanical Engineering MSc/PgDip/PgCert

This course provides high calibre engineering graduates with an in-depth technical understanding of advanced mechanical engineering topics, together with transferable business and management skills sought by employers. The course satisfies further learning

requirements of the IMechE and provides a route to Chartered Engineer status. Benefits for students include:

- > flexible and tailored learning to suit individual needs and interests
- > the development of critical and analytical skills for problem-solving, creative and innovative abilities based on the theoretical and practical knowledge acquired
- > the ability to critically source, analyse, evaluate, synthesise and utilise information relevant to system/ components performance assessment and the design process
- > business and management modules providing transferable skills—a key requirement to attain Chartered Engineer (CEng) status1

Course Structure

Students will have the opportunity to select up to nine technical/specialist advanced mechanical engineering classes, plus three business/management modules which are necessary to satisfy the key requirements to achieve Chartered Engineer status.

Teaching combines academic and industrial lectures, with on-site visits to industry and seminars presented by visiting experts from the UK and overseas. It is recommended that technical classes are taken with an aerospace, energy or materials theme as follows:

AEROSPACE

- > Advanced Topics in Fluid Systems Engineering
- > Aerodynamic Performance
- > Aerodynamic Propulsion Systems
- > Light Weight Structures
- > Machine Dynamics
- > Mathematical Modelling in Engineering Science
- > Spaceflight Mechanics
- > Systems Engineering 1
- > Systems Engineering 2

ENERGY

- > Advanced Topics in Fluid Systems Engineering
- > Electrical Power Systems
- > Energy Modelling and Monitoring
- > Energy Resources and Policy
- > Machinery Diagnosis and Condition Monitoring
- > Mathematical Modelling in Engineering Science
- > Renewable Energy Systems
- > Systems Engineering 1
- > Systems Engineering 2

MATERIALS

- > Ceramic and Polymer Engineering; Engineering Composites

- > Metals and Alloys
- > Light Weight Structures
- > Machine Dynamics
- > Mathematical Modelling in Engineering Science
- > Pressurised Systems
- > Systems Engineering 1
- > Systems Engineering 2

Students may also opt to take a different combination of classes to suit their needs, subject to availability.

Course Duration

MSc: 12 months full-time
PgDip/PgCert: 9 months full-time.

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in engineering or physical science.
PgDip/PgCert: Normally a first degree in a relevant subject, but other applicants will be considered if they have equivalent industrial experience.

Scholarships

Some funded studentships may be available for MSc or PgDip candidates. Please see www.strath.ac.uk/search/scholarships for details.

Careers

Mechanical Engineers are in demand across the engineering sectors, including oil and gas, energy, aerospace, manufacturing and process industries. Therefore the career prospects of graduates are excellent due to the current skills shortage. This course meets the needs for graduate engineers who want to develop the advanced skills required to meet Chartered Engineer status.

Power Plant Technologies MSc/PgDip/PgCert

This course has been developed with industrialists to address skills shortages in the power generation sector. With input from across the engineering disciplines, it provides students with in-depth training in the operation of conventional, renewable and nuclear power plants. It is particularly relevant for graduates wishing to work in the power generation industry and the businesses that support it, or for employees already working in this field.

Course Structure

The course consists of technical and generic skills instructional modules. Technical classes provide an overview of power plant operations and in-depth knowledge of power plant functions, maintenance and optimisation. Teaching combines academic and industrial lectures, with on-site visits to industry and

DID YOU KNOW?

The MSc in Power Plant Engineering offers part-time study, ideally suited for those already working in the industry. This is the first course of its type in Scotland. For more information visit www.strath.ac.uk/gse/ppe



seminars presented by visiting experts from the UK and overseas.

TECHNICAL MODULES

- > Power Plant Systems
- > Electrical Power Systems
- > Energy Resources and Policy
- > Advanced Boiler Technologies 1
- > Advanced Boiler Technologies 2
- > Environmental Performance and Related Technologies
- > Materials for Power Plant
- > Plant Safety and Environment

GENERIC MODULES

In addition, students take three generic modules, from the following, which meet employers' requirements for comprehensive engineering skills, and satisfy key requirements to reach Chartered Engineer status:

- > Design Management
- > Project Management
- > Environmental Impact and Sustainability
- > Information Management
- > Finance
- > Risk Management

Successful completion of five instructional modules leads to the award of a Postgraduate Certificate. Successful completion of 10 instructional modules leads to the award of a Postgraduate Diploma.

INDIVIDUAL PROJECT

MSc students also undertake an individual project which allows the study of a selected topic in depth and demonstrates the application of learning from the course. This may be an industry-based project or one aligned to engineering research at Strathclyde.

Course Duration

MSc: 12 months full-time
PgDip: 9 months full-time

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in engineering or physical science.

PgDip/PgCert: Normally a first degree, but other applicants will be considered.

Some funded studentships may be available for MSc or PgDip candidates. Please contact the Faculty for details.

Careers

There are recognised skills shortages in the Power Generation sector which this course aims to redress. The course has been developed with companies and organisations including Doosan Babcock, Mott MacDonald, ScottishPower, Jacobs UK, Sinclair Knight Merz, Scottish Enterprise and the Industrial and Power Association.

Contact for Taught Courses

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Department of Naval Architecture and Marine Engineering

www.strath.ac.uk/na-me

The Department of Naval Architecture and Marine Engineering (NA-ME) has a long history of offering high-quality courses in Naval Architecture and its related subjects. NA-ME has staff expertise covering all areas of Naval Architecture, Ship Design, Marine Engineering, Ocean Engineering, High-Speed and Small Craft Design. The Department's teaching and research infrastructure is well-developed: students have access to laboratory and computing facilities unparalleled in university terms, as well as a racing yacht.

NA-ME is located in its own building, the Henry Dyer Building, which contains lecture theatres, computing and study areas, and a large design office. Experiment facilities include the Hydrodynamics Laboratory (located at the West of Scotland Science Park), equipped with the largest university ship model experiment tank in the UK (76m x 4.6m x 2.4m), as well as a small towing/wave-making tank (25m x 1.5m x 1.0m), and a diesel engine test facility located in the Henry Dyer Building.

Powerful state-of-the-art software developed in-house and excellent commercial software tools are supported by extensive computing laboratory facilities. The University can also offer a large selection of other facilities, including materials testing and fluid mechanics laboratories, a wind tunnel, an advanced machine-tool laboratory and a CAD Centre.

RESEARCH ENVIRONMENT

NA-ME is a highly active research department, with world-leading expertise in a number of areas. Our main research interests lie in:

- > ship stability and safety
- > marine hydrodynamics
- > marine structures
- > ocean engineering
- > marine engineering
- > emerging technologies
- > marine renewable energy and alternative fuels

Students studying for an MPhil (1 year) or PhD (3 years) may carry out their research in any of these areas.

Our staff participate in a wide range of research projects and networks funded by the Engineering and Physical Sciences



Hydrodynamics lab

Research Council (EPSRC), EU, and the UK government. The Department makes a significant contribution to national, European and international policy-making in marine technology research and its application through the participation of members of staff in research bodies including the Foresight Transport Panel, the EPSRC College, the EU Research and Development Coordination Group, and WEGEMT (an association of 43 EU universities involved in Marine Technology and Related Sciences). Department staff are also involved in major international bodies including the International Standards Organisation, the International Maritime Organisation, the Offshore Structures Code, the International Towing Tank Conference and the International Ship and Offshore Structures Congress.

NA-ME attracts researchers and visiting academics from a wide range of prestigious institutions worldwide. Strong collaborative research links with UK and overseas universities provide the basis for continuous interchange between research staff and students. Recent visitors include more than 20 academics from renowned universities all around the world.

Staff are internationally recognised for their expertise in the safety of ships and marine installations, reliability of marine structures, advanced structural analysis, offshore engineering, marine environment sustainability, ship hydrodynamics and computer applications.

NA-ME research activities are focused through three research centres and three research groups:

CENTRE FOR MARINE HYDRODYNAMICS

Building on its existing strength in hydrodynamics of ships and offshore structures, the Centre focuses on EFD (experimental fluid dynamics) and CFD (computational fluid dynamics) research. The Centre operates the Kelvin Hydrodynamics laboratory and is developing a variety of innovative experimental techniques, including techniques for investigation of unsteady resistance, determination of fluid forces on damaged vessels, generation of freak waves, and hydrodynamic performance of marine renewable energy devices. Research is supported by a range of bodies including EU and EPSRC.

MARINE STRUCTURES AND RELIABILITY CENTRE

Research is focused on efficient and improved strength and response modelling of offshore and ship structural components and systems. Methods for rational selection of partial safety factors, often in conjunction with inspection quality and timing, for structures degrading through fatigue and corrosion are investigated.

SHIP SAFETY RESEARCH CENTRE

SSRC is already acknowledged internationally as the leading centre on ship stability and safety. Efforts to promote a safety culture in the design and operation of ships have elevated safety-related research to top priority, thus providing new opportunities for growth. The Centre is developing research in Design for Safety to effectively combine national and European research efforts to target safety as a life-cycle issue for all safety-critical ship types.

SUSTAINABLE MARINE ENGINEERING GROUP

This group focuses on environmental impact of ship design, construction and operations, addressing areas such as marine exhaust gas emission reduction, efficient machinery and systems, engine combustion and simulation, alternative fuel, eg. bio-fuels application in ships, fuel-cell technologies for ships, ballast water treatment, and marine oil pollution. The experimental research activities of the group are carried out in the Marine Engineering Laboratory which houses a diesel engine test-bed contained in an acoustic cell. As part of a collaborative research programme within the Faculty of Engineering, supported by the University and BP shipping, a 5kW solid oxide fuel cell test platform is currently being installed in the laboratory.

MARINE RENEWABLE ENERGY GROUP

This group integrates and develops existing activities in offshore wind/current/wave energy within the Department, and links with other departments in Strathclyde/Glasgow and throughout Scotland. The group's

experimental research is carried out in the Hydrodynamics Laboratory.

MARINE DESIGN, OPERATION AND HUMAN FACTORS

This group's activities include multi criteria ship design optimisation techniques for improving producibility and subdivision layout, and improved understanding of human factors in design and operation

CONTACT

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TAUGHT COURSES

Apply online:

www.strath.ac.uk/courses/postgraduate

**Marine Engineering
Marine Technology*
Offshore Floating Systems
Offshore Renewable Energy*
Ship and Offshore Structures
Subsea Engineering
Technical Management of Ship Operations**

* part of the Faculty Sustainable Engineering Programme, see pg 32 for course details

Course Duration

MSc: 12 months full-time
PgDip: 9 months full-time

Contact for Taught Courses

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Marine Engineering MSc/PgDip

This programme allows graduate engineers or those from related disciplines to specialise in, or convert to, Marine Engineering. Marine Engineering is concerned with the design, construction, installation, and support of the systems and equipment onboard marine vehicles, with particular emphasis on propulsion and control systems. High efficiency and low environmental impact of marine engines are the key factors in assuring economical operation and environmental protection in maritime transportation, which has important implications for both economic success and environmental impact.

Curriculum

The programme has three components as follows:

- > Instructional Modules
- > Group Project
- > Individual Project (MSc only)

DID YOU KNOW?

- In the 2008 Research Assessment Exercise NA-ME was the top-rated department in its Unit of Assessment in Scotland.
- The Department has a Sigma 33 training yacht, available for use by students and staff for cruising and racing.

Instructional classes offered during the two semesters, include modules, such as:

- > Advanced Marine Engineering
- > Marine Engineering Simulation and Modelling
- > Energy Management Systems
- > Inspection and Survey
- > Maritime Safety and Risk
- > Waterborne Transportation Systems
- > Design Management
- > Project Work and Project Management
- > Environmental Impact and Sustainability
- > Information Management
- > Risk Management
- > Finance

Students with a lesser knowledge of marine engineering may be required to take the following modules instead of some of those listed above:

- > Ship Power Systems and Design
- > Marine Environment Protection and Safety
- > Marine Transmission and Propulsion Systems

Careers

Graduates are prepared for openings in a wide range of challenging and rewarding careers in the marine and related industries. These include marine engineering machinery and system design, surveying, technical superintendence, project management, safety management, support services, classification societies and consultancy services.

Offshore Floating Systems MSc/PgDip

With the world-wide search for offshore oil and gas moving into increasingly hostile areas of ocean and deep and ultra-deep water, floating systems are becoming

more widely used. Floating systems must be designed and built to withstand harsh environments with innovative methods and techniques being adopted to develop robust as well as economically efficient and safe structures.

In meeting these challenges, concern for the environment is of increasing importance.

This programme is designed for graduate engineers or those from related disciplines. It provides students with practical knowledge of offshore floating systems, their conceptions, design and installation, with a sound basis of mathematical and engineering fundamentals.

Curriculum

The programme has three components as follows:

- > Instructional Modules
- > Group Project
- > Individual Project (MSc only)

Instructional classes offered during the two semesters, include modules, such as:

- > Inspection and Survey
- > Maritime Safety and Risk
- > Design and Construction of FPSOs
- > Risers and Mooring Lines
- > Dynamics of Floating Offshore Installations
- > Offshore Engineering Practice
- > Finite Element Analysis of Floating Structures
- > Modelling and Optimisation in Design
- > Advanced Marine Structures
- > Theory and Practice of Marine CFD

Careers

Graduates will be well-prepared for a challenging career in all sectors of offshore engineering dealing not only with offshore floating systems but also fixed marine structures.

Ship and Offshore Structures MSc/PgDip

This programme was developed following an increase in demand for design engineers who can design and assess new ships and offshore structures. It is designed for graduate engineers or those from related disciplines who will be introduced to ultimate strength, fatigue and design concepts for structural components of ships and offshore floating systems. The programme will provide students with knowledge of material behaviour together with factors influencing the dynamic behaviour of offshore installations.

Curriculum

The programme has three components as follows:

- > Instructional Modules
- > Group Project
- > Individual Project (MSc only)

Instructional classes offered during the two semesters, include modules, such as:

- > Risers and Mooring Lines
- > Dynamics of Ships and Floating Offshore Structures

- > Reliability-based Structural Design and Plated Structures
- > Ultimate Strength of Ship and Shell Structures
- > Computational Modelling and Approximation in Structural Mechanics
- > Computational Modelling of Non-linear Problems in Structural Mechanics
- > Materials Engineering

Careers

There is currently a shortage of Naval Architects and Structural Engineers. The graduates from this programme will find jobs with oil and gas firms, classification societies and consultancy firms dealing with ship and offshore design.

Subsea Engineering MSc/PgDip

This programme is designed for graduate engineers or those from related disciplines who wish to acquire advanced knowledge on subsea systems, their conceptions, design and installation. These include systems and equipment such as pipelines, wellheads, drilling rigs and riser and mooring systems.

As oil is required to be extracted in deeper and rougher seas new demands continue to be imposed on design development as well as new installation and inspection techniques.

Curriculum

The programme has three components as follows:

- > Instructional Modules
- > Group Project
- > Individual Project (MSc only)

Instructional classes offered during the two semesters, include modules, such as:

- > Inspection and Survey
- > Maritime Safety and Risk
- > Risers and Mooring Lines
- > Marine Pipelines
- > Subsea Systems and Installation
- > Offshore Engineering Practice
- > Subsurface Technology
- > Design and Construction of FPSOs
- > Dynamics of Floating Offshore Installation
- > Theory and Practice of Marine CFD
- > Computational Free Surface Hydrodynamics

Careers

There is a great demand for graduates from this programme who find jobs in oil and gas companies, subsea system manufacturing firms, classification societies, firms specialising in riser and mooring analysis, and marine consultancies.

Technical Management of Ship Operations MSc/PgDip

This programme is designed to give graduate engineers and well-qualified sea-going personnel an opportunity to acquire the knowledge and skills required for technical ship management. The programme develops an in-depth understanding of those subjects essential for effective and efficient management of ships and fleets, which is of vital importance to the shipping industry with 90% of world trade being carried by sea.

With in-depth knowledge in ship operations, graduates of the course will be capable of making significant contributions to the industry as technical ship superintendents/managers..

Curriculum

The programme has three components as follows:

- > Instructional Modules
- > Group Project
- > Individual Project (MSc only)

Instructional classes offered during the two semesters, include modules, such as:

- > Waterborne Transportation Systems
- > Maritime Law, Contracts and Insurance
- > Maritime Safety and Risk
- > Maritime Regulatory Framework
- > Inspection and Survey
- > Energy Management Systems
- > Systems Availability and Maintenance
- > Shipping Practices and Management

Careers

There is a great demand for well-qualified technical ship superintendents/managers. Graduates will be able to make a valuable contribution to the currently booming shipping industry. Employment opportunities are also available in ship insurance firms.

Entry Requirements

For the above MSc courses: BEng with second-class Honours or equivalent qualification. Applicants with marginally lower qualifications will be considered for a PgDip. Applicants with other qualifications will be considered on an individual basis.

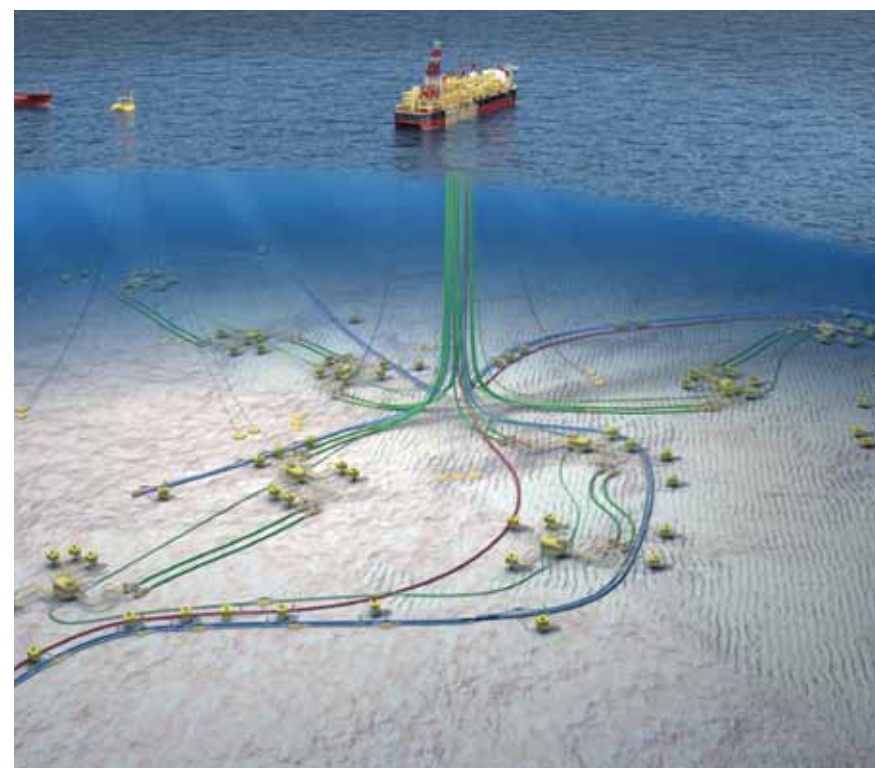
Funding

Postgraduate Diploma students from EU countries may be able to get fees-only support from Student Awards Agency for Scotland (www.saas.gov.uk). Applications should be made to the Department in the first instance.

RAUL MEZA MSc in Subsea Engineering



The course is specific to the topic, and is very relevant for job prospects when I return to Mexico. I like the location in the city centre and there is a lot of transport available. I also like the facilities in the sport centre and the library. The city centre is beautiful and there are always many places to go after class.



National Centre for Prosthetics and Orthotics

www.strath.ac.uk/prosthetics

The National Centre for Prosthetics and Orthotics (NCPO) has a wide network of collaborative links with other departments in the Faculty of Engineering and the Faculty of Humanities and Social Sciences and also with clinical and research facilities across the UK and overseas. The Department's purpose-built facilities allow flexibility to address the needs of different research projects. We have a range of equipment, including fully equipped workshops, an environmental-controlled laboratory, pressure measurement and scanning systems, rapid prototyping facilities and a respiratory gas monitoring system.

RESEARCH

The NCPO has an active and expanding research portfolio of fundamental and applied research projects. Staff members have collaborative national and international links and attract research income from a variety of sources such as governments, charities and research councils.

NCPO's research activities are grouped under main themes:

- > Clinical Activities
- > Development and evaluation of clinical techniques
- > Evaluation of prosthetic and orthotic interventions
- > Development and evaluation of outcome measures
- > Quality of Life
- > Products
- > Clinical evaluation tools
- > Components
- > Technologies
- > Clinical simulation for prescription
- > Shape capture

UNDERTAKING A RESEARCH DEGREE

We welcome suitably-qualified individuals from a variety of disciplines to pursue research leading to the degrees of MRes, MPhil or PhD. Some degrees can be completed on either a full-time or part-time basis on- and off-site.

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RESEARCH FACT FILE



Dr Margrit Meier (NCPO) & Dr Rebecca Lunn (Civil Engineering)

A multidisciplinary team has been awarded a £200,000 grant to develop research proposals on how to improve the biological and mechanical performance of prosthetic limbs. Approximately half of the 62,000 people living with limb loss in the UK are affected by skin infections or irritation thought to be caused by bacteria in the prosthetic liners that separate a prosthetic limb from the skin. The team will collect data on the microbial populations present in a number of liners from users who have experienced skin infections and those who have had no problems. Experts will image and compare the size and location of microbial populations using electron microscopy; model the growth of bacteria and investigate the behaviour of bacteria in porous materials with the long-term aim of designing new technologies, including antimicrobial lining materials.

DID YOU KNOW?

The National Centre is redeveloping its MSc by distance learning programme, which will be available for applications in 2011. Visit www.strath.ac.uk/prosthetics for up-to-date course information.