University of Strathclyde Glasgow

faculty of science

POSTGRADUATE PROSPECTUS 2012

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.

contents

Scotland on your doorstep

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.

The Riverside Museum, Scotland's museum of transport and travel, is Glasgow's newest, most contemporary attraction.

welcome to Glasgow

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.

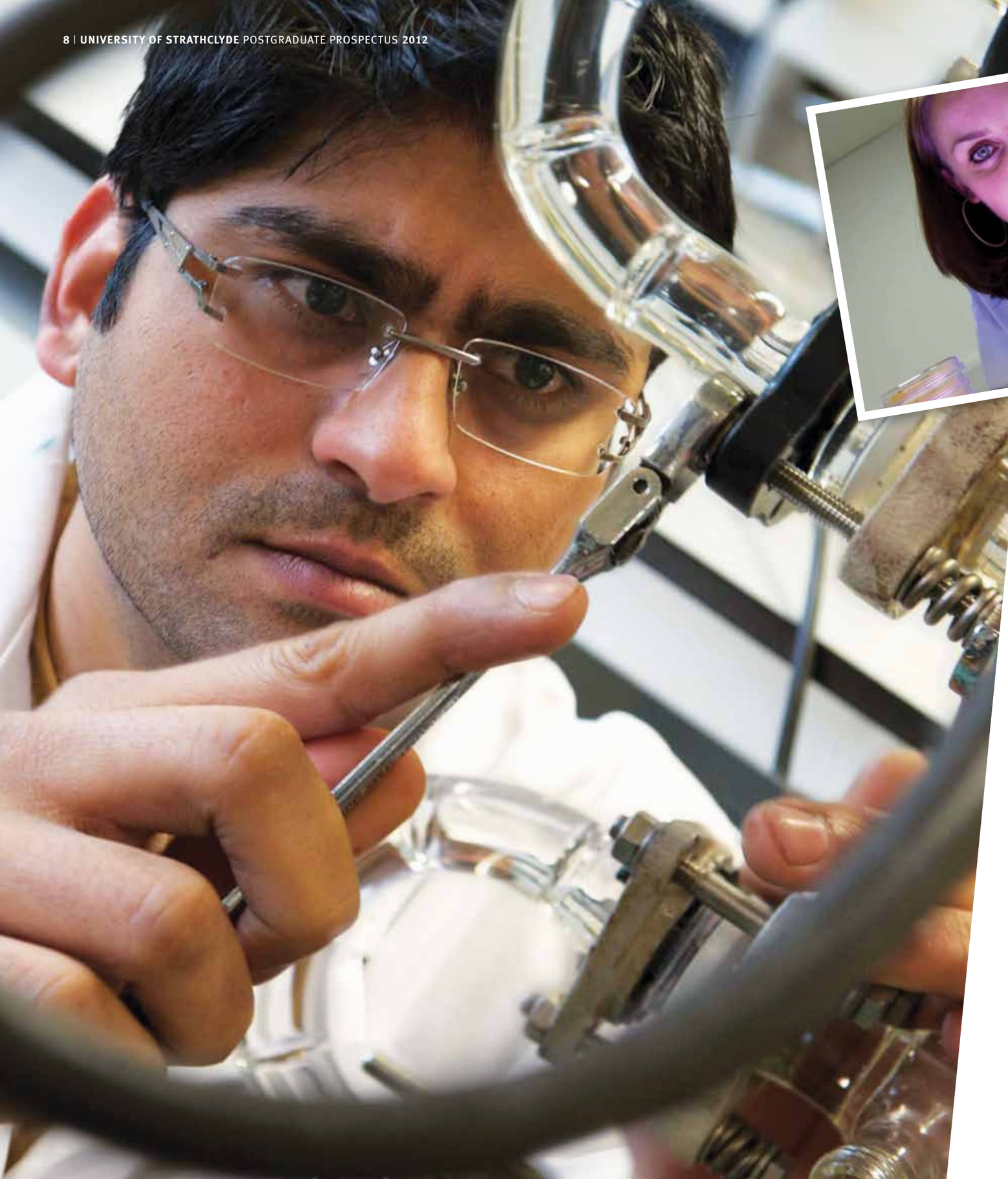
Flights of an advanced craft into ‘near space’ launched by engineering students via a helium balloon helped build flight heritage and knowledge to develop them into highly skilled professionals fit for the modern world.

our vision

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.

The world-leading Technology and Innovation Centre at Strathclyde (TIC) will transform the way universities and industry collaborate to bring global competitive advantage to Scotland. TIC will bring together academics, researchers and project managers from the University and its leading industrial partners to work side-by-side in a state-of-the-art building in the heart of Glasgow. Opening in 2014, TIC reflects Strathclyde’s commitment to finding solutions to challenges in sectors central to economic regeneration in Scotland and further afield.



our research

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 most recent 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**

your experience at Strathclyde

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 clubs and activities available at the University and to the restaurants, shopping and nightlife available on your doorstep in the city centre.

www.strath.ac.uk/science

faculty of science

399
Postgraduate students (research)

154
Postgraduate students (taught)

187
Research staff

218
Academic (teaching) staff

Science at Strathclyde is relevant to the real world, challenging traditional academic boundaries to solve global problems. Studying here on a taught or research degree will inspire you and involve you in the lifelong application of science.

SCIENCE AT STRATHCLYDE

- applies science in the real world
- engages with external partners
- involves an international community of scholars

APPLIED SCIENCE

Our principal areas of research are in:

- future of computation: internet, algorithms and novel technologies
- health: molecules to medicine to public health
- materials: characterisation, functionality and novel devices
- modelling the real world: applying maths and statistics to make a difference
- photonics: developing new laser technologies for innovative products

Most of these research themes involve staff from a range of disciplines. For instance, health-related research includes: mathematical modelling of infectious diseases; studies of the effect of disease on normal cell function; cardiovascular physiology and pharmacology; fundamental and applied chemistry; quality assurance of medication use; the use of solid state lasers in medicine; and the development of artificial intelligence to support future health systems.

Research degrees in Science may be based within a specific department, but increasingly there are opportunities for study across traditional departmental and disciplinary boundaries, within the Faculty, or with other Faculties and other institutions.

Multidisciplinary study is also a feature of certain postgraduate taught courses, such as the new MSc degrees in Nanoscience and in Photonics & Device Microfabrication. Other taught courses provide professionally-accredited qualifications (MSc in Forensic Science) or offer continuing professional development for practitioners (MSc in Clinical Pharmacy).

EXTERNAL ENGAGEMENT

The Faculty attracts around £20 million per year in research grant income from the UK research councils, industry, charities and government or other public bodies in the UK and EU. Academics in Science take pride in working with industry partners, such as:

- staff of leading healthcare company GlaxoSmithKline are able to undertake in-house research degrees under the supervision of Strathclyde staff
- academic researchers in Computer & Information Systems are working in partnership with the Monterey Bay Aquarium Research Institute as well as industry giants Google and Microsoft
- expertise in Physics is being harnessed to assist two small companies with detecting defects in semi-conductors
- the MSc in Advanced Computing Science was developed in consultation with the Industry Advisory Board

The University's new Technology and Innovation Centre represents a major step forward in industry-university partnerships. Science staff are building on existing partnerships to develop photonics and sensors, nanoscience and Strathclyde Health Technologies as key components of the Centre (**www.strath.ac.uk/tic**).

There is also engagement with the public sector and charitable bodies. Examples include:

- Strathclyde statisticians have developed software to support the NHS in planning for epidemics
- mathematical models are used to assist Marine Scotland with fish stock management
- the Cancer Research UK Formulation Unit collaborates on development of putative anti-cancer drugs

INTERNATIONAL COMMUNITY

In choosing to study Science at Strathclyde you will become part of an international community of researchers. More than one-quarter of the Faculty's postgraduate students are from outwith the UK and the staff population is similarly cosmopolitan.

The quality profile resulting from the 2008 Research Assessment Exercise results confirms that 90% of research submitted was judged to be international in quality. Many staff work in partnership with international researchers, or undertake research overseas, as well as contributing to or leading international conferences.

Postgraduate students are increasingly offered opportunities to undertake part of their course abroad, through exchange or other arrangement.

DEPARTMENTS AND CENTRES

- Computer & Information Sciences
- Mathematics & Statistics
- Physics
- Pure & Applied Chemistry (including the Centre for Forensic Science)
- Strathclyde Institute of Pharmacy & Biomedical Sciences

In addition to these academic Departments, all of which offer research degrees and postgraduate taught courses, the Faculty hosts the Institute of Photonics, a commercially-oriented research centre.

POSTGRADUATE STUDY

The Faculty's success in educating postgraduate students is reflected in the sustained large and diverse student population. Departments provide high-quality supervision, teaching and support and, through pooling arrangements with other Scottish universities, students have access to a wide range of expertise. Students on taught courses and research degrees will be encouraged to develop transferable skills through a range of activities and training opportunities.

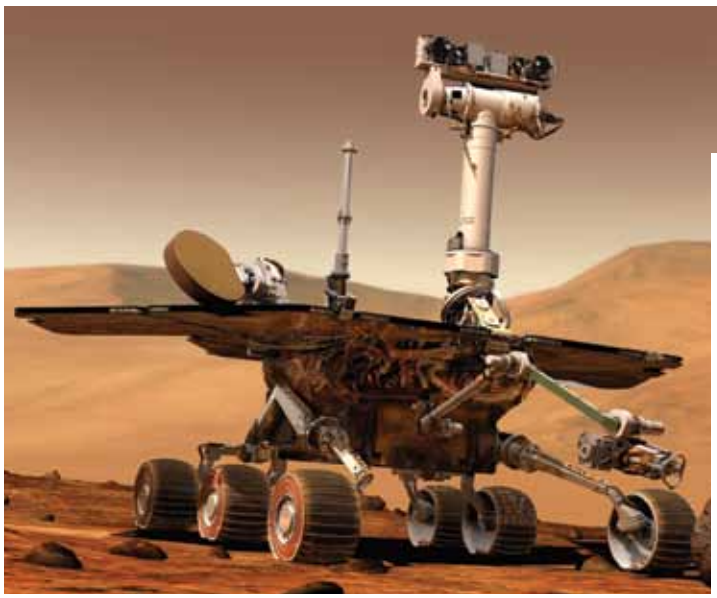
Employment prospects are good, with most graduates finding jobs in industry or the health and education sectors as analysts, researchers, scientists and managers.

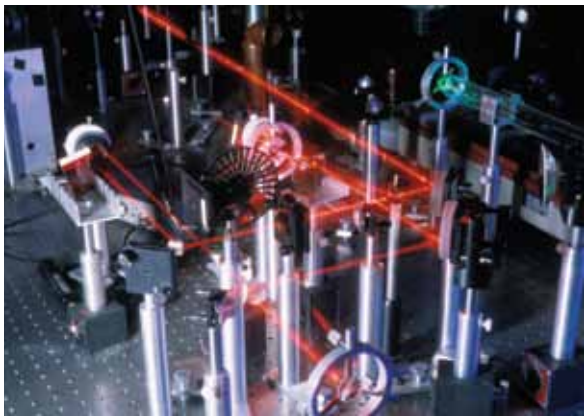
Staff in Departments will be happy to deal with enquiries or to arrange visits for anyone wishing to learn more about the range of exciting possibilities open to all those who study Science at Strathclyde.

CONTACT

Faculty of Science Office
t: +44 (0)141 548 2014
e: contact-facultyofscience@strath.ac.uk

RESEARCH FACT FILE: NATIONWIDE PARTNERSHIPS





The Faculty of Science is involved in key collaborations across Scotland:

> The Scottish Informatics and Computer Science Alliance (SICSA) is a collaboration of universities seeking to consolidate Scotland's position as an international research leader in informatics and computer science (ICS). About 16% of the best ICS research output comes from Scotland, and SICSA members hold about 20% of national ICS research funds.

> The Scottish Mathematical Sciences Training Centre is an EPSRC-funded collaborative venture involving seven universities. It provides video-based training in Mathematics and Statistics for first-year students beginning PhDs in any aspect of mathematical sciences. The aim is to complement more specialised courses and introduce students into the mathematical sciences community.

> The Scottish Universities Life Sciences Alliance (SULSA) involves six universities and aims to advance Scotland's position in the life sciences by recruiting international research leaders, funding world-class facilities and connecting researchers through events and collaborative studentships. SULSA's investments are focused in three research themes: cell biology, systems biology and translational biology.

> Strathclyde is a major partner in the Scottish Universities Physics Alliance, the largest physics grouping in the UK. Major research themes being pursued are astronomy, condensed matter and materials physics, nuclear and plasma physics, elementary particles, photonics, and physics and life sciences.

> ScotCHEM is a pooling initiative launched with £24 million investment that aims to make Scottish chemistry a magnet for the best researchers and a target for major funding agencies worldwide.

Department of Chemistry, Pure & Applied (including the Centre for Forensic Science)

www.strath.ac.uk/chemistry

RESEARCH DEGREES

MPhil, PhD

TAUGHT COURSES

MSc/PgDip/PgCert

Forensic Science

Environmental Forensics (with David Livingstone Centre for Sustainability, Faculty of Engineering)

The Department of Pure & Applied Chemistry has one of the largest research schools in the UK, with expertise ranging from analytical chemistry to materials science, and from biological chemistry to organic and inorganic synthesis. The Department also has a strong forensic science research base and extensive national and international collaborations are in place in all research areas.

WestCHEM, the joint research school of the Universities of Strathclyde and Glasgow, is one of the largest in the UK and was formed as part of the ScotCHEM initiative on Chemistry pooling in Scotland. The School brings together the strengths of the two major Chemistry Departments in the West of Scotland to offer outstanding facilities and opportunities within a large, diverse and expanding chemistry research environment.

Research in the Department is well-supported by industry, government, research councils, the EU and charitable foundations. Successes include £12.5 million funding for the Research Centre of Excellence in Nanometrology, the Research Centre of Excellence in Physical Organic Chemistry, and a major anti-cancer programme funded by Cancer Research UK. Chemistry students at Strathclyde benefit from the ongoing investment in world-class laboratory and instrumentation facilities.

Postgraduate chemistry students come from all over the world to study with the award-winning and internationally recognised research chemists and forensic experts at Strathclyde. Current postgraduate students come from Scotland, the UK and Europe as well as Botswana, India, China, Malaysia, North America and South Africa.

A postgraduate degree in chemistry opens doors to a wide range of career opportunities. An advanced knowledge of chemistry is required in so many scientific and technological areas that there is a continuous demand for good chemistry graduates; however, it is not so well known that there are also major opportunities for chemists in other areas. Strathclyde chemistry graduates have an excellent record of finding rewarding careers and recent postgraduates have taken up positions in sectors such as the police, higher education and industry.

RESEARCH

Across the Department, research is concentrated as follows:

Analytical Chemistry

Research is wide-ranging and includes atomic spectrometry, molecular spectrometry, chromatography, radioanalytical techniques and chemometrics.

Process analytical chemistry is a major interest through the Centre for Process Analytics and Control Technology (CPACT) – a multidisciplinary collaboration involving three universities and 19 companies. Research includes developments in non-invasive on-line and in-reactor analysis techniques, process control and optimisation; the analysis of soils, sediments, sea and river waters and air for organic and inorganic pollutants; and the development of new methods to determine metals in clinical samples. Techniques are being developed to investigate the degradation processes which affect plastics, glass, limestone and metallic artifacts in museum collections.

Low-cost, unobtrusive monitors for pollutants in indoor air are being devised, and sorbents developed to reduce their concentration.

Inorganic Chemistry

Research is based on the synthesis, characterisation and understanding of the properties of new compounds which are important in the chemistry of elements other than carbon. One programme is focused on the design of novel synergic bimetallic molecules and has led to the development of the new concepts of alkali-metal-mediated metallation and inverse crown complexes, which apply to both main group and transition metal chemistry. Surface-enhanced Raman scattering has been developed to give information on the bonding and orientation between organic molecules and transition metal surfaces. Very sensitive and selective assays for drugs of abuse, some clinical drugs, explosives and DNA have been developed.

A state-of-the-art Raman microscopy facility supports projects in the creation of sensing devices using microsystems technology and nanoparticles. New chemistry for analysis is a growing area. Breakthroughs have been made in the sensitive and selective use of DNA.

RESEARCH FACT FILE

Innovative Working with Industry

An innovative Chemistry degree programme run by Strathclyde and world-leading pharmaceutical company GlaxoSmithKline (GSK) has recently expanded into the area of Drug Metabolism and Pharmacokinetics (DMPK).

The initial programmes, designed for GSK staff, were groundbreaking MPhil and PhD initiatives in Synthetic and Medicinal Chemistry based in the Department of Pure and Applied Chemistry. Extension into DMPK with the Strathclyde Institute of Pharmacy & Biomedical Sciences has now also been established.

These endeavours are designed to allow employees to perform collaborative research with academia towards new treatments and, in so doing, further their career in the pharmaceutical sector. The research is geared towards identifying and developing a range of novel treatments for respiratory and inflammatory diseases.

The programme has been endorsed by the Scottish Parliament and was shortlisted for a prestigious THES award as a knowledge exchange exemplar – industry and academia sharing ideas and expertise for educational, economic, and social benefit.

"I have really enjoyed the challenge of pursuing an industrial research project in collaboration with academia. The scientific input of my academic supervisor, Professor Kerr, has been excellent and his contributions have moved my GSK research project forward. The extremely valuable skills I have developed during the year have increased my appetite to transfer onto the collaborative Strathclyde/GSK PhD programme at the earliest opportunity."
– Seb Campos, Medicinal Chemist at GSK working on project to find a new inhalable treatment for chronic asthma.

Organic Chemistry

Research includes total synthesis for medicinal and agrochemical applications. International collaborative studies of new pteridines as potent inhibitors of important enzymes also have fundamental applications for cancer and infectious disease therapies. The synthesis of sequence-selective DNA minor-groove binders addresses the cancer theme from another angle together with anti-bacterial activity.

In the field of organometallic chemistry, complexes based on several transition metals are being applied to develop stereo-controlled syntheses of important organic molecules, including antibiotics and anti-malarial agents. Forefront stereo-selective reactions with organomagnesium amides also feature prominently in our work.

Physical organic chemistry is represented by studies of reactive molecules, intermediates and transition states in important organic and medicinal chemistry reactions using forefront computational methods, high-field NMR and by low-temperature matrix isolation. Polymer chemistry emphasises the synthesis of tailored polymers with specific chemical or physical properties. More fundamental studies focus on novel methods of controlling nanopore formation in ultra-high specific surface area polymers, as well as nanoparticle assembly processes.

Physical Chemistry

Research on polymer degradation has led to significant advances in fire retardancy in flexible foam polymer systems. A fundamental understanding of the factors that control ageing in adhesive-bonded structures continues to be developed. Nano-composites research focuses on the factors influencing the dispersion of nanoparticles, and their influence on the physical properties of thermoplastics and thermosets. A growing activity relates to materials for optoelectronic applications; new materials have been developed designed to operate into the UV with functionality that allows use for sensor and OLED device applications.

Work on crystal chemistry uses fundamental understanding to drive atoms to adopt unusual bonding arrangements that can lead to exciting physical properties. The focus is on complex metal oxide ceramics that can show a wide range of useful magnetic or electrical properties, as well as exotic effects such as magnetoresistance, multiferroic behaviour or ionic conductivity.

Research into organic semi-conductors encompasses the synthesis and characterisation of complex electro-active molecules and macromolecules for organic semiconductor devices. Specific applications include solar cells, field effect transistors, electrochromic devices, light emitting diodes and capacitors/supercapacitors.

In computational and theoretical chemistry, research centres on the application of quantum chemical methods to understand underlying physical phenomena. The research is primarily done in close collaboration with experimental partners, and applications include organic chemistry, biochemistry, drug design, catalysis and analytical chemistry.

Biophysical research aims to understand the mechanisms of natural processes such as enzyme catalysis, self-assembly and molecular recognition. Studies are in progress of the activity and stability of enzymes in systems relevant to their application as practical catalysts. Deposition of proteins, peptides, nucleic acids and nanoparticles in ordered structures on inorganic and organic crystals is used to understand self-assembly and molecular recognition processes with applications in bionanotechnology, drug delivery and molecular electronics.

Centre for Forensic Science

Strathclyde is internationally recognised as a centre of excellence in forensic science education, research and practice. The Centre for Forensic Science (CFS) is unique in the range, experience and expertise of its staff, most of whom combine teaching, research,

casework and professional activities. The Centre provides training in forensic science to police, scientists and lawyers world-wide and staff carry out forensic casework and consultancy in many specialist areas including DNA and fire investigation.

Centre staff play key roles in the European Network of Forensic Science Institutes and the Forensic Science Society. The Centre is a recognised leader in research in forensic science and has the largest research group of its type in the UK. Working in close collaboration with partners in operational forensic science laboratories, CFS members have published extensively in peer-reviewed journals and books in areas such as DNA, fire investigation, explosives, drugs and investigative use of forensic science.

Research within the Centre encompasses a wide range of applications with an emphasis on the development of techniques for solving current and future forensic problems. The biology-based research includes DNA profiling for both human and wildlife identification. Wildlife crime investigation is an expanding area and the Centre is at the forefront of molecular analysis used to discriminate a wide variety of species. Ultra low DNA typing is a theme with research on the factors affecting cell and DNA transfer being a focus of research studies. The transfer and persistence of fibres is also studied, with a specialised database of fibre types being developed to determine the frequency of any given fibre.

Comprehensive research involving drug profiling of the main amphetamine-type stimulants and semi-synthetic illicit drugs has been undertaken. Using a combination of preparative organic chemistry, analytical chemistry (GCMS, ICPMS and IRMS) and chemometric analysis sample to sample linkages are being explored at a fundamental level.

Fire investigation research involves recovery of human contact traces, evaluation of ignition sources, arc mapping, analysis of thermal decomposition of polymers and using Artificial Neural Networks in the evaluation of data resulting from fire debris analysis. Statistical analysis is also a focus of research, with Bayesian and multivariate mathematical systems being developed for data management systems for the diverse data sets produced in forensic analysis.

Research is not confined to the laboratory examination of samples, but extends to studies of the application of science in law enforcement and the legal process.

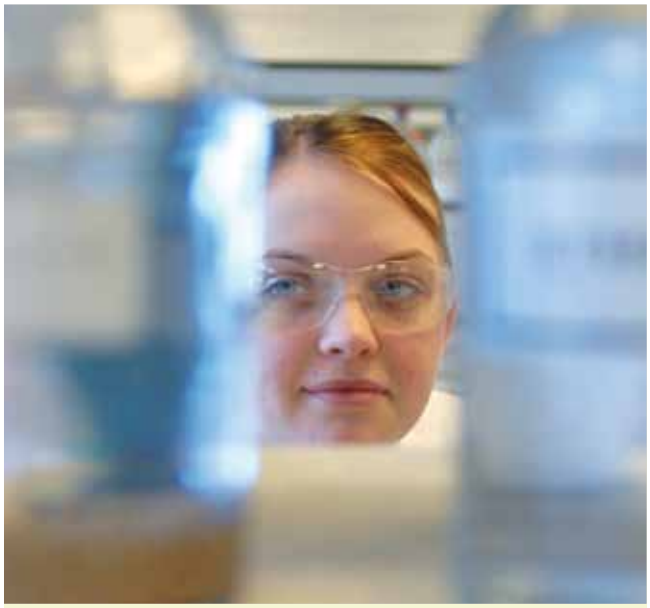
RESEARCH DEGREES

Applications are invited from graduates in all branches of chemistry to undertake a PhD or MPhil degree. The Department's pooling arrangement with the University of Glasgow's Department of Chemistry has created a Research School with excellently equipped modern laboratories in Glasgow city centre and Strathclyde has spent over £10 million over the last five years to ensure that chemistry facilities remain at the cutting edge; this investment is reinforced by the WestCHEM £11 million grant made in 2009.

Funding for studentships arises from a number of sources including EPSRC, BBSRC, WestCHEM, industry, EU, ORS and the University of Strathclyde. For more information visit **www.chem.strath.ac.uk/applying/research**

CONTACT FOR RESEARCH DEGREES

Professor Duncan Graham
t: +44 (0)141 548 2259/4701
e: pg-application.chemistry@strath.ac.uk



ARLENE DAVIES

MSci, current PhD Student
Winner of the Pfizer Prize in Organic Chemistry 2010

After completing my undergraduate degree in Forensic and Analytical Chemistry at Strathclyde, I wanted to stay at Strathclyde to continue my education, and I am now carrying out a PhD investigating new routes for synthesising functionalised polymers with ultra-high specific surface areas.

During the first year of my PhD I carried out a three-month placement at a collaborating university in Tarragona, Spain. This was an excellent opportunity to expand my knowledge of chemistry while also experiencing life in another country and meeting lots of fantastic people.

Further opportunities to expand my knowledge and personal development have come from supervising students in the undergraduate teaching laboratories and from attendance at local and international conferences.

The excellent reputation of the Department of Pure & Applied Chemistry, combined with the high quality staff and first-class laboratory facilities, makes Strathclyde the ideal place to study chemistry. I have thoroughly enjoyed my time at Strathclyde and will leave not only with qualifications in chemistry, but with many fond memories and lifelong friendships.

Forensic Science

MSc/PgDip/PgCert

The University of Strathclyde has been teaching forensic science for over 40 years and has the longest established programme in the UK. This intensive course equips graduates with relevant practical skills combined with analytical and investigative thinking. It is accredited by the Forensic Science Society.

Alumni from Strathclyde are internationally recognised and have been employed in all laboratories throughout the British Isles and around 60 countries worldwide. The Centre for Forensic Science has the largest multidisciplinary research group in the UK and offers a unique learning experience, combining 'case-based learning' with research-led teaching. The classes maintain their current relevance by being taught by academic staff with a wealth of professional knowledge and experience.

Course Structure

SEMESTER 1

The first semester covers core material that all forensic science students should know, including:

- the law and legal aspects of forensic science
- Investigation of crime and crime scene management
- evidence recovery including the examination of trace evidence (glass, paint, hairs and fibres)
- writing legal reports and statements

SEMESTER 2

The second semester is split between biological aspects (eg body fluids, DNA, biological trace evidence) and chemical aspects (eg drugs of abuse, toxicology, fires, explosives).

MSc PROJECT

A project, typically lasting three months and usually based at a forensic science laboratory, is the culmination of the MSc course. Those undertaking the PgDip and PgCert do not complete the research project.

Course Duration

MSc: 12 months full-time; 36 months distance learning
PgDip/PgCert: 9 months full-time

Entry Requirements

MSc: A first- or upper second-class Honours degree, or equivalent, in a relevant science subject such as chemistry, biology, biochemistry, pharmacy, zoology or botany. Candidates with operational experience are also welcome to apply.
PgDip/PgCert: This is ideal for those who are marginally under-qualified for entry to the MSc course but also have relevant experience.
English language: IELTS 7.0 is required for all non-English speakers.

Entry is competitive and selection is based on academic ability with previous experience being taken into consideration. Final selection decisions are made by the academic selector and notified to successful applicants normally in March.

CONTACT

Dr Niamh Nic Daeid
t: +44 (0)141 548 2100
e: n.nicdaeid@strath.ac.uk

Department of Computer & Information Sciences

www.strath.ac.uk/cis

RESEARCH DEGREES

MPhil, PhD
MRes Automated Planning for Autonomous Systems
EngD in System Level Integration

TAUGHT COURSES

MSc/PgDip
Advanced Computer Science
Information & Library Studies
Information Management
Business Information Technology Systems (with Department of Management, Strathclyde Business School)

The Department of Computer & Information Sciences is an interdisciplinary school providing a unique and innovative curriculum and research environment. The Department has 40 academic staff including postdoctoral research fellows, and a lively and diverse international community of approximately 100 postgraduate students. Research interests span the whole spectrum of computer and information sciences theory and application from fundamental algorithms to information retrieval and management. Research is funded by the Research Councils (EPSRC, PPARC and AHRC), EU, and various government agencies and industry bodies. We collaborate with a range of external partners including the Monterey Bay Aquarium Research Institute, Metropolitan Police, NASA and the European Space Agency.

RESEARCH

Research activities are structured around five main groups:

iLab

Research is centered on information use and access, and incorporates a broad portfolio of activity including statistical data modeling; information retrieval; information and service management; mobile information access; and digital libraries. The group is involved in national and international projects and contributes to the international Information Retrieval and Human Computer Interaction (applied to Information Access) communities. Members are leading researchers in information retrieval and have chaired or co-chaired several international conferences, most recently the 30th European Conference on Information Retrieval (ECIR 2008). Members serve in an editorial capacity on journals including Advances in Human Computer Interaction, Information Processing and Management, Library Review, Journal of the American Society for Information Science and Technology, Journal of Information Retrieval, Personal and Ubiquitous Computing, and the International Journal of Mobile Human Computer Interaction.

Software Systems

Research activity falls into two broad themes. The first is focused on the construction and analysis of complex software-based systems – an extremely challenging activity requiring the development of sophisticated tools, techniques and evaluation mechanisms. The second focuses on the challenges of engineering mobile and distributed systems that rely on large amounts of globally distributed data but run on small portable computing devices. This includes effective and efficient query systems for semi-structured, globally distributed information. EPSRC-funded research on the reuse of object-oriented frameworks and automated detection of software design flaws led to the group being ranked, by independent research study (IEEE Transactions on Software Engineering 2005 3 (9), pp733-752) as the top international research group conducting controlled experiments in software engineering. Group members play editorial roles on journals including Software Testing, Verification and Reliability and Empirical Software Engineering, provide representation on the MobileHCI international steering committee, and have chaired or co-chaired national and international conferences including CHI 2008 and the 2004 International Conference on Mobile HCI.

Planning

The Strathclyde Planning Group works in automated planning and problem-solving for autonomous systems (such as self-driving cars and underwater vehicles). The group is well-known internationally for its work on the theoretical foundations and practice of planning. Members of the group work in a range of application areas including automated operations for space rovers, electrical power supply and restoration and battery load management (an important problem for electric vehicles). Recently the group has developed machine learning techniques for condition and behaviour monitoring of a range of complex systems including mobile robots, power transformers and weather patterns. The group also works in applying evolutionary approaches to control rule learning for planning. Members of the group serve as chairs, editors and editorial board members of some of the top journals and conferences in Artificial Intelligence. The group also has membership of the Executive Councils of the International Conference on Automated Planning and Scheduling, and the Association for the Advancement of Artificial Intelligence. Members of the group collaborate with industry and independent research laboratories, including SciSys Ltd and the Monterey Bay Aquarium Research Institute.

Mathematically Structured Programming

The Mathematically Structured Programming group aims to enhance understanding of the process of computation, and to drive the development of high-level programming languages. This depends on ideas from the following disciplines:

- Automated Planning for Autonomous Systems
- Functional Programming: Functional programming is currently at the apex of high-level programming languages and so forms the target model of computation.

- Logic: Why is functional programming successful as a model of high-level computation? The answer lies in its genesis as a clean implementation of the logical structure of computation.
- Type Theory: Type theory supports this by providing a language at an intermediate level of abstraction between a programming language and its logical foundations. Type theory could be said to be the ideas factory for programming languages.
- Category Theory: Ideas such as monads, initial algebra semantics indicate the deep contribution that category theory has made to computation.

The research of the Mathematically Structured Programming group aims to migrate logical, type-theoretic and categorical ideas into functional programming and, reciprocally, to feed challenges back from functional programming into these more mathematical domains. The group has a strong funding portfolio, including support from MicroSoft and EPSRC. The group is one of the strongest and most coherently focused research groups in this area in the UK.

Global and Mobile Dataflow Systems Research Group

The Global and Mobile Dataflow Systems Research Group works with dataflow applications, applications which typically have many clients. Clients operate within a large or complex geographical domain and have large volumes of data flowing among clients. The group's research includes research on programming languages, semi-structured data, network architectures and autonomous control systems. The group is a growing research nucleus supported by both EU and EPSRC funding.

The Mobiquitous Lab

Computing is not restricted to desktop computers and graphical user interfaces any more. The Mobiquitous Lab investigates user behavior in the context of mobile devices, ubiquitous computing, and new developing multimodal interaction mechanisms, such as multi-touch tables and tangible interaction. Our research spans a variety of user-centered design methods, including quantitative user studies in controlled experiments, field studies of technology deployment in the use context, and participant observation. We have experience in conducting system evaluations as well as in contributing to requirements analysis through working closely with end users over the course of a system development project.

Combinatorics Group

Combinatorics is one of the underpinnings of theoretical computer science, which also provides much of the motivation for research in the field. The research of the Strathclyde Combinatorics Group spans a wide spectrum, with recent emphasis on permutation patterns, combinatorics on words, graph theory and applications to physics and biology. Our research spans a variety of user-centered design methods, including quantitative user studies in controlled experiments, field studies of technology deployment in the use context, and participant observation. We have experience in conducting system evaluations as well as in contributing to requirements analysis through working closely with end users over the course of a system development project.

RESEARCH DEGREES

The Department welcomes research proposals from applicants interested in undertaking an MPhil or PhD degree in any of the research areas described above. In addition, the Department offers an MRes in Automated Planning for Autonomous Systems and an EngD in System Level Integration.

CONTACT FOR RESEARCH DEGREES

Professor Neil Ghani
t: +44 (0)141 548 4303
e: neil.ghani@cis.strath.ac.uk

Automated Planning for Autonomous Systems

MRes

This course is designed to develop specialist automated planning skills for the implementation and deployment of next generation intelligent robotics and autonomous systems. Autonomy is an area of strategic development in knowledge economies, driving towards the increasing automation of sophisticated systems using intelligent decision-making to achieve computer-control. Planning is a key component of such systems and the skills required to build and deploy planning systems, integrated into autonomous systems, is becoming critical as the ambitions for autonomous control grow. There is currently a global surge of interest in next-generation intelligent robotics and autonomous systems, in which automated planning will play a key role.

Course Structure

Diploma and MRes students follow the same instructional course for the first nine months consisting of three compulsory classes across two semesters; thereafter, those who attain the standard required to proceed to MRes complete an interdisciplinary research project while those who do not attain this standard complete a planning systems project for award of PgDip.

CLASSES

- Foundations of Automated Planning
- Resource-based Reasoning in Planning
- Advances in Automated Planning
- Planning Systems Project

Interdisciplinary Research Project

The project is carried out in collaboration with a partner organisation and will focus on building a real application of automated planning, providing scope for original thought, research and presentation.

Course Duration

MRes/PgDip: 12 months full-time

Entry Requirements

First or upper-second class Honours degree, or equivalent, in computer science or a related mathematical/engineering discipline.

Careers

The Automated Planning group at Strathclyde is recognised internationally as a centre of excellence in this area. This course builds on the group's reputation, training the next generation of planning researchers and creating researchers and practitioners who can build real applications using state-of-the-art modern planning technology. Graduates will be prepared for a research-oriented career, either directly pursuing further research or managing or leading advanced applications within industry.

CONTACT

t: +44 (0)141 548 3096
e: ap-enquiry@cis.strath.ac.uk

Advanced Computer Science

MSc/PgDip

Computer science underpins the construction, development and deployment of computer systems. Systems development is of central importance in more and more aspects of modern life and there is an intense and growing need, worldwide, for skilled, advanced computer science professionals. This course offers students the opportunity to pursue a tailored course of advanced study through a flexible structure of optional classes, organised into specialist topic pathways.

Course Structure

Students undertake two compulsory classes and select five optional classes from a selected specialist pathway. Pathways are as follows:

MOBILE SYSTEMS
- Designing Usable Systems
- Mobile Software Applications
- Advanced Topics in Software Engineering
- Computer Security
- Embedded Systems Development
- Personal Study Unit

INTELLIGENT CONTROL AND PLANNING
- Foundations of Automated Planning
- Resource-based Reasoning in Planning
- Advances in Automated Planning
- Embedded Systems Development
- Business Analytics
- Personal Study Unit

ADVANCED SOFTWARE ENGINEERING
- Advanced Topics in Software Engineering
- Information Systems Architecture
- Mobile Software Applications
- Computer Security
- Embedded Systems Development
- Designing Usable Systems
- Distributed Information Systems
- Personal Study Unit

ENTERPRISE INFORMATION SYSTEMS
- Information Systems Architecture
- Service Management
- Information Retrieval and Access
- Business Analytics
- Distributed Information Systems
- Personal Study Unit

All pathways also include the following compulsory elements, designed to enhance the contextual knowledge of students in support of the practice and application of advanced computer science skills.

COMPULSORY CLASSES
- Professional Practice
- Research Methods

DISSERTATION

The dissertation is a compulsory individual research project, undertaken by MSc students, on an approved topic related to the selected pathway, allowing students to pursue a specific interest in depth, giving scope for original thought, research and technical presentation of complex ideas.

Course Duration

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

Entry Requirements

First or second-class Honours degree, or equivalent, in Computer Science or a closely related mathematical or engineering discipline.

Careers

Graduates of advanced computing science are variously employed as analysts, architects, and developers. In particular, there is a demand for advanced practitioners and researchers in the rapidly growing area of embedded systems development.

CONTACT
t: +44 (0)141 548 3096
e: acs-enquiry@cis.strath.ac.uk

DID YOU KNOW

The MSc in Information & Library Studies and the MSc in Information Management are accredited by the Chartered Institute of Library and Information Professionals. Graduates are entitled to become associate members of CILIP and are eligible for chartership. In addition, the MSc in Information Management is recognised by the Chartered Management Institute and graduates are also entitled to associate membership of CMI and can progress to Member grade, and on to Chartered Manager.

Information & Library Studies

MSc/PgDip

Accredited by the Chartered Institute of Library and Information Professionals (CILIP) this course prepares graduates to perform at the initial professional level in libraries and manage information services in both the public and private sector. Graduates will be entitled to become associate members of CILIP and will be eligible for chartership leading to the award of MCLIP, providing direct entry to a professional body and offering access to an enhanced career path.

The course focuses on the essential core skills of library and information work, while providing an opportunity to specialise in particular aspects of the profession and to develop skills and knowledge in digital archiving and organisation of knowledge.

Course Structure

Diploma and MSc students follow the same instructional course for the first two semesters; thereafter, MSc students undertake a dissertation.

CLASSES

- Information Retrieval and Access
- Information Law
- Library Technology and Systems
- Managing Information Services
- Organisation of Knowledge
- Libraries, Information, and Society
- Research Methods

DISSERTATION

The dissertation is an individual research project on an approved topic, which allows students to pursue an area of specific interest, providing scope for original thought, research and presentation.

PLACEMENT (OPTIONAL)

An optional work placement, organised by the Department, is offered at the end of semester two. Previous participating organisations include NHS Scotland, Scottish Television, IDOX, various national and local public libraries, and government agencies.

Course Duration

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

Entry Requirements

First- or second-class Honours degree, or equivalent.

Careers

Graduates are employed as information consultants or in private research roles, as well as in the more traditional areas such as public, academic, health, and school libraries.

CONTACT

t: +44 (0)141 548 3096
e: ils-enquiry@cis.strath.ac.uk

ALISON KENNEDY

MSc Information and Library Sciences graduate, current PhD student

My positive undergraduate experience at Strathclyde meant I had no hesitation about returning when I was looking to re-train in Library Science. The MSc course met all of my objectives in terms of a theoretical and practical balance to serve me well in a career in information and library services. As a result of the diversity of staff research interests, the course is dynamic and relevant. The quality of teaching and the support available was such that I achieved a distinction and was able to pursue my ambition of continuing to PhD research through a university scholarship.

While career prospects were a huge consideration, the university itself was important to me. The facilities on campus promote a positive and useful learning experience and the city-centre location means it is a vibrant campus which is easily accessible.

Information Management

MSc/PgDip

This course is accredited by the Chartered Institute of Library and Information Professionals (CILIP) and also recognised by the Chartered Management Institute (CMI). The course is designed to develop specialist managers who can operate at the interface between business and technology and manage information resources. It provides participants with core business, management, and technology skills, with a particular focus on enterprise level information systems and services. It provides direct entry to two professional bodies, meeting the requirements of many specialist employers. Graduates are entitled to become associate members of CILIP and are eligible for chartership (MCLIP). Graduates are also entitled to associate membership of CMI (ACMI) and can progress to Member grade (MCMI), and on to Chartered Manager.

Course Structure

Diploma and MSc students follow the same instructional course for the first two semesters; thereafter, MSc students undertake a dissertation.

CLASSES

- Information Systems Architecture
- Database and Web Systems Development
- Information Retrieval and Access
- Information Law
- Business Analytics
- Research Methods

DISSERTATION

The dissertation is an individual research project on an approved topic, which allows students to pursue an area of specific interest, providing scope for original thought, research and presentation.

Course Duration

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

Entry Requirements

First or second-class Honours degree, or equivalent.

Careers

Graduates are employed in both the private and public sector, and in both management and consultancy roles. Previous employers include: Arthur Anderson (Accenture), Cap Gemini, Price Waterhouse Coopers, Sun Microsystems, IBM, Compaq, SMS MT, Royal Bank of Scotland, Scottish Government, Analysys, Glaxo, Standard Life, British Council, and the Ministry of Defence.

CONTACT

t: +44 (0)141 548 3096
e: im-enquiry@cis.strath.ac.uk

Business Information Technology Systems

MSc/PgDip

This course is aimed at graduates with a business background and an interest in information and communications technology (ICT), or those with an ICT background with an interest in business, or those seeking a career spanning both areas. ICT supports the activities of nearly every type of organisation, from government departments to not-for-profit organisations and from those manufacturing goods to financial institutions. Behind complex ICT systems are a range of professionals such as system analysts and architects, solution providers, business consultants and managers of ICT with the ability to demonstrate high-level interpersonal skills in the analysis, design and delivery of IT solutions. This course provides the technical understanding, business knowledge and managerial skills needed to succeed in a vibrant and dynamic industry.

Course Structure

The programme is delivered through a partnership between the Department and the Strathclyde Business School and consists of:

MODULE 1 – BUSINESS PRINCIPLES AND ORGANISATIONAL PROCESSES

- Developing Business Strategy
- Operations Management and the Business Process
- Managing Business Resources

MODULE 2 – MANAGING THE BUSINESS PROCESS

- Programme and Project Management – an IT approach
- Integrated Skills Programme

MODULE 3 – ICT AND THE ORGANISATION

- Information Systems Architecture
- Database and Web Systems Development
- Service Management

MODULE 4 – DISSERTATION PROJECT

The dissertation allows students to pursue a topic of interest related to the practical use of technology in management contexts.

Course Duration

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

Entry Requirements

First or second-class Honours degree, or equivalent. A 250 TOEFL score or 100 IBT test score for applicants whose first language is not English.

Applications are welcome from those who do not hold a formal qualification but have relevant experience and can demonstrate academic potential.

Careers

Graduates are employed in a range of management and consultancy roles. Recent recruiters include: Accenture, BT Syntegra, Cap Gemini, Deloitte, Hewlett Packard, IBM, J P Morgan, Bloomberg, Morgan Stanley, PricewaterhouseCoopers, Sky Broadcasting, ScottishPower, Standard Life and Unilever.

CONTACT

Strathclyde Business School
Recruitment & Marketing Unit
t: +44 (0)141 553 6118/9
e: sbs.admissions@strath.ac.uk

Department of Mathematics & Statistics

www.strath.ac.uk/mathstat

RESEARCH DEGREES
MRes, MPhil, PhD

The Department of Mathematics & Statistics is one of the largest of its kind in Scotland, with an international reputation in the use of mathematical analysis for real-world problems. The most recent Research Assessment Exercise (RAE 2008) judged that 95% of the research in the Department was of a "quality that is recognised internationally" and 50% of our research is "internationally excellent".

Research is focused on applied mathematics and statistics in the broadest sense, with an emphasis on modelling and analysis of real-world problems. The Department has collaborative links with researchers in many institutions, including other universities, research establishments and industry in the UK, Europe, the USA and elsewhere in the world.

As a focus for activities – primarily in research but also in teaching – the Department has adopted nonlinear systems and solution of industrial problems as a major theme.

Our postgraduate students benefit from being part of the Scottish Mathematical Sciences Training Centre, which links together mathematics and statistics departments in Scotland to enhance postgraduate training and allow students across Scotland to meet and develop a strong, dynamic postgraduate community. Students also attend research seminars within the Department and national and international conferences. Other generic skills courses are open to students, including writing, presentation and careers workshops.

Guidance and support for postgraduate students is provided throughout the study period and the Department benefits from the University's state-of-the-art computer facilities. Funding comes from a range of sources including the Engineering and Physical Sciences Research Council (EPSRC), Medical Research Council (MRC), Carnegie Trust, University Scholarship Awards, the Scottish Overseas Research Student Awards Scheme, UK industry and the EU.

Research activity has also been focused into key priority areas in order to strengthen and advance the research we undertake. These research areas often overlap and there is significant collaboration between groups.

Research activities are focused in five interdependent groups:

Applied Analysis

This group is involved in the development of rigorous analytic and constructive methods for solving differential and integral equations arising in the applied sciences. Particular attention is paid to nonlinear evolutionary processes and operator equations. There is particular interest in the application of semigroup theory to coagulation-fragmentation equations and other evolutionary processes.
More recently there is considerable interest in the area of complex networks. In particular new mathematical approaches based of spectral graph theory are being used to study the global and local topological properties of these networks. Research is also carried out in the application of techniques from discrete mathematics, such as graph theory and discrete geometry, in combination with quantum mechanics and statistical mechanics to characterize protein structure and function. These studies help us to understand the global folding characteristics of proteins and how they influence protein function.

Research is also carried out on the qualitative theory of nonlinear dynamical systems in material science and mathematical biology.

Another major area of research in this group are various aspects of spectral theory including the spectral theory of block operator matrices and operator functions, distributional spectral theory and multiparameter spectral theory.

Continuum Mechanics and Industrial Mathematics

One of the principle areas within the group is the mathematical modelling of liquid crystals. Current interests in this area include flow induced switching and the motion of defects in nematic liquid crystals. There is also interest in modelling chevrons and flow effects in smectic liquid crystals.
There is also substantial work on the dynamics of thin fluids in a variety of industrially relevant problems. Specifically, the flow of sheets and rivulets of both Newtonian and non-Newtonian fluids driven by a variety of different physical effects including gravity, surface tension, surface-tension-gradients, centripetal forces and

DID YOU KNOW

Postgraduate students in the Department of Mathematics & Statistics benefit from being part of the Scottish Mathematical Sciences Training centre. The Centre provides high-quality training in fundamental areas of mathematics and statistics for students beginning their PhD in any aspect of mathematical sciences. It is a collaborative venture of seven Scottish universities which delivers eight streams of material via weekly lectures, given to a local audience and delivered live via Video-Conferencing to other sites.

externally applied jets of air (the latter two relevant to the industrial spin coating and and air-knife coating processes respectively) has been investigated.

There is also active interest in the propagation of nonlinear waves in dispersive media, and topics under investigation include: stability properties of periodic and solitary wave solutions to some new evolution equations that occur in plasma physics, internal dynamics of soliton interactions and the derivation of new equations having multi-loop soliton solutions, and their properties

Research is also carried out in the area of earth sciences including the modelling of flow and transport processes in porous media, including convection in chemically reactive geothermal systems and the propagation of vaporisation and salinisation fronts in water-vapour systems.

A number of projects within the group concern the modelling of non-destructive measurement and testing. In particular there are strong links with the Centre for Ultrasonic Engineering (CUE), which designs, manufactures and tests ultrasonic transducers for use in biomedical diagnosis and therapeutic treatment, and in non-destructive testing and sonar.

The group is also the national coordinating centre for the European Consortium for Mathematics in Industry (ECMI) and is a partner in the Centre for Applied Intelligent Systems.

Numerical Analysis and Scientific Computing

This group is one of the largest in the UK and has an international reputation for excellence of its research in the construction and analysis of methods for the numerical solution of nonlinear differential and integral equations, and on the computational solution of problems of practical interest. There is considerable interest in the analysis and use of adaptive strategies including p and hp finite element methods and adaptive moving mesh methods. Applications of these approaches include computational electromechanics, solid mechanics, geomechanics, liquid crystals and phase-change problems.

The numerical approximation of partial differential equations normally gives rise to extremely large linear systems of equations and there is interest in the group on the development of efficient solution strategies, including preconditioning and multigrid methods.

The group also has interests in the application of high performance computing techniques to practical problems and is a member of NAIS (The centre for Numerical Analysis and Intelligent Software) which is an EPSRC and SFC funded joint venture between Strathclyde, Edinburgh and Heriot-Watt Universities.

There is also interest in the application of computational techniques to tackle problems in biology ranging from computational graph theory for complex biological networks to adaptive surface finite elements methods for the simulation of tumour modelling, cell migration and chemotaxis. Often the models are stochastic in nature and research is also conducted to develop robust computational methods for these problems as well as applications in computational finance.

The group also carries out research in approximation theory, specifically in the area of scattered data fitting and multivariate splines. These techniques are also been used to develop meshless methods for the solution of partial differential equations.

Population Modelling and Epidemiology

This group comprises a broad spectrum of expertise from statistics, informatics and image processing to dynamical systems and time series analysis. The uniting theme of the group is the use of modelling techniques to extract information from complex data sets with an emphasis on practical problems. Current research focuses on the epidemiology of infectious diseases, ecological complexity, marine and fisheries modelling, and mathematical cell biology.

The group has strong links with Health Protection Scotland (HPS) and the Veterinary Laboratory Agency (VLA) and collaborates both on a national and international level with experts in epidemiology and related fields. Research focuses on public health and the epidemiology of infectious diseases in both animals and humans. Research interests include spatial statistics, experimental design and image processing; stochastic and deterministic differential equations for the modelling of infectious diseases and risk, particularly in relation to animal diseases.

The group has strong research links with Marine Scotland as well as collaborations in large multi-university projects and with empirical scientists in other institutes. Mathematical models are

MIKO ROJ
PhD Mathematics

I was fortunate to win an EPSRC and NAG Scholarship to study a PhD in Computational Finance at Strathclyde. I am encouraged to deliver high quality publishable work and go to conferences. My office is well-equipped and exclusively for the use of PhD students, creating a supportive and stimulating study environment. I have the opportunity to attend seminars, workshops and lectures, which all help in the development of important transferrable skills. There are also opportunities to get involved in teaching – supporting lecturers by demonstrating or invigilating.

Social life in Glasgow caters for everyone. Glasgow's location is spectacular too – living in the city centre I am just half an hour's drive away from beautiful scenery and I can get involved in outdoor activities such as climbing, walking, cycling, surfing or sailing.

used to solve a variety of ecological and biological problems including fish stock management, nutrient impacts on ecosystem dynamics, linkage between individual behaviour and population dynamics, the effects of ocean currents on the productivity of copepods and the effect of multispecies interactions on complex marine ecosystems.

In the area of mathematical biology research interests include the role of space in problems such as the speed and intensity of spatial epidemics, ecological complexity and evolutionary processes; models of antibiotic production; developmental cell signalling, cancer gene therapy and adaptive dynamics. The Department also participates in the Centre for Mathematics Applied to the Life Sciences, which has run a number of meetings and seminars in Mathematical Biology. It also participates in the Scottish Universities Life Sciences Alliance, ensuring a strong interaction between theoretical and experimental groups across the whole of Scotland.

Stochastic Analysis

Research is ongoing across a broad range of stochastic mathematics including discrete-state space Markov processes, stochastic differential equations, stochastic geometry, point processes and time series. Application areas include modelling in population biology, agricultural epidemiology, biochemistry, quantum optics, telecommunications systems, finance and financial econometrics.

As well as strength in theoretical aspects of stochastic modelling and diffusion-type processes, the research profile is strongly oriented towards applied work in both statistical and modelling areas. Much of the most fruitful activity is highly multidisciplinary, combining elements traditionally found in both statistics and applied mathematics with problems arising in biology, physics, medicine, veterinary medicine, meteorology, engineering, geology and computer science.

RESEARCH DEGREES

The Department welcomes applications for MSc, MRes, MPhil and PhD degrees in an area of departmental expertise.

CONTACT FOR RESEARCH DEGREES

Irene Spencer
Postgraduate Secretary
t: +44 (0)141 548 3382
e: irene.spencer@strath.ac.uk

STAFF PROFILE DR TONY MULHOLLAND

Dr Tony Mulholland, a Senior Lecturer in the Department of Mathematics & Statistics, appeared on the BBC programme Coast to help calculate the length of Britain's coastline. In search of the answer, he used satellite imaging and the mathematical concept of 'fractals,' or irregular shapes, which can be used for measuring coastlines.

Dr Mulholland revealed on the programme that finding the answer is less straightforward than might be thought: "If you measured in a straight line, you would miss all the curves and contours of the coast and if you used different lengths of ruler, you would get a different measurement each time. This helped to open up a new branch of mathematics called fractals. Using this technique, we are able to assign a single number between one and two, called the fractal dimension, to a coastline according to how rugged it is. A very rugged coastline could have a fractal dimension of 1.6 but a very smooth coastline might have a fractal dimension very close to one."

Fractals are now beginning to find applications in modern technologies, including use to reduce the size of mobile phones by employing fractal antennae. Dr Mulholland is currently examining their use in the design of ultrasound transducers and this could lead to improvements in medical imaging.

Department of Physics

www.strath.ac.uk/physics

RESEARCH DEGREES

MPhil, PhD
EngD in Optics & Photonics Technologies

TAUGHT COURSES

MSc/PgDip
- **High-Power Radio Frequency Science and Engineering**
- **Nanoscience**
- **Optical Technologies**
- **Photonics & Device Microfabrication**
- **Quantum Information & Coherence**

CONTACT FOR TAUGHT COURSES

Lynn Gilmour
t: + 44 (0)141 548 3362
e: pgt@phys.strath.ac.uk

The Department of Physics has a vibrant and dynamic research environment in which our PhD students work closely with around 30 postdoctoral researchers and a similar number of academic staff. Activities range from fundamental aspects of physics to application-oriented programmes. Researchers are active in many national and international collaborations.

The Physics EPSRC research grant portfolio is £17 million, the largest of any physics department in Scotland. Highlights include £3.3 million to study radiation sources that exploit laser-driven plasma waves, and a £4.3 million EPSRC Science and Innovation Award (joint with King's College London), which places the Department at the forefront of the emerging field of nanometrology. Links with industry and government research laboratories bring the research to the public benefit either through development of equipment and measurement techniques or through commercialisation of results.

Structured postgraduate lectures and seminars provide high-level background support. Research students become members of the Scottish Universities Physics Alliance Graduate School (SUPA GS) (**www.supa.ac.uk**), a pan-Scotland body dedicated to enhancing research training. SUPA GS provides graduate lecture courses, enables visits by distinguished scientists and provides studentships.

Several of the Department's research groups are involved in cross-disciplinary projects. One initiative is the Institute of Complex Systems at Strathclyde (ICSS), which supports cross-disciplinary projects, workshops and international speakers in the area of Complexity and coordinates research activities in complex systems across the Faculties of Science and Engineering.

Funding Opportunities

Studentship prizes are awarded to physics students from around the world by the Scottish Universities Physics Alliance, of which Strathclyde is a member. More information is available at **www.supa.ac.uk/studentship**

RESEARCH

The most recent Research Assessment Exercise (RAE 2008) found that 90% of research submitted by the Department was of international standing. For applicants interested in undertaking a PhD or MPhil degree, there is scope for both theoretical and experimental research in each of the Department's three divisions:

NANOSCIENCE

Research covers two main areas:

- **Semiconductor Spectroscopy and Devices** undertakes microspectroscopic studies of light-matter interaction in semiconductors. We complement visible-light emission and excitation spectroscopy with structural characterisation imaging techniques. A combination of optical spectroscopy and electron microscopy and analysis provides a novel experimental channel for the refinement of new-functionality optoelectronic devices, as well as the fundamental investigation of optical processes in low dimensional semiconductors, quantum wires and dots. Specific materials studied are wide-band-gap semiconductors such as II-VI, III-nitride compounds and alloys for UV-green laser displays and single-photon sources.

- **Biomolecular & Chemical Physics** has four subgroups:

  - **Ultrafast Chemical Physics** studies chemical and biological reactions which present the key difficulty of being at once ultraslow and ultrafast. The challenge they face is to be able to perform experiments on a range of timescales (femtosecond to nanosecond and slower) and to be sensitive to structure from the microscopic (molecular bonds) to the mesoscopic (molecular clusters to droplets). Our current research involves the structure and dynamics of proteins, peptides and protein models, liquids (especially water and aqueous solutions), and phase transitions.

  - **Photophysics** research is concerned with the fundamental interactions and application of molecular fluorescence in condensed media. The main areas of interest are structural studies on amorphous solids, macromolecules, and colloids,

fluorescence lifetime sensors, and the development of new time-resolved techniques, and instrumentation.

- **Environmental Optics** concentrates on the application of optical techniques for remote sensing and for the unattended monitoring of environmental variables. These techniques have an increasing role to play in areas such as environmental protection, pollution assessment, and the study of transient events in global ecosystems. Much of the current work concerns optical measurements in oceanography, which frequently involve instrument deployment under technically challenging conditions.

- **Astrochemistry** studies surface chemistry in order to understand interstellar environments.

OPTICS

The Optics Division is world-renowned as a major centre for theoretical and experimental optics. Its research covers two main areas:

- Computational Nonlinear and Quantum Optics
- Photonics

Computational Nonlinear and Quantum Optics investigates quantum theory, the nature of light and its interaction with matter, as well as nonlinear optics and the special capabilities of nonlinear optical devices, using both analytical and computational approaches. The group has its own advanced computer network, part of which is dedicated to fast simulation of optical systems, both classical and quantum.

Research topics include pattern formation and spatial structures in nonlinear optics, Bose-Einstein condensation, quantum measurements, quantum optics, angular momentum of light, the hot topic of quantum information and computation, cavity solitons, online design of optoelectronic systems, quantum images, short pulses, control of spatial and temporal disorder and complexity in optical systems.

Photonics investigates a broad range of experimental optics linked by the common element of the photon. Laser light can be used to cool and trap atoms. This work has led to the production of Scotland's first Bose-Einstein-Condensate – a giant matter wave, which is held in a storage ring to perform interference experiments. Ultracold atoms trapped in periodic light fields, the so-called optical lattices, can be used as quantum simulators for condensed matter phenomena. With an ultrahigh resolution microscope, these atoms are individually imaged and manipulated – a key ingredient for using them as a building block of a quantum computer. Other activities centre on nonlinear photonics, solitons, VECSELS and quantum cascade laser applications.

PLASMAS

The Plasmas Division is the largest centre for plasma physics research in Scotland and is the location for the new Scottish Centre for the Application of Plasma-based Accelerators.

Strathclyde Intense Laser Interaction Studies has experimental and theoretical research programmes in high harmonic generation, nonlinear optics of plasmas, advanced laser-plasma accelerators of both electrons and ions, terahertz generation from magnetised plasmas, femtosecond laser micromachining, photofragmentation studies of molecules, plasma studies, interaction of ultra-intense pulses with atomic clusters, gas jets, foils and solids and collective scattering processes.

The research programme is supported by a collection of state-of-the-art high power femtosecond lasers, which form part of the Strathclyde Terahertz to Optical Pulse Source facility. Research is also carried out at national and international high power laser facilities, including the Central Laser Facility at the Rutherford Appleton Laboratory.

ALICJA ZAROWNA-DABROWSKA
PhD in Physics

I came to Scotland after obtaining a Master's degree from a French University and during my PhD in the Institute of Photonics I worked on a joint project between Strathclyde and Glasgow Universities. Thanks to the interdisciplinary nature of my project, I developed skills in different fields. I had the privilege of working with the best researchers in my subject area with access to the latest technologies and research equipment.

I could always count on theoretical and practical support from my supervisors and research colleagues from whom I learned a lot. I was able to present the results of my research at international conferences and publish my work in renowned peer-reviewed journals. In addition I had a rare opportunity to go on a study exchange to China.

Last but not least, the accessibility of beautiful landscapes and high quality of life in Scotland make it a perfect place for the start of a research career.

Another core research topic is ultra-intense laser-induced nuclear and plasma physics, which has many potential applications, ranging from medical physics to making nuclear waste safe.

Atoms, Beams and Plasmas has active research programmes in experimental, computational and theoretical relativistic electron beam physics, electron cyclotron masers, cyclotron autoresonance masers, free electron lasers, super-radiant sources, pseudospark physics and high-brightness electron sources. The creation of novel electrodynamic structures is enabling new types of coherent free-electron sources. Numerical simulations and laboratory experiments are providing a fundamental understanding of naturally occurring sources, including Auroral Kilometric Radiation. Experimental, numerical and theoretical studies are being undertaken in collaboration with the Central Laser Facility at the Rutherford Appleton Laboratory and the University of St Andrews to investigate the relaxation of the kinetic energy associated with super-thermal electron populations in scenarios relevant to magnetic and inertial confinement fusion projects.

Non-neutral relativistic plasma physics is a growth area, with applications in heating fusion plasmas, plasma diagnostics, communications, accelerators, radars, and millimetre-wave materials processing.

Research interests also include spectroscopy, reaction kinetics, and collision dynamics and the role of atoms, ions and molecules in plasmas. This research is relevant to high temperature fusion and stellar plasmas, the solar corona, and low temperature discharges. There is strong theoretical and computational research focused principally on electron collisions and spectral emission from plasmas. This work is closely linked to major Earth observation, astrophysical, fusion and heavy ion ring laboratories in Europe.

RESEARCH DEGREES

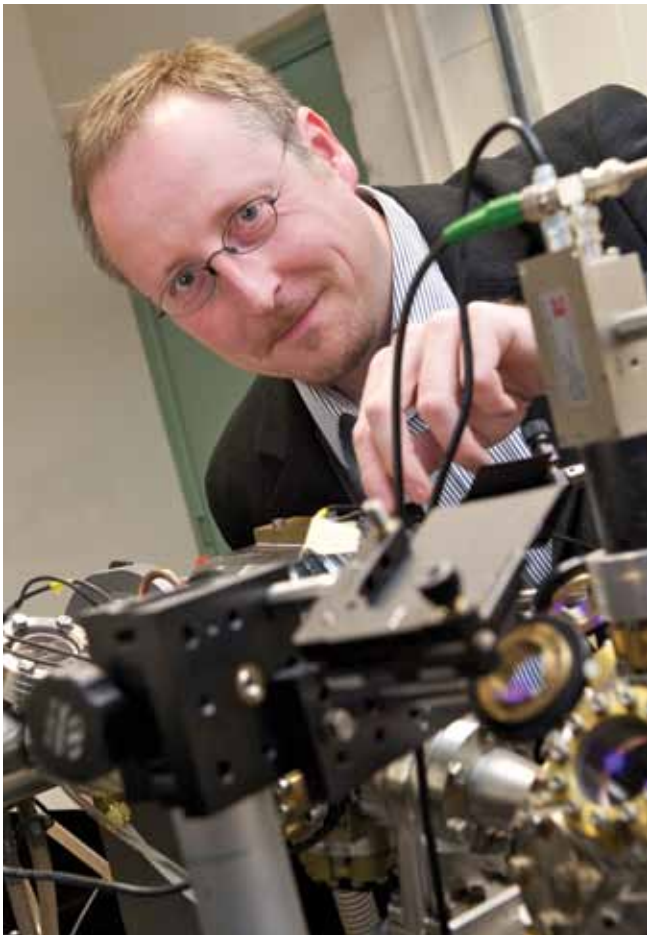
Study is normally full-time, with the majority of the time spent in the Department, but part-time and external studentships are also possible.

Entry Requirements

MPhil: second-class BSc Honours or MSci/MPhys degree in Physics, or equivalent
PhD/EngD: first- or upper second-class BSc Honours or MSci/MPhys degree or MSc degree in a relevant discipline.

CONTACT FOR RESEARCH DEGREES

t: +44 (0)141 548 3366/3358
e: pgstudies@phys.strath.ac.uk



STAFF PROFILE PROFESSOR STEFAN KUHR

Professor Stefan Kuhr joined the Physics Department in 2011 and holds the SUPA Chair of Quantum Information. His research activities focus on manipulation and detection of ultracold atoms in laser fields, the so-called optical lattices. Before joining Strathclyde, Stefan worked at the Max-Planck-Institute for Quantum Optics in Munich. There he invented revolutionary methods for detecting and addressing the atoms one by one – lattice site by lattice site. At Strathclyde, he will use the atoms in the lattice as a quantum bits – the building blocks for future quantum computers. The atoms held in the lattice of laser light can also serve as simulators for condensed matter physics which may lead to a deeper understanding of material properties, such as high temperature superconductivity.

High-Power Radio Frequency Science & Engineering

MSc/PgDip

High-power signals at radio and microwave frequencies are used in a wide range of applications including particle acceleration for scientific and medical purposes, scientific and industrial plasma heating, material processing, telecommunications and RaDAR systems. This course is aimed at candidates with a background in physical science or engineering. It has been developed in conjunction with the Faraday Partnership in High-Power Radio Frequency (HPRF) (of which the University is a founding partner) to satisfy the need for skilled graduates in the field of high-power radio frequency science and engineering. The course is structured for either full-time or part-time learning.

Course Structure

The following instructional classes are supplemented by independent learning and reading. You will learn about a wide range of applications and discuss issues related to project management and contractual issues:

- Advanced Electromagnetics
- HPRF Physical Processes
- HPRF Passive Components
- HPRF Active Components
- Power Supplies and High-Power RF Issues
- High-Power RF Systems

An independent research project is required for the MSc and is optional for the Diploma. This may take place in conjunction with research programmes at the University, or in an industry setting. Transfer between the MSc and PgDip is possible, depending on performance.

Course Duration

MSc: 12 months full-time; 24/36 months part-time
PgDip: Diploma course may be shorter depending on the options selected

Entry Requirements

MSc: A first- or second-class Honours degree, or equivalent, in physical science or electrical/electronic engineering.
PgDip: Honours degree in physical science or electrical/electronic engineering.

Other qualifications may be considered for both the MSc and PgDip, including industrial experience. Candidates may be invited for interview.

Funding

Limited sponsorship may be available to provide support towards stipends and/or fees. Applicants who wish to be considered for these bursaries should discuss with the course contact.

Nanoscience

MSc/PgDip

This course explores the frontiers of science on the nanoscale. Many developing 21st century technologies depend on expanding our understanding of the properties, processes and behaviours of systems in this sub-micrometre-scale size domain. The multidisciplinary nature of nanoscience research means that this course will be attractive to physical science graduates looking to work in this emerging area. It offers the opportunity to gain the skills and in-depth understanding of the key science behind this rapidly expanding sector. The course provides a further training opportunity to those with an industrial background and a means of gaining insights into topics at the forefront of current research.

Course Structure

Two semesters of formal teaching are followed by a four-month intensive project. The projects take place primarily in research labs associated with nanoscience located in the University's physical science departments, with some opportunities for relevant industrial placements.

The course will comprise a taught component featuring:

- Conversion Course
- Introductory Nanoscience
- Research Skills Training

Current topics in advanced nanoscience will then be covered through courses such as:

- Imaging and Microscopy
- Solid State Nanoscience
- Chemical and Biomedical Nanoscience

Following the taught component, students will undertake a research-intensive project in a relevant nanoscience topic.

Course Duration

12 months full-time; 24 months part-time

Careers

The course is intended to give non-specialists a background in this rapidly evolving area. Graduates will obtain an in-depth insight into the range of state-of-the-art research in industry-related topics in nanoscience. This course is designed to equip graduates for a research-based career in industry, but can be used as a means of progression towards a PhD.

Entry Requirements

MSc: First- or second-class Honours degree in physics, chemistry or a related subject.
PgDip: Honours degree in physical science or a related subject.

Other qualifications may be considered for both the MSc and PgDip, including industrial experience. Candidates may be invited for interview.

Scholarships

Financial support might be available on a case-by-case basis. Please contact the Department for details.

Optical Technologies

MSc/PgDip

The versatile field of optical technologies underpins many aspects of modern society and is expected to be a key enabling technology of the 21st century. The course is based on the strong record of optical technologies in all research divisions of the Department of Physics, the Institute of Photonics (a commercially-oriented research unit at the interface between academia and industry), the Centre for Biophotonics and the Department of Electronic & Electrical Engineering. Students can choose taught elements relevant to their career interests from a wide range of topics in photonics, nanosciences, optics at the physics-life sciences interface, information technology and quantum optics. The knowledge gained in the taught components is then put to use in a cutting edge research project.

The course is aimed at graduates with a science or engineering background who want to undertake a vocational degree including hands-on experimental research experience on modern instrumentation or the theoretical/ computational equivalent. It is also suitable for those in industry who want to underpin their future career by further academic studies in relevant subjects.

Course Structure

Two semesters of taught classes are followed by a four-month research project. Compulsory components in semester 1 are transferable skills training (Research Skills, Research Ethics, Managing Technological Innovation) and in semester 2 a Literature Survey preparing for the project. In addition, students can choose from a portfolio of classes which include:

- Quantum Optics
- Photonics and Ultrafast Physics
- Nanoscience and Imaging
- Material Sciences
- Optical Communication Networks

Course Duration

12 months full-time; 24 months part-time

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in physics or a closely related subject.
PgDip: Honours degree in physical science or a related subject.

Other qualifications may be considered and the applicant is advised to contact the Department.

Careers

The course provides a basis for a successful entry to an optics-related PhD as well as for work in the photonics, optical and life sciences industries. The MSc will provide the basis to excel in more interesting and challenging posts than with an undergraduate degree and to enhance career prospects.

Scholarships

Financial support might be available on a case-by-case basis. Please contact the Department for details.

Quantum Information & Coherence

MSc/PgDip

Quantum phenomena are crucial for understanding the behaviour of matter and are critical to the operation of many modern technologies. Controlling quantum effects will become even more important for 21st century technology. This course will provide a thorough foundation in quantum information processing, coherent quantum phenomena, and their implementation. The study of quantum information and coherence is a major theme in the department with approximately 15 experimentalists and theorists working in the field.

The course will provide an in-depth understanding of quantum information and coherence and their implications for future technology. It will provide a valuable grounding for further postgraduate study and will also enhance the analytical, numerical and practical skills that are highly desired by industry.

Course Structure

The course comprises taught classes, coursework and an extended supervised project. The taught classes will cover material related to:

- Quantum Information and Quantum Computation
- Experimental Quantum Control and Coherence
- Advanced Quantum Physics and Open Quantum Systems

Course Duration

12 months full-time; 24 months part-time

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in physics or a closely related subject.
PgDip: Honours degree in physical science or a related subject.

Other qualifications may be considered and the applicant is advised to contact the Department.

Careers

The course will teach many practical transferable skills in contemporary physics, and enhance technical and analytical facilities. This will strengthen the student's career options in a wide range of areas including science, business, finance, engineering and management.

Scholarships

Financial support might be available on a case-by-case basis. Please contact the department for details.

Institute of Photonics

If world-leading applied research in photonics is what you want to do, then the Institute of Photonics is the place to undertake your research. The Institute of Photonics is a commercially-oriented research unit established in 1996 and is now one of the top five research income earners in the University. Our key objective is to bridge the gap between academic research and industrial application and development in the area of photonics through excellence in commercially-relevant research and its exploitation.

Our research agenda is influenced both by the latest developments in academic research and by industry requirements. We seek to establish ongoing relationships with companies, providing research capabilities which both complement and supplement their internal research activities, and hence enhance business performance.

Our research interests span a broad range of photonics. Current themes are:

Advanced Solid-State Lasers – specialises in the science, technology and engineering of all-solid-state light sources and systems for practical applications including mid-IR lasers, laser control techniques and headline research on diamond lasers.

III-V Semiconductor Optoelectronic Devices – focuses on optically pumped semiconductor lasers, gallium nitride micro-pixellated LEDs and integrated optical microsystems.

Hybrid and Flexible Photonics – specialises in polymer and nano-composite lasers, novel colour conversion techniques for lighting and energy applications.

Advanced Microfabrication – ranges from plasma etching of diamond and organic oxides to inkjet printing and photo-patterning of polymers.

Applications – concentrates on the applications of ultra-fast lasers and other light sources for biomedical sensing, imaging and diagnostics.

RESEARCH DEGREES

The Institute is located in the Wolfson Centre at the University, where we have dedicated laser laboratories, electronics and mechanical workshops and a range of specialist equipment.

Due to the multidisciplinary nature of photonics, many of our students are jointly supervised with academic colleagues from other departments in Strathclyde, such as Physics, Chemistry or Bioengineering.

In this way we can provide PhD students with training which is truly cross-disciplinary, and from which their future careers, either in academia or industry, will benefit.

The Institute provides a friendly and supportive environment for a large number of postgraduate students. We do not teach undergraduates, so our efforts are entirely focused on generating high-quality research and researchers. Postgraduate student training and development is recognised as a core part of this activity.

CONTACT

Lynda McLaughlin
t: +44 (0)141 548 4120
e: l.d.mclaughlin@strath.ac.uk
www.strath.ac.uk/photonics

Photonics & Device Microfabrication

MSc/PgDip

The course covers the fundamental principles and technologies used to design, fabricate and analyse micro/nanoscale photonic and optoelectronic devices, coupled with technology management. The course is suitable for graduates wishing to take up further training, and for industrial staff seeking continuing professional development.

Course Structure

The course comprises both taught modules and a practical research project. Teaching methods include lectures, computer-aided learning and practical instruction on state-of-the-art device fabrication facilities.

Students select three baseline modules from a range offered by the Department of Physics and three specialist modules, given by Institute of Photonics staff, specifically oriented towards state-of-the-art photonic device microfabrication technologies. The course is completed by a practical project using dedicated equipment located at the microfabrication facility operated by the Institute of Photonics.

Course Duration

12 months full-time

Entry Requirements

A first or second-class Honours degree, or equivalent, in physical science or electrical/electronic engineering.

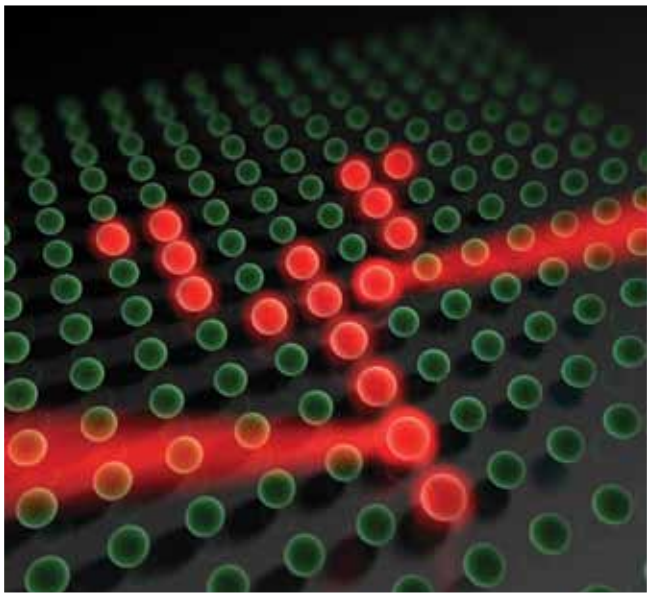
Other qualifications may be considered for the MSc, including industrial experience. Candidates may be invited for interview

Careers

Graduates will have a thorough grounding in the knowledge and skills necessary for a technically-based career. For the participants who successfully complete the course and wish to pursue PhD studies, various PhD studentship opportunities are available in the Institute.

Scholarships

Financial support might be available on a case-by-case basis. Please contact the Institute for details (see left).



Strathclyde Institute of Pharmacy & Biomedical Sciences

www.strath.ac.uk/sipbs

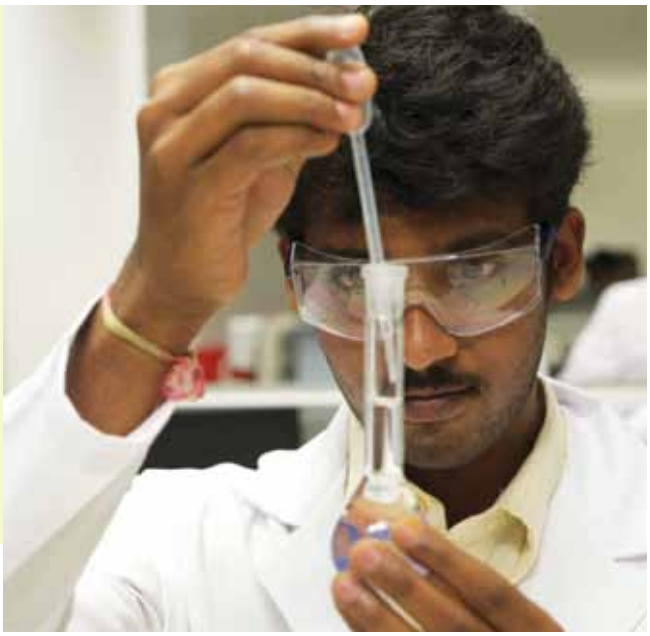
RESEARCH DEGREES

MPhil, PhD, DPharm

MRes
Biomedical Sciences
Drug Delivery Systems
Medical Devices (in collaboration with the Faculty of Engineering)

TAUGHT COURSES

MSc/PgDip
Analysis of Medicines (part-time distance learning)
Clinical Pharmacy
Pharmaceutical Analysis
Pharmaceutical Quality & Good Manufacturing Practice (part-time)



The Strathclyde Institute of Pharmacy and Biomedical Sciences (SIPBS) is a leading research centre focused on the discovery, development and delivery of better medicines. Our research involves the use of pharmacological and genetic approaches to inform on fundamental biological processes. We integrate biological, medicinal chemistry, formulation/delivery and pharmacy practice for medicine discovery as well as application programmes focused on defined diseases where we have existing strengths.

The Institute was judged to be among the UK's top Schools of Pharmacy in the 2008 Research Assessment Exercise. Fifty-five per cent of research conducted by staff in the Institute was judged as either world leading or internationally excellent and, in terms of both quality and volume, Strathclyde is the top institution in Scotland and the second top in the UK for Pharmacy research. Research within the Institute is based around six main groups:

- Cardiovascular Diseases
- Cell Biology
- Infection, Immunity and Microbiology
- Medicines Use and Health
- Neuroscience
- Pharmaceutical Sciences

The Institute's annual research income is around £6 million. Extensive collaborations exist with other Strathclyde departments and with external organisations such as the University of Glasgow, Glasgow hospitals and collaborating Health Boards delivering pharmaceutical services in Scotland. There are strong industrial links with several major UK and international companies. Research funding is from the MRC, Wellcome Trust, BBSRC, EPSRC, CRUK, Action Research, European Commission, Leverhulme Trust, Tenovus-Scotland, Scottish Enterprise, Chief Scientists Office, the Synergy fund and industry.

The Institute also holds a Biotechnology & Biological Sciences Research Council Doctoral Training Grant, acknowledging the international quality of our comprehensive four-year PhD studentship training programme which runs alongside our three-year PhD programmes.

MAJOR FACILITIES

Our wide range of state-of-the-art facilities was recently enhanced with the opening of a new £36 million building in the centre of Glasgow.

- The Institute houses PsyRING (**Psychiatric Research Institute of Neuroscience in Glasgow**), a multimillion pound collaboration between the Universities of Strathclyde and Glasgow and NHS Greater Glasgow and Clyde for schizophrenia research funded by Mitsubishi Pharma Co, the Translational Medicines Research Institute and major pharmaceutical companies.
- **The Cancer Research UK Formulation Unit** collaborates with a large number of research groups to develop putative anti-cancer drugs for Phase I and II clinical trials. Since inception this unit has developed over 100 compounds and manufactured over 1,000,000 product units. Several of the compounds have been passed to international pharmaceutical companies for further development and some are now available worldwide for the treatment of cancer.
- **The Centre for Biophotonics** provides state-of-the-art confocal, multiphoton laser scanning and epifluorescence microscopes along with the latest image analysis software. Multiphoton instruments in the Centre are being applied to a wide range of biological projects, many aimed at addressing fundamental questions of cell function that are important in the search for understanding disease processes and developing new drug treatments. Current applications of these techniques range from functional studies of immune cells in isolation and in situ, application of these studies to diseases such as asthma, atherosclerosis and arthritis.

All our research laboratories have high quality equipment. Our teaching and research links with the pharmacy profession derive from a network including 50 honorary lecturers including some of the most prominent clinical pharmacists in Scotland, and this network extends through formal international partners within the European ERASMUS scheme.

RESEARCH

Research is undertaken in the following six major research groups:

CARDIOVASCULAR RESEARCH

The cardiovascular research group is active in the twin research fields of vascular biology and myocardial cell function. These are explored through *in vivo* models of disease, integrative studies at the organ level, and functional evaluation of cardiovascular cell behaviour. Members of the research group have particular expertise in regulation of subcellular calcium concentrations, structual remodelling, drug-receptor interactions and integrative pharmacology. Research within the group is leading to the identification of novel drug targets and the evaluation of candidate therapeutic interventions.

The group is actively involved in the Centre of Excellence in Integrative Mammalian Biology which is a partnership between biomedical scientists at the Universities of Glasgow and Strathclyde. Further information is available on the IMB website at **www.imb-glasgow.org/index.php**

CELL BIOLOGY

Research within this group is focused at the understanding of cellular and molecular organisation and function in health and disease. The following fundamental cellular processes are being investigated:

- cell physiology
- signalling
- changes in gene expression
- responses to stress
- cell death
- biomarkers for disease processes
- translational biology

The following technologies and expertise are available within the group:

- cell culture, including a wide range of cell-based assays and techniques
- molecular biology, including Q-RT-PCR, siRNA techniques, cloning, expression systems, protein purification
- enzyme assays, signalling assays
- biophotonics
- electrophysiology including expression systems, isolated cells, primary and organotypic neuronal culture and acute brain slices
- Ca^{2+} imaging from isolated and intact smooth muscle, primary and organotypic neuronal culture

The group is also leading on the development of a new virtual centre for cancer research (Research in Cancer at Strathclyde, **http://spider.science.strath.ac.uk/ricas/**), which brings together staff across the University including cell biologists, drug discovery, drug formulation, chemists and physicists.

INFECTION, IMMUNITY AND MICROBIOLOGY (IIM)

IIM is a vibrant research group focused on infection and immunity in human and animal populations. It has links with external research collaborations and within the Institute. The group strives to understand the physiology and molecular pathogenesis of the infective agents in order to develop and characterise appropriate vaccines, novel adjuvants and biopharmaceuticals. Another key area is in the immuno-pathogenesis and immuno-modulation of eg allergic, autoimmune and cardiovascular diseases.

The group houses the Strathclyde Fermentation Centre and has strong links with the Centre for Biophotonics.

Pathogens/model organisms under study within the group are *Acanthomoeba, Acanthocheilonema, Aspergillus, Corynebacterium, Escherichia, Leishmania, Myobacterium, Pichia, Pseudomonas, Salmonella, Shigella, Streptomyces, Toxoplasma, Trichomonas, Vibrio*.

RESEARCH FACT FILE

£1 million grant for innovative research in heart disease.

Clues to the causes of serious, and often fatal, diseases and conditions such as heart disease, stroke and high blood pressure are being investigated with the support of a £1million grant from the Wellcome Trust.

Professor John McCarron, who is leading the research, and his co-investigator Dr Richard Hartley of the University of Glasgow, have made a breakthrough in techniques for exploring faults in ‘smooth’ muscles, which play a major part in controlling blood flow, blood pressure and the digestion of food. For all of this to operate properly, the muscles must act in a coordinated way but how they do this is still not fully understood. However, it is known that calcium plays a part and the researchers have developed innovative procedures which can be targeted at specific parts of a cell, so that calcium changes in small areas can be studied, manipulated and understood.

MEDICINES USE AND HEALTH

Research to improve the quality of healthcare is delivered in collaboration with clinicians from the NHS in Scotland who have joint/Honorary academic appointments. Sources of research grants include the Scottish Government Health Department, Macmillan Cancer Support and the Chief Scientists Office.

Research focuses on person-centred, safe and effective use of medicines and public health improvement under the following areas:

- assessment of new health technologies
- design and evaluation of dosage regimens and delivery
- pharmacoepidemiology
- creation and assessment of new models of pharmaceutical care
- evaluation of medicines information resources and knowledge
- pharmaceutical interventions to improve health and medicines safety
- educational research to support professional development

NEUROSCIENCE

The Neuroscience group focuses on understanding fundamental neurobiological mechanisms in health and disease and the identification of new treatments. Emphasis is placed on schizophrenia, Parkinson's disease, stroke, cognitive and hearing disorders. Research activities span multiple levels – from genetics, molecules, cells, circuits and neural systems through to pharmacology, behaviour and cognition, and incorporate a wide array of techniques from genomics, transcriptomics, and metabolomics to brain imaging, biophotonics, electrophysiology, stem cell manipulation, behaviour, and the development of a range of *in vivo* models including transgenic mice. Several projects are integrated with human research in terms of drug discovery, diagnostics and genetic vulnerability.

The recently-formed cross-faculty Centre for Neuroscience at the University (CeNsUS) provides a coherent framework to enable cross-disciplinary engagement and facilitate excellence in Neuroscience research and knowledge exchange.

SHROOK KREEM

PhD in the Strathclyde Institute of Pharmacy and Biomedical Science

When deciding to study in the UK, making the decision as to which university best suits your speciality can be difficult. I chose to study in the Strathclyde Institute of Pharmacy & Biomedical Sciences in order to benefit from the wide range of facilities and diverse experience of staff. The Institute is an integrated unit of scientific research which removes the barriers between different sciences to help students from different backgrounds to conduct their research in an integrated scientific environment.

Strathclyde in general and the Institute in particular provide is an environment where you have access to a lot of information and expertise, and where you will learn to be independent and to think creatively.

The group has a number of active research grants from the Wellcome Trust, MRC and Translational Medicine Research Instititute and hosts a number of funded postgraduate research students through the Doctoral Training Centre in Medical Devices, SULSA and the EPSRC.

The group is actively involved in the Centre of Excellence in Integrative Mammalian Biology which is a partnership between biomedical scientists at the Universities of Glasgow and Strathclyde. Further information is available at **www.imb-glasgow.org/index.php**

PHARMACEUTICAL SCIENCES

Research focuses around three key areas:

- **Drug Discovery –** active programmes seek to identify new drug molecules for a number of conditions including cancer and infectious diseases such as tuberculosis. The approach uses well established drug screening programs from natural sources and compound libraries to their best advantage, coupled to in silico techniques, lead target optimisation and synthesis-characterisation.
- **Drug Development –** an understanding of the critical product attributes that impact on *in vivo* performance is key to the production of safe and effective medicines. Thus, a key driver for our research is the development of new basic science and technology underpinning the development of new pharmaceutical products. Research includes the structure and properties of drugs and excipients, biopharmaceutical characterisation, pharmaceutical processing and technology and formulation and analysis.
- **Drug Delivery –** the development of novel drug delivery systems can offer safer, more convenient or more effective medical treatments. Dermal, ocular, oral and CNS drug delivery programmes are supported by expertise in biopharmaceuticals and solid-dose formulation. *In vivo* studies involve nanomedicines to overcome poor oral bioavailability; gene delivery to treat various cancers; and gamma scintigraphy imaging to monitor dose transit.

The group is actively commercialising its research and building on links with the NHS in particular as it works to establish a Centre for Medicines Innovation to deliver improved medicines particularly for vulnerable patient groups. The group also has active links with industry including Pfizer, Allergan, Schering Plough, Johnston Matthey, GSK and AstraZeneca.

Major current grant funding includes a Small Molecule Cancer Drug Discovery Programme Grant from Cancer Research UK, an EPSRC Science and Innovation award in Physical Organic Chemistry and further significant funding by Cancer Research UK in the Formulation Unit.

RESEARCH DEGREES

Applications are welcome from students interested in undertaking a research degree (PhD, MPhil) at the Institute. Detailed research interests of staff and potential PhD projects are available on our website (**www.strath.ac.uk/sipbs**). Students may request a specific project from those available or request a project within a specific area of interest.

Training

There is a strong emphasis on generic skills training within the PhD programme and this is administered through the SIPBS Graduate School.

On arrival, an induction session provides information, guidance and regulations required for the successful completion of a PhD. Formal training for first-year PhD students includes courses in biostatistics, health and safety, paper critique, computing and

communication skills, and additional topics in the Life Sciences. Throughout the programme, students are encouraged in personal development and reflective practice. Training, progress and communication are also supported by a web-based, virtual learning environment.

Students become part of a basic and transitional research environment consisting of six research groups, each with 10-25 academic staff supported by around 50 postdoctoral researchers and 150 postgraduate research students. Students are typically assigned to their primary supervisor's research group for specific training appropriate to their individual research project. Each student meets with their supervisor on a regular basis and presents results to their Research Group in each year of study. Regular seminar programmes featuring external and internal speakers widen the learning experience of each student.

CONTACT FOR RESEARCH DEGREES

SIPBS Graduate School
e: sipbs-postgrad@strath.ac.uk

Doctor of Pharmacy

DPharm

The professional doctorate of Pharmacy aims to attract pharmacists to a qualification that is directly linked to their professional role and responds to a need for more pharmacists to engage in research linked to their professional and practice role in areas in which a PhD may not be the most appropriate qualification. The DPharm would fit with all areas of the practice of pharmacy including hospital clinical pharmacy, technical services and community pharmacy practice.

Course Structure

The course comprises two elements: 180 taught credits and a two-year full-time equivalent research programme.

The taught part of the course is split into three 60-credit classes: clinical skills, research skills and literature review. This part of the course aims to develop the skills that will be required as a pharmacy professional and form the basis on which the research element of the degree will be built. The latter part of the course is research-based, generally in the student's area of practice. The areas of practice are not limited to clinical practice.

Course Duration

36 months full-time; 48 months part-time.

Entry Requirements

Normally a first- or second-class Honours degree in Pharmacy from a UK university, or equivalent qualification. In the case of recent Pharmacy graduates, this will be the degree of MPharm with merit or distinction. Applications will also be considered from candidates holding other qualifications.

Candidates are normally required to be registered with the General Pharmaceutical Council as a pharmacist in the UK; or with the relevant professional body in the EU (including EEA countries); or may be registered as a pharmacist in a country outside the EU.

For students with appropriate qualifications and experience, credit for prior learning may be awarded. Applicants who think that they may be suitable for this should contact the Institute.

CONTACT

Dr Anne Boyter
t: +44 (0)141 548 4594
e: anne.boyter@strath.ac.uk

Biomedical Sciences

MRes

This course provides intensive laboratory-based training in research methods, supported by in-depth understanding, in the Biomedical Sciences. The aim is to prepare graduates to make contributions, as individuals and members of a team, to research-oriented activities in the biomedical industries and related service sectors, or academia. The course is also suitable for those who wish to upgrade a first degree, change field, or gain valuable laboratory experience before employment or a PhD.

Curriculum

The MRes degree is mainly focused on research and students will spend around two-thirds of their time undertaking a laboratory-based research project, supervised by an academic member of staff. The remaining time comprises lectures, workshops and practical classes in the following areas:

- transferable skills training in data mining, interpretation and presentation; experimental planning; personal effectiveness, commercialisation and entrepreneurship
- advanced-level techniques, learning practical skills appropriate to the specialisation chosen
- advanced-level topics, gaining an in-depth understanding appropriate to the specialisation chosen

To support their chosen research project, students tend to choose advanced-level taught courses in a named specialisation, from the following areas:

- Biochemistry
- Immunology
- Microbiology
- Molecular Biology
- Parasitology
- Pharmacology

Alternatively, students can opt to take the general degree of MRes in Biomedical Sciences, wherein they choose different named specialisations (eg advanced microbial techniques, with advanced topics in biochemistry, and an immunology-based research project).

Course Duration

One year full-time; two years part-time

Entry Requirements

First- or second-class Honours degree, or equivalent, in a biological/pharmaceutical-related subject.

Careers

As the courses on offer involve choices from all the Biomedical Sciences, the career opportunities are extensive and cover positions in the pharmaceutical and biotechnology industries, education, government and health-service research.

Drug Delivery Systems/ Drug Delivery Systems with International Placement

MRes

This course is designed to provide students with intensive laboratory-based training in research methods, supported by in-depth understanding in Drug Delivery Systems. The aim is to prepare graduates to make contributions, as individuals and members of a team, to research-oriented activities in the biomedical industries and related service sectors, or academia. The course is also suitable for those who wish to upgrade a first degree, change field, or gain valuable laboratory experience before employment or a PhD. The course is also available with an international placement when students spend three to six months completing a research project at the International Medical University, Kuala Lumpur, Malaysia.

Curriculum

The MRes degree is mainly focused on research and students will spend around two-thirds of their time undertaking a laboratory-based research project, supervised by an academic member of staff. The remaining time comprises lectures, workshops and practical classes in the following areas:

- transferable skills training in data mining, interpretation and presentation; experimental planning; personal effectiveness, commercialisation and entrepreneurship
- advanced-level techniques, learning practical skills in formulation, testing and analysis
- advanced-level topics, gaining an in-depth understanding appropriate to the specialisation chosen

To support their chosen research project, students select advanced-level taught courses in a named specialisation from the following areas:

- Drug Delivery Systems
- Pharmaceutical Materials and Formulation

Previous research projects have included:

- Nanoparticulate formulations of insulin and their analysis
- Melanin-biopolymer interactions: influence of pH and electrolytes
- Nasal formulations of poorly soluble compounds
- Oral delivery of cyclosporine-A using mesoporous silica nanoparticles

Course Duration

One year full-time; two years part-time

Entry Requirements

First- or second-class Honours degree, or equivalent, in a biological/pharmaceutical-related subject.

Careers

The course prepares graduates to make contributions, as individuals and members of a team, to research-oriented activities in the pharmaceutical, biotechnology and biomedical industries, and the related academic and health-service sectors.

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.

Curriculum

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, or equivalent, in engineering or physical sciences.

CONTACT FOR MRes/EngD DEGREES

Eileen Paterson
t: +44 (0)141 548 3825
e: e.paterson@strath.ac.uk

Analysis of Medicines

MSc/PgDip (part-time distance learning)

This web-based modular course has been developed in response to increased demand for continuing professional development by industry professionals unable to undertake a full-time course. It is fully web-based, hosted on a virtual learning environment using interactive animations, quizzes and exercises to reinforce learning points contained in the notes. Students also receive hard copies of all notes and exercises, tutor support and in-house laboratory-based practical training. Practical training components may be undertaken in laboratories outwith the University if suitable facilities are available.

Curriculum

COMPULSORY CLASSES

- Validation of Analytical Methods,
- GLP and Basic Calculations
- Physiochemical Properties of Drug Molecules
- Chemical Analysis
- Quantitative and Qualitative Spectrophotometry
- Separation Techniques
- Hyphenated Techniques
- Structure Elucidation of Drug Molecules
- Management, Quality Regulation and Licensing
- Practical Skills

ELECTIVES (CHOOSE THREE)

- Advanced Separation Techniques
- QC of Biotechnology Products
- Statistical Analysis of Data
- Bioanalysis
- Phytochemical Analysis

The MSc requires a three-month project (may be taken over a longer period if part-time), which can be undertaken at Strathclyde, within your company if you are a practicing analyst or at another approved educational institution. You submit a dissertation and take an oral examination on the project.

You may start the Diploma anytime but will finish in the third April after the commencement of the course (if starting in April it will take exactly two years). The MSc will be completed in the fourth April after the commencement of the course.

Course Duration

PgDip: two years part-time including three weeks' practical training (training exemption available for practicing analysts)
MSc: three years (PgDip component plus a research project)

Entry Requirements

MSc: First- or second-class Honours degree, or equivalent, in an appropriate science.
PgDip: Appropriate science degree or equivalent qualification.

Careers

The course aims to give non-specialists a background in pharmaceutical analysis and a clearer focus towards an industry where there is currently high demand for analysts.

CONTACT

Dr Blair Johnston
t: +44 (0)141 548 5756
e: blair.johnston@strath.ac.uk

Clinical Pharmacy

MSc/PgDip

This course enables pharmacists to apply knowledge of drug action in patient care and to develop the skills required to promote effective use of medicines in hospitals and in primary care. You will study the scientific and clinical factors that influence treatment with medicines and the delivery of pharmaceutical care. Advanced training in the practice of clinical pharmacy enables you to judge new treatments critically and to extend clinical services.

Curriculum

The course content includes the following:

- communicating in clinical settings
- clinical information sources
- common laboratory tests and their relevance to monitoring patients receiving drug therapy
- principles and practice of therapeutics
- pharmaceutical care and management of disease states, focusing on the contribution of the pharmacist
- oral communication and problem-solving
- pharmacological, pathological and physiological background for therapeutic strategies to manage disease states
- clinical, laboratory and organisational methods to monitor and assess drug therapy
- drug delivery and dosage selection
- experience of pharmaceutical care within a chosen specialty
- delivery of specialised clinical pharmacy services
- application of research methods to new developments
- research project

Course Duration

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

Entry Requirements

First- or second-class Honours degree in pharmacy, or equivalent. Preferably, at least one year of practical experience as a pharmacist.

CONTACT

e: sipbs-pgi@strath.ac.uk

Pharmaceutical Analysis

MSc/PgDip

This course provides specialised knowledge of the analytical techniques used to detect, identify and quantitatively determine drugs and related substances. Participants are introduced to techniques for evaluating analytical data and validating analytical methods, and to strategies for analytical research and development. The course has access to the full range of analytical spectroscopic (NMR, UV, ATR-FTIR and MS) and chromatographic (HPLC, GC and LC/GC-MS) instrumentation and students gain firsthand experience in a wide range of modern instrumentation and techniques.

Course Structure

COMPULSORY MODULES

- Chemical and Statistical Analysis
- Spectrophotometric and Spectroscopic Methods
- Chromatography
- Bioanalysis, Biotechnology and Quality Management
- Chemical And Spectroscopic Methods
- Chromatographic and Bioanalytical Methods

In addition MSc students undertake a laboratory-based research project either in house or at an external collaborative partner.

Diploma students who satisfy the appropriate criteria may transfer to the MSc course. A Certificate may be awarded on completion of 60 credits.

Course Duration

MSc: 12 or 24 months full-time, depending on entry qualifications
PgDip: 12 months full-time

Entry Requirements

MSc: Applicants with a first- or second-class Honours degree, or equivalent, in an appropriate science.
PgDip: Appropriate science degree, or equivalent qualification.

Funding for UK students for course tuition fees is available from the Postgraduate Student Allowance Scheme (**www.saas.gov.uk**).

Careers

The course is intended to give non-specialists a background in pharmaceutical analysis and a clearer focus towards an industry where there is currently high demand for analysts.

CONTACT

e: sipbs-pgi@strath.ac.uk

Pharmaceutical Quality & Good Manufacturing Practice

MSc/PgDip (part-time only)

This course enables suitably-qualified pharmaceutical industry personnel to acquire the necessary knowledge to submit themselves for nomination as an EU Qualified Person (QP), and also achieve the award of Postgraduate Diploma in Pharmaceutical Quality & Good Manufacturing Practice. The training, based on the European-approved study guide, is provided in a unique collaboration with David Begg Associates who organise the course modules. For those studying in the USA the course is designed to enhance professional development as a Quality Leader in the US pharmaceutical industry.

Curriculum

In the UK, the theoretical modules are usually held at a venue in York and the practical module at the University of Strathclyde. In the QLP equivalent programme in the USA the theoretical modules are held in Boston, Mass, and US students have the option of coming to Strathclyde for the practical module or undertaking equivalent approved study in local industry.

Note: Registration with David Begg Associates (**www.dba-global.com**) and payment of their fee for each module is essential in addition to registration with the University.

Each module consists of lectures, workshops, discussion groups and relevant visits. The cohesion of the student group develops rapidly as all participants generally work in some aspect of quality assurance in the pharmaceutical industry. The informal aspects of each module also become an important part of the knowledge-gathering process.

MODULES IN UK AND USA

- Pharmaceutical Law and Administration
- Medicinal Chemistry and Therapeutics
- Pharmaceutical Formulation and Processing (1 & 2)
- Pharmaceutical Microbiology
- Active Pharmaceutical Ingredients
- Mathematics and Statistics
- Analysis and Testing
- Pharmaceutical Packaging
- Quality Management Systems
- Practical (held at the University of Strathclyde)
- Investigational Medicinal Products
- The Role and Professional Duties of a QP

The Diploma can be converted to the MSc by completion of a research project, normally undertaken at the student's workplace.

Start Date

Variable

Course Duration

MSc: 27 months part-time; PgDip: 21 months part-time

Entry Requirements

Relevant first degree and, preferably, some experience in the pharmaceutical industry.

Careers

The Diploma course provides Qualified Person and technical leadership instruction and is required by several Health Authorities in Europe as a proof of training as a QP. It is also a vital asset in career advancement in the pharmaceutical industry worldwide.

CONTACT
Dr James Johnson
t: +44 (0)141 548 2677
e: j.r.johnson@strath.ac.uk


> VISIT US AT
You
Tube

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.

RECRUITMENT & INTERNATIONAL OFFICE
www.strath.ac.uk/rio

If you are interested in studying at Strathclyde as a postgraduate student, staff from the University's Recruitment & International Office (RIO) 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 agents and representatives in many countries around the world. You can find a list on the RIO website (see above).

We know that you may have queries about the course you are applying to and about life in Glasgow, so 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 RIO 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
Recruitment & International 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)

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-sessional 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 Recruitment & International Office for further advice. You can also check the entry requirements specific to your country at **www.strath.ac.uk/rio/prospective**

APPLICATIONS

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.

Visit **www.strath.ac.uk/admissions** for details of the application process.

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 internet-based test (iBT). 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 Recruitment & International 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-sessional programme. The final four-week Pre-sessional 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: hass-courses-hum@strath.ac.uk
w: www.strath.ac.uk/elt

UK 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 a Tier 4 (General) Student Visa. Points are gained as follows:

- A Confirmation of Acceptance for Studies (CAS) (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 before your CAS 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 the following websites:

Information & Advice
www.strath.ac.uk/sees/infoint

UK Council for International Student Affairs
www.ukcisa.org.uk

Your Strathclyde Experience

Our Courses

OUR DEGREES

Strathclyde is one of the largest providers of postgraduate education in the UK. Taught Master's degrees (MSc, MBA, LLM, 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, DPharm, DPsych, 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.

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.

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 on 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 are an average and intended as a guide only. Fees for 2012/2013 may be up to 3% higher and will be confirmed in March 2012. The cost of your course will be available from the contact included in each course listing.

Working after your studies

From April 2012, the Post Study Work scheme, entitling graduates to remain in the UK to find employment will close. However, students will be able to switch into Tier 2 if they are in the UK and find suitable employment with a UKBA licensed Tier 2 sponsor before their student visa expires. Further information and updates on changes to the immigration system can be found at **www.ukba.homeoffice.gov.uk** and updates on how changes will affect students will be noted on the Information and Advice website: **www.strath.ac.uk/sees/infoint**

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 visit **www.scotlandistheplace.com**

Tuition fees 2011/2012 full-time postgraduate taught courses

OVERSEAS STUDENTS (NON-UK, NON-EU)

> Faculty of Engineering	£12,980
> Faculty of Humanities & Social Sciences	£9,950
> Faculty of Science	£12,980
> Strathclyde Business School	£10,100

HOME STUDENTS (UK & EU)

> All Faculties	£3,400

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

Your Strathclyde Experience

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 at:
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**

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. General information for EU students is 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 the relevant 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.iefa.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 Financial Support Team offers information and advice to UK students considering postgraduate study or who encounter financial difficulties during their studies. The team 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/student/finance

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. The University's investment in facilities, services and support help you make the most of your student experience at Strathclyde.

INFORMATION TECHNOLOGY
www.strath.ac.uk/it

At Strathclyde you will benefit from 21st-century IT provision, including:

- over 40 computer laboratories, teaching rooms and library spaces containing more than 1,500 PCs, many available 24 hours a day
- access to personal, individual curriculum and academic information via PEGASUS (Portal Engine Giving Access to Strathclyde University Systems) from your computer or mobile device.
- 400 wi-fi hot-spots campus-wide allowing free wireless network access, plus network connectivity in all student residences and serviced laptop user areas
- personal University user account with free email, web access and 100 megabytes of backed-up disk-space for the duration of your studies
- a Development & Training Resource Centre where you will find tutorial and training manuals

LIBRARY FACILITIES
www.lib.strath.ac.uk

The University is investing in the Library to develop and modify facilities to meet the needs of students and staff. This enhanced portfolio of facilities will include the redevelopment of the Library building, introduction of compact mobile shelving, increased focus on acquiring digital content and provision of more group and individual study spaces.

There are currently more than 2,000 reader places, 450 computer places and extensive wi-fi zones for laptop use. The Library is particularly strong in science, engineering, technology, language and literature, business studies and management and also holds Scotland's largest resource in education and teacher training. The Library holds over one million print volumes as well as access to over 126,000 electronic books that can be accessed 24/7 from any suitably-enabled computer.

Other services include an open-access print Short Loan Collection, e-books and digitised collections of exam papers and other learning materials. Users also have 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. Library staff are also available to offer training on information literacy and how to use electronic resources.

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 and 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.

If you plan to bring your family to Glasgow, we advise you to do so only after you have found suitable, affordable accommodation.

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, www.glasgowpad.org), a web-based service which has been set up especially for students to find a safe, secure place to stay.

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 Support

www.strath.ac.uk/sees/infoint

The University provides a range of services, advice and assistance to help ensure that all of our students enjoy their time here. Our Information & Advice Team offers advice, guidance and information on all issues associated with student life to home and international students, especially those that concern welfare, academic, immigration and personal issues.

The team is also responsible for student transition, including induction and orientation activities for home and international students, and for the administration and analysis of key student surveys. You can access more detailed information on our website (see above).

CONTACT
e: tier4@strath.ac.uk
e: infoandadvice@strath.ac.uk

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
www.strath.ac.uk/studentcounselling

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: student-counselling@strath.ac.uk

STUDENT FINANCE AND WELFARE
www.strath.ac.uk/student/finance

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
e: s.finance@strath.ac.uk

STUDENT HEALTH SERVICE
www.strath.ac.uk/ps/studenthealthservice

The Student Health Service (SHS) helps students with any physical or emotional problems. Hospital-based doctors run a clinic on campus twice daily during term and a family planning/healthcare clinic weekly.

All students require to register with a local doctor. To receive any treatment through the National Health Service (NHS) you have to be registered with a doctor (GP). The SHS can give you information about local GPs. International students on courses longer than six months are eligible to register with the NHS, which means consultations with a doctor and hospital treatment will be free of charge. 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. 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 living abroad.

Students from some countries are required to have a TB screening test at registration and the SHS will arrange this.

CONTACT
e: studenthealth@strath.ac.uk

Your Strathclyde Experience

DISABILITY SERVICE
www.strath.ac.uk/disabilityservice

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 notetaking in lectures. The University's Assistive Technology advisers can help identify appropriate technology to support you and can provide ongoing advice, assistance and training.

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 campus a challenge, but most classes can be timetabled in rooms that are accessible. 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
t: +44 (0)141 548 3402
Minicom: +44 (0)141 548 4739
e: disabilityservice@strath.ac.uk

CHAPLAINCY CENTRE
www.strath.ac.uk/chaplaincy

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.

CONTACT
t: +44 (0)141 548 4144
e: chaplaincy@strath.ac.uk

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.

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.

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 skills and make arrangements for them to be given assistance if required.

Childcare Scotland runs a nursery facility on campus for pre-school children on a paying basis. The nursery is very popular so it is advisable to check for availability of places (+44 (0)141 553 4125).

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

Sports

SPORTS UNION
www.sportsunion.strath.ac.uk

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

CENTRE FOR SPORT & RECREATION
www.strath.ac.uk/sport

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
e: sport@strath.ac.uk

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 facilitiy where you can get help with academic appeals, financial problems and personal matters, as well as general enquiries. The Union's welfare team also administers a confidential Nightline Service staffed by trained student volunteeers.

The Students' Association 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.

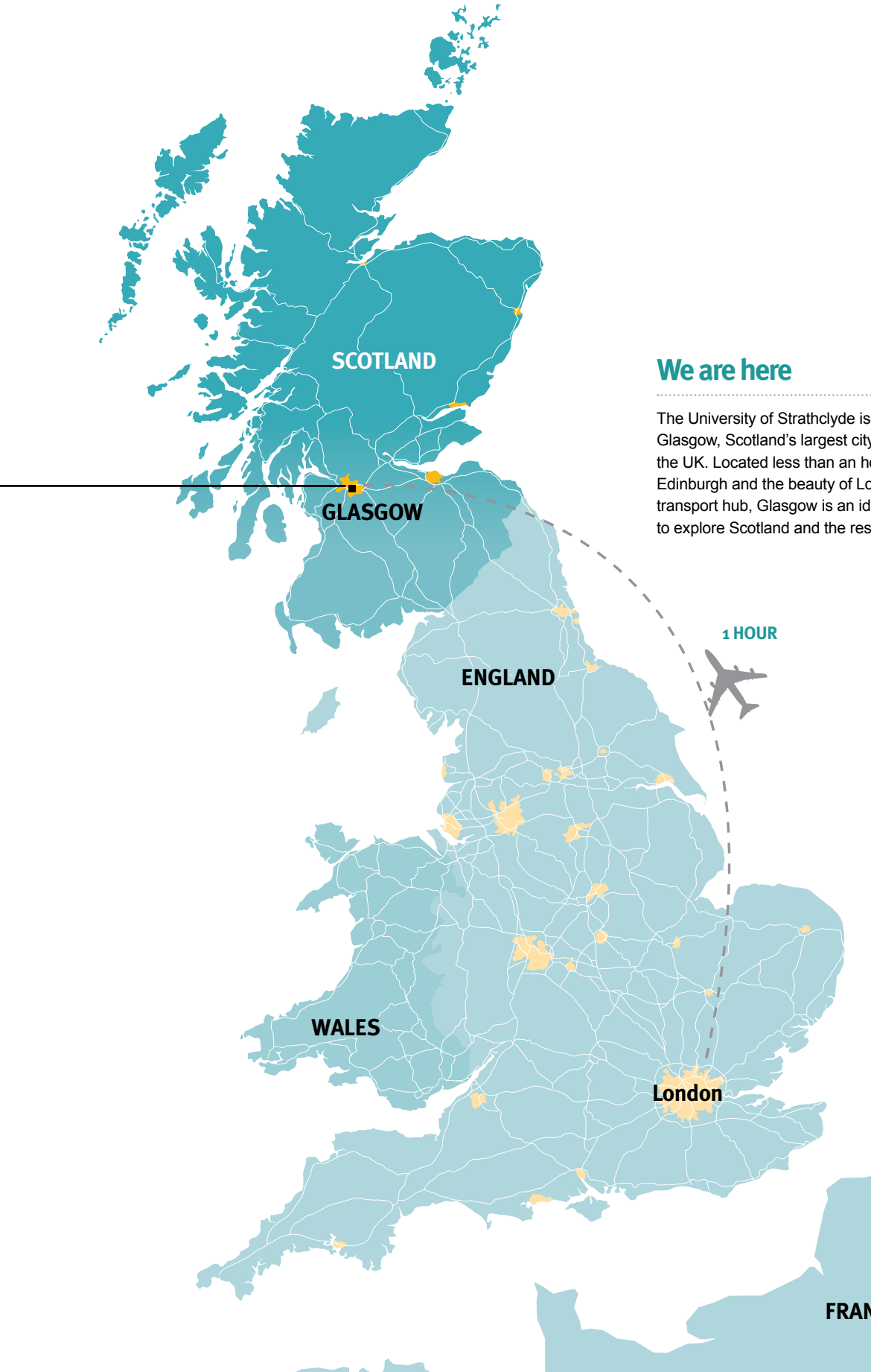
Students play an important role in terms of the University's development, and there are opportunities to become involved in the Students' Association and as a Class Representative, participating in staff-student committees to discuss issues of relevance to students in your course. Visit the Students'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

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 website (see above), or you can visit the University. If you are based in the UK and would like to visit, contact **pg-enquiries@strath.ac.uk** 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/rio/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

The following is a list of postgraduate taught courses offered at the University of Strathclyde.
Please see following page for index of courses included in this prospectus.
To download or request a copy of the prospectus for any of the other three Faculties, visit **www.strath.ac.uk/prospectus**

COURSE	DEGREE
ADVANCED MANUFACTURE: TECHNOLOGY & SYSTEMS	MSc/PgDip/PgCert
ADVANCED MANUFACTURING: FORGING & FORMING	EngD
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 (Sustainable Engineering Programme)	MSc/PgDip/PgCert
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/PgDiPgCert
BUSINESS INFORMATION TECHNOLOGY SYSTEMS	MSc/PgDip
CHARTERED TEACHER STUDIES	MSc/PgDip/PgCert
CHEMICAL & PROCESS ENGINEERING, ADVANCED	MSc/PgDip/PgCert
CHEMICAL PROCESSING (Sustainable Engineering Programme)	MSc/PgDip/PgCert
CHEMICAL TECHNOLOGY & MANAGEMENT	MSc/PgDip/PgCert
CLIMATE CHANGE ADAPTATION	MRes
CLINICAL PHARMACY	MSc/PgDip
COACHING & MENTORING	MSc
COMMUNICATIONS, CONTROL & DIGITAL SIGNAL PROCESSING	MSc
COMMUNICATIONS TECHNOLOGY & POLICY	MSc
COMMUNITY CARE	MSc/PgDip/PgCert
COMPUTER AIDED ENGINEERING DESIGN	MSc/PgDip/PgCert
COMPUTER SCIENCE, ADVANCED	MSc/PgDip
COUNSELLING	MSc/PgDip
COUNSELLING PSYCHOLOGY	MSc/DPsych
COUNSELLING SKILLS	PgCert
CREATIVE WRITING	MRes
DIGITAL CREATIVITY	MSc/PgDip/PgCert
DIGITAL MULTIMEDIA & COMMUNICATION SYSTEMS	MSc
DRUG DELIVERY SYSTEMS/with INTERNATIONAL PLACEMENT	MRes
EARLY CHILDHOOD STUDIES	MSc/PgDip/PgCert
ECONOMIC MANAGEMENT & POLICY	MSc
EDUCATION	EdD/MEd
EDUCATIONAL RESEARCH, APPLIED	MSc/PgDip

COURSE	DEGREE
EDUCATIONAL SUPPORT	MSc/PgDip/PgCert
ELECTRICAL POWER ENGINEERING with BUSINESS	MSc
ELECTRONIC & ELECTRICAL ENGINEERING	MSc
ENGINEERING	MRes
ENVIRONMENTAL ENGINEERING	MSc
ENVIRONMENTAL ENTREPRENEURSHIP	MSc
ENVIRONMENTAL FORENSICS	MSc
ENVIRONMENTAL HEALTH	MSc
ENVIRONMENTAL SCIENCE	MSc
EXECUTIVE COACHING	PgCert
FINANCE	MSc/PgDip
FORENSIC SCIENCE	MSc/PgDip/PgCert
GENEALOGICAL, PALAEOLOGICAL & HERALDIC STUDIES	MSc/PgDip/PgCert
GEO-ENVIRONMENTAL ENGINEERING	MRes
GEOTECHNICS	MSc
GLOBAL INNOVATION MANAGEMENT	MSc
GLOBAL WATER SUSTAINABILITY	MSc
HEALTH HISTORY	MSc/PgDip/PgCert
HIGH-POWER RADIO FREQUENCY SCIENCE & ENGINEERING	MSc/PgDip
HISTORICAL STUDIES	MSc/PgDip
HOSPITALITY & TOURISM LEADERSHIP	Executive Masters
HUMAN RESOURCE MANAGEMENT	MSc/PgDip
HYDROGEOLOGY	MSc/PgDip
INFORMATION & LIBRARY STUDIES	MSc/PgDip
INFORMATION MANAGEMENT	MSc/PgDip
INTERNATIONAL ACCOUNTING & FINANCE	MSc/PgDip
INTERNATIONAL BANKING & FINANCE	MSc/PgDip
INTERNATIONAL HOSPITALITY & TOURISM MANAGEMENT	MSc/PgDip
INTERNATIONAL HUMAN RESOURCE MANAGEMENT	MSc/PgDip
INTERNATIONAL LAW & SUSTAINABLE DEVELOPMENT	LLM/PgDip/PgCert
INTERNATIONAL MANAGEMENT	MSc/PgDip
INTERNATIONAL MARKETING	MSc/PgDip
INTERNET LAW & POLICY	LLM/PgDip/PgCert
INVESTMENT & FINANCE	MSc/PgDip
JOURNALISM	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, INTERNATIONAL ECONOMIC	LLM/PgDip/PgCert
LAW (Pre-qualification Courses)	

Engineering
Humanities & Social Sciences
Science
Strathclyde Business School

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
LITERATURE, CULTURE & PLACE	MLitt/PgDip/PgCert
MANAGEMENT	Masters
MANAGEMENT & LEADERSHIP in EDUCATION	MSc/PgDip/PgCert
MARINE ENGINEERING	MSc/PgDip
MARINE TECHNOLOGY (Sustainable Engineering Programme)	MSc/PgDip/PgCert
MARKETING	MSc/PgDip
MECHANICAL ENGINEERING, ADVANCED	MSc/PgDip/PgCert
MECHATRONICS & AUTOMATION	MSc/PgDip/PgCert
MEDIATION & CONFLICT RESOLUTION	MSc/PgDip/PgCert
MEDICAL DEVICES	EngD/ MSc/PgDip/PgCert
MEDICAL TECHNOLOGY	MRes
NANOSCIENCE	MSc/PgDip
NORTH ATLANTIC WORLD, c900-c1800	MSc/PgDip
OFFSHORE FLOATING SYSTEMS	MSc/PgDip
OFFSHORE RENEWABLE ENERGY (Sustainable Engineering Programme)	MSc/PgDip/PgCert
OPERATIONAL RESEARCH	MSc/PgDip/PgCert
OPERATIONS MANAGEMENT in ENGINEERING	MSc/PgDip/PgCert
OPTICAL TECHNOLOGIES	MSc/PgDip
OPTICS & PHOTONICS TECHNOLOGIES	EngD
PHARMACEUTICAL ANALYSIS	MSc/PgDip
PHARMACEUTICAL QUALITY & GOOD MANUFACTURING PRACTICE	MSc/PgDip
PHILOSOPHY WITH CHILDREN	PgCert
PHOTONICS & DEVICE MICROFABRICATION	MSc/PgDip
POLITICAL RESEARCH	MSc
POLLUTION PREVENTION CONTROL, INTEGRATED	MRes
POWER PLANT TECHNOLOGIES/ENGINEERING	MSc/PgDip/PgCert
PRIMARY EDUCATION	PGDE (Primary)
PROCESS TECHNOLOGY & MANAGEMENT	MSc/PgDip/PgCert
PRODUCT ENGINEERING DESIGN	MSc/PgDip/PgCert
PROFESSIONAL LEGAL PRACTICE	Diploma
PROFESSIONAL STUDIES, ADVANCED	MSc/PgDip/PgCert
PSYCHOLOGY, EDUCATIONAL	DEdPsy/MSc
PSYCHOLOGY, RESEARCH METHODS in	MRes
PUBLIC POLICY	MSc
PUBLIC POLICY, EUROPEAN	MSc
PUBLIC POLICY, INTERNATIONAL	MSc
QUANTUM INFORMATION & COHERENCE	MSc/PgDip
REHABILITATION STUDIES	MSc
RENEWABLE ENERGY SYSTEMS & the ENVIRONMENT (Sustainable Engineering Programme)	MSc/PgDip/PgCert
RESIDENTIAL CHILDCARE, ADVANCED	MSc/PgDip/PgCert
SAFETY & RISK MANAGEMENT	MSc/PgDip/PgCert
SECONDARY EDUCATION	PGDE (secondary)

COURSE	DEGREE
SHIP & OFFSHORE STRUCTURES	MSc/PgDip
SHIP & OFFSHORE TECHNOLOGY	MSc/PgDip
SOCIAL HISTORY	MSc/PgDip
SOCIAL WORK	Master/PgDip
SOCIAL WORK MANAGEMENT	MSc/PgDip/PgCert
SUBSEA ENGINEERING	MSc/PgDip
SUPPLY CHAIN & OPERATIONS MANAGEMENT/ LOGISTICS MANAGEMENT/PROCUREMENT MANAGEMENT	MSc/PgDip/PgCert
SUPPORTING BILINGUAL LEARNERS	PgCert
SUSTAINABLE ENGINEERING, Faculty Programme in	MSc/PgDip/PgCert
SUSTAINABLE PRODUCT DEVELOPMENT (Sustainable Engineering Programme)	MSc/PgDip/PgCert
SUSTAINABILITY & ENVIRONMENTAL STUDIES	MSc
TECHNICAL SHIP MANAGEMENT	MSc/PgDip
URBAN DESIGN	MSc/PgDip/PgCert

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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 2011, 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.

Campus Map

Key

1 McCance Building
2 Livingstone Tower
3 Graham Hills Building
4 Royal College Building
5 James Weir Building
6 Thomas Graham Building
7 Centre for Sport & Recreation
7a Chaplaincy/St Paul's Building (not in view)
7b Student Union (not in view)
8 Rottenrow Gardens
9 Colville Building
10 Architecture Building
11 Sir William Duncan Building
12 Strathclyde Business School
13 Stenhouse Building
14 Arbuthnott Building
15 Wolfson Building
16 Curran Building
17 Lord Hope Building (not in view)
18 John Anderson Building
19 Chancellors Hall
20 James Blyth Court/Thomas Campbell Court
21 James Young Hall
22 Forbes Hall
23 James Goold Hall
24 Murray Hall
25 Campus Village Office
26 Garnett Hall
27 Birkbeck Court
28 Barony Hall
29 Andrew Ure Hall
30 Patrick Thomas Court
31 Henry Dyer Building
32 Collins Building / Collins Gallery
33 Ramshorn Theatre
34 The Strathclyde Institute of Pharmacy and Biomedical Science (SIPBS)