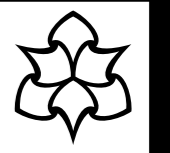


The University for  
World-Class Professionals



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University

Postgraduate Study 2014



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Science and  
Engineering

Biology and Conservation • Computing and Digital Technology  
Environment and Geography • Engineering • Healthcare Science

# Welcome

Manchester Metropolitan University offers the highest concentration of postgraduate taught courses in the North West of England, ranging from certificates to doctoral programmes. We can help to give you the competitive edge. With partners and students from all over the world, the Faculty has a global vision which can help you realise your ambitions.

## Award-winning university

Winner of the 2013 Guardian newspaper's university award for best student experience, the University has also been named the greenest university in the UK, topping the 2013 People and Planet league table of 140 universities for environmental sustainability.

## Developing the next generation of scientists and engineers

### Introducing the Faculty of Science and Engineering

Set within state-of-the-art facilities, located in the heart of Manchester, you will be taught by expert professionals with a passion for their subject and an internationally acclaimed reputation for research.

The Faculty is one of the largest science and engineering educators in the UK with over 5,000 students, 700 of whom are studying at postgraduate level. We offer a wide range of Masters degrees in the following specialist areas:

- Biology and conservation
- Biomedical and healthcare science
- Computing and digital technology
- Engineering
- Environment and geography

### Professionally focussed courses

Advanced study at postgraduate level equips you with the skills and knowledge to build a successful and fulfilling career. Our postgraduates gain a combination of practical and theoretical skills that enable them to progress in employment in areas as diverse as computing, engineering, healthcare, environmental protection, conservation, transport, manufacturing, education and research.

### World-class facilities

You will have access to state-of-the-art laboratories, workshops, IT zones and lecture theatres, in addition to purpose-built facilities spanning clinical skills laboratories, multimedia studios, a £4m engineering workshop and more.

### Manchester: our vibrant home

Manchester is one of the biggest higher education centres in Europe and undoubtedly the most popular city for students in the UK. Manchester is a vibrant city of culture, music and sport and as the world's first industrialised city, has its roots firmly in innovation and technology. It has a strong cosmopolitan character and a diverse population, attracting students from a broad range of backgrounds and countries.

### Experts in the field

The Faculty of Science and Engineering is home to a very broad range of academic expertise, backed up by dedicated teams of technical staff. Many of our tutors are experienced professionals with well established links and contacts in their industry sector. These links ensure that our programmes allow you to develop the skills and knowledge required to address the industry-specific challenges of your chosen career.

### World-leading research

A very broad range of research is undertaken in the faculty and this is key to ensuring our postgraduate teaching remains vibrant and informed by the very latest advances in science and engineering. You will be taught and supervised by research-active tutors.

Our research in biomedical science, computer science, Earth systems, environmental science, human geography and GIS received the top 4\* 'world-leading' rating in the most recent major review of research at UK universities; while engineering and materials research also performed well.

A team of our researchers were awarded Nobel Certificates in 2007 for their contribution to the United Nations Intergovernmental Panel on Climate Change.

To find out more about our research institutes, please see pages 33-35.

Faculty of Science  
and Engineering

## Case study: Dr Nadia Ali

**School of Healthcare Science**  
MSc Biomedical Science, 2006  
PhD, 2012

I combine my research in the area of diabetes with my passion for teaching, which gives me the perfect balance.

I was born in Iraq, and moved to Jordan to complete my school and undergraduate education. I then travelled to the UK with my husband and settled in Manchester to continue my study at Manchester Metropolitan University.

I've enjoyed every minute. Manchester is a very good place to study and live. It is a multicultural city with all the wonderful facilities you would expect to find in a modern city: childcare, a diverse range of schools and places of worship, public libraries, healthcare facilities, sports and leisure centres, retail outlets, parks and public spaces. And equally, the University has excellent facilities: the labs and equipment here are top class.

The core subject of my study was about the effect of the drug simvastatin – an inhibitor of cholesterol – on advanced glycation, the main culprit in diabetes. Having completed my PhD, I am now working at the University as an assistant lecturer supporting first year healthcare science students. I have always wanted to work in academic and research fields. It is an exciting job with many opportunities to learn new skills. Next I would like to work as a postdoctoral researcher in biomedical science.

Working as a team is very enjoyable especially when it comes to assisting students and programme leaders. My preference is to stay in the training field at the University. Teaching is something I am passionate about. I enjoy teaching students and I learn from them everyday.



## Advancing your career

An MSc qualification gives you the edge over other graduates in the job market and can lead to higher level employment opportunities. Industry is keen to employ postgraduates who can learn independently and apply critical thinking and problem solving to real world problems. The job market in scientific and technological sectors is buoyant with many industries maintaining good performance despite the current economic climate.

### Our courses

We place employability at the heart of your learning and regularly review our courses to ensure that they are up-to-date and relevant to the needs of industry.

Many of our courses are accredited by leading professional bodies and associations including the Institute of Biomedical Science, the British Computing Society and the Institution of Engineering and Technology, with whom we have enhanced academic partner status.

With an MSc qualification you will also be well placed to pursue further study such as a PhD. As well as providing MSc courses tailored to the specific requirements of industry, we provide supervision for MSc study by research; and, post-Masters, full time or part time MPhil and PhD programmes.

### A university of the region

Our local connections are an important part of our strength and identity. The City of Manchester and the wider North West region are home to the largest centre for scientific and engineering related enterprise outside the South East. Our graduates find employment in industries related to their education, so you will be well placed to take advantage of the North West's diverse and thriving scientific and engineering sector.

### Computing and Digital Technology

Manchester is a major hub for the digital media industry. The close proximity of MediaCityUK, and local initiatives such as the 100Mbps Oxford Road "Corridor" broadband project, are attracting key players in the digital media sector along with smaller web design and new media companies to the city.

### Engineering

Employers recognise the advanced skills and problem-solving capacity of the engineering Masters graduate and our programmes are designed in conjunction with industry to give you the specialist knowledge and skillset to succeed.

Over half of our Engineering Masters programmes are certified with the EUR-ACE® European quality label meaning that on completion of your MSc you will have fulfilled the academic part of CEng recognition. On completion of further professional competencies in the workplace, you can achieve chartered status enabling you to practise engineering in any EU member state. We are one of only five UK universities including Cambridge to have gained this prestigious certification.

### Biology, Conservation, Environment and Geography

The School of Science and the Environment has close links with professional organisations and employers and our Masters programmes have been developed in consultation with employers in environmental and conservation agencies to ensure your studies reflect the latest best practice in business and corporate social responsibility.

### Healthcare Science

We have extensive links with NHS trusts, hospitals and other healthcare providers in Manchester and the North West region which keep your studies up-to-date and help put your learning into practice.

### Careers and employability support

Careers and employability support is available from the moment you join us, and for up to three years after the completion of your course. We have a range of careers and employability services available with dedicated careers and employability advisors, offering services including:

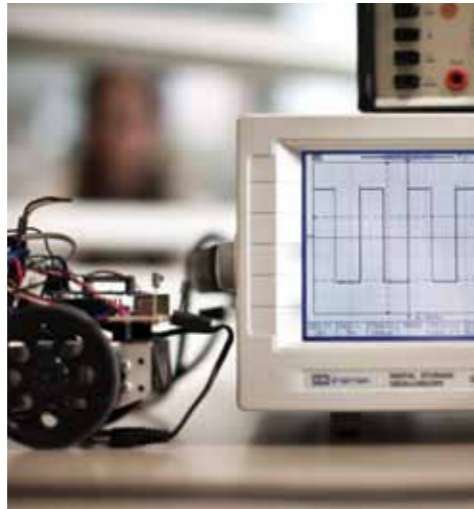
- Career development workshops, offering support on writing CVs and application forms, preparing for interviews and networking.
- Career guides, videos and resources.
- Going Global – an online database ideal for international students planning to return home to work or any postgraduate student looking to explore a career in a new country.
- Advice on self-employment and freelancing.
- Employer visits and presentations.

### International outlook

Exposure to the links the faculty has with international companies/partners can enhance your opportunities of gaining employment, and give organisations confidence that you will be able to work successfully in a global environment.



# Postgraduate study in Science and Engineering



## World-class learning and teaching facilities

As a student in our Faculty, you'll have access to our impressively equipped laboratories, workshops, IT suites and lecture theatres.

In the last seven years alone we've invested over £50 million in our home, the John Dalton building, including a £4 million new engineering workshop with the latest facilities for research and teaching in surface engineering, materials, dynamics and automotive engineering; and a £3 million brand new building for our Institute for Biomedical Research into Human Movement and Health which features state-of-the-art x-ray and ultrasound kit, a fully equipped exercise suite and a magnetic resonance imaging (MRI) scanner, the latter rarely found outside hospital settings.

The main university library, with 24-hour opening during busy periods, is on site and offers access to over 750,000 books, as well as e-journals, articles and e-books. The University can also lend you multimedia equipment including laptops, camcorders and projectors entirely free of charge.

## Learning to suit you

Flexibility is a key feature of our Masters programmes: you can study full or part-time or, in some cases, via distance learning. Especially useful for flexible, 24-hour study is our online virtual learning environment, Moodle, which provides extensive access to lectures, course materials and assessment information. For some subjects, classes are concentrated on certain days of the week to facilitate attendance for those who also work or have other commitments. Part-time students usually aim to complete in three years or less, but can take longer if necessary.

Choose also from taught and research-led modes of study.

## A supportive learning environment

In addition to academic support, we provide a range of personal and pastoral support that you may need while you are a postgraduate student here. We are renowned as a very friendly university, and we take a personal interest in making sure that you are happy here. The on-site Student Information Point serves as a one-stop-shop which provides comprehensive advice and information on all student-related matters, including referral to specialist services.

There are also dedicated student support officers on campus to provide advice and guidance and to provide you with study skills support through individual sessions and/or group workshops on a whole range of topics including revision techniques, presentation skills, essay writing and time management. You will also have round-the-clock access to study skills resources on Moodle, your online virtual learning environment.

## Specialist support for disabled students and those with specific learning difficulties

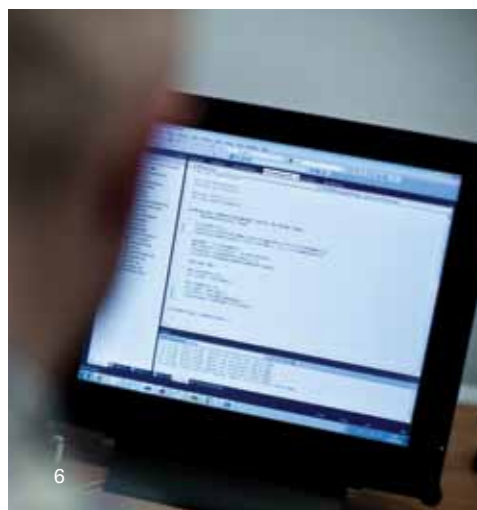
The Learner Development Service works closely with academic departments and other central services to support disabled students. Advisors can offer you confidential advice, information and support in relation to an ongoing health condition, disability or dyslexia. You can contact us before starting the course, to speed up the process of getting support in place for when you start to study with us.

[mmu.ac.uk/learnerdevelopment](http://mmu.ac.uk/learnerdevelopment)

## Accommodation

There is a wealth of good quality, affordable homes for students including halls of residences, flats and shared houses. The University runs ten halls of residences with a range of comforts and services including halls with en-suite bathrooms, catering and internet access.

More information is available at [mmu.ac.uk/accommodation/postgraduate](http://mmu.ac.uk/accommodation/postgraduate)



# Teaching expertise that is second to none

You will be taught and supervised by research-active academic staff who are at the forefront of their specialist field, and who will give you support and guidance throughout your postgraduate studies and beyond.

Many of our tutors are experienced professionals with well-established links and contacts in their industry sector; many have received significant funding awards to carry out the research they do.

Teaching and research is supported by dedicated teams of highly-skilled technical staff across all our subject specialisms.



**Dr Darren Dancey**  
School of Computing,  
Mathematics and  
Digital Technology

“As a postgraduate, you’ll be part of a close network of students and research staff in the School. We work closely together and all learn from each other. You could find yourself working on exciting new projects such as the Manchester Time Machine app we recently developed with the North West Film Archive and Manchester School of Art.”



**Margaret Fowler**  
School of Engineering

“There’s a wide range of study areas you might specialise in within the fields of electronic engineering and computer network technology such as renewable power engineering or micro-electronics. Our pioneering researchers are working on image-based screening systems to help detect terror threats.”



**Dr Tim Edensor**  
School of Science and the Environment

“I am interested in urban materiality and the ways in which the city is a composite of materials from elsewhere, like brick, wood and stone. The work I have done looks at the various places that the stone in St Ann’s Church in central Manchester has come from and what has happened to it over the years. I specialise in the social side of environmental sustainability. Sustainability issues are at the core of our research and teaching in the School.”



**Dr Robin Sen**  
School of Science and the Environment

“My specialisms in soil microbial ecology and biotechnology helped explain the nature and gravity of the recent ash dieback threat to UK trees. Among projects targeting pure and applied environmental microbiology, I am currently working with the Forestry Commission to develop low-input sustainable production of nursery Scots pine tree seedlings. In the School we have close links with professional organisations and employers to ensure your studies reflect the latest best practice in business and corporate social responsibility.”



**Mark Slevin**  
Professor of Cell Pathology,  
School of Healthcare Science

“The Cell and Molecular Biology suite is a state-of-the-art facility run by talented research-active academics and dedicated research personnel, all with a passion for teaching in the field of life-sciences. From bacteria and nano-devices to whole genome studies and patient clinical trials, the research centres pride themselves on being able to offer a very wide range of research to satisfy the interest of our students and which we hope will help to prepare them to become independent thinkers and scientists of the future.”

ing, 37,000 Students, Finance, Business Management, Science, Engineering, Healthcare, Social Work, Design, Computing and Technology, Art and Design, Humanities, Law, Teaching, Graduates, Career, Professional, Tutors, Courses, Learning, Academic Staff, Organisations, Companies, International Students, Class Facilities, Higher Education, £350 Million Investment, Buildings, Leading Edge Teaching, Study Facilities, Library, UK's Largest Providers of Science Technology Engineering and Mathematics Courses, h, Expertise, 70 Professional Bodies and Associations, Industrial Placements, Sandwich Courses, Real ects, Over 4,000 Staff, Supportive, Study in Europe, Award Winning, Counselling Service, Knowledge, ndly, Sports Facilities, Community, Vibrant, Diverse, Faith, Student Book Production, Accommodation, ories, Biomechanics, Motor Control, Biochemistry, Computer Games, Usability, Laboratory, Rehearsal, ng Music Suites, Orthopaedics, Forensics, Dynamics, New Media Technology, Business School, MBA, n Show, Psychology, Lecture Theatres, Cutting-Edge Laboratories, Specialist Facilities, Moodle, Books, f-the-Art Equipment, MSc, Politics, Electronic Books, Induction, Social Events, PgDip, Study Support, nt Exchange, Study Abroad, Integrated Learning, Developing, Employability Skills, Work Placements, ating, Effective Networking, Recruitment Fairs, Coffee Bar, Music Venues, Alumni, Success, Magazine, mbassador, Architecture, Biology, Healthcare Sciences, Marketing, Chemistry, Computing and Digital chnology, Dance, Drama, Music, Education, Environmental and Geographical Sciences, Engineering, n and Creative Writing, Fashion, Clothing and Textiles, Food, Tourism, Hospitality, Health, Psychology, dy Languages, Law, Sport Science, Philosophy, Criminology, Sociology, Politics, Research, Evaluation, Conclusion, Speeches, Study Groups, Development, Practical, Printmaking, Theories, Computer Suite, een Printer, MA, Letterpress, Machinery, Filmmaking, History, Drawing, Online, Digital, Business and nagement Courses, Photographic Darkroom, Photoshop, Sports, Wood and Metal Workshops, Painting udio, Video Animation, Etching, Cultures, IT Software, Interior Design, Exhibition Design, Illustration, ve, Multimedia, Fine Art, Critical Thinking, Foreign Exchange, Seminars, Discussions, Culture, Skills, Presentations, Note Taking, Clubs and Societies, Guidance and Support, Residence, Research Rooms, ers, Learner Development, Orientation, Challenges, Open Days, Student Crime Scene, Net-Books and ing, Birley Campus, Laptops, Hub, **Science and Engineering**, Biodiversity, Faith, Interactive, Graduate Success, Diversity, Student Information Points, MSc, Dance, Sustainable, WiFi, IT Zones, Counselling, zability, Vertical MRI Scanner, Acupuncture, Clinical Skills, Performing Arts, Olympic Training Centre, dhood Studies, Formula Student, Wind Tunnel, Mock Crime Scene, Mock Court Room, Practical Skills, Rapid Prototyping, Project Management, All Saints Campus, Cheshire Campus, Lifelong, Professional evelopment, Lifelong Learning, Virtual Learning, Mechanical Engineering, Creative Writing, English, m, Social History, Web Development, Ecology, Internships, Enrolment, Interview, Portfolios, Part-Time, nteractive, Virtual Learning Environment, Computer Forensics, Marketing, Biology, Animal Behaviour, king, Ambassadors, 3G Football Pitch, Exchange, Choices, Genetics and Cell Biology, Gallery Spaces, Nutrition, Orthopaedics, Gerontology, Exercise Science, Bio-engineering, Sports Injury Clinic, Altitude Training Chamber, Green Credentials, Student PCs and Macs, Workshops, Snack Bars, PhD, IT Zones, Professionals, Academics, Professors, Award-Winning, Health Professionals, Microsoft, Poet Laureate, ration, Embroidery Machine, Blue-Chip Companies, Private Sector, Public Sector, First-Class Support, Central, Cultural Studies, Acting, Conservation, Food Technology, Treatment Rooms, Health, Therapy, n Pathology, Linguistics, Philosophy, Politics, Multimedia, Computer Games Technology, International ics, Mathematics, MA, Sociology, Human Biology, Touchscreen, Fashion Buying, Event Management, nance, Post Production, Technology for Film TV and CGI, Study in North America, Social Networking, naceutical Chemistry, Advertising, Human Resources, International support, PhD, Halls of Residence, evelopment Team, Orientation, Challenges, Student Hub, Biodiversity, Graduate Success, Net-Books apptops, Diversity, Faith, Student Information Points, Dance, Sustainable, WiFi, IT Zones, Counselling, Employability, Vertical MRI Scanner, Acupuncture, Clinical Skills, Performing Arts, Olympic Training ce, Childhood Studies, Formula Student, Wind Tunnel, Etching, Exhibition Design, Crime Scene, Mock rt Room, Practical Skills, CAD, Rapid Prototyping, Project Video Animation, 70 Professional Bodies and ociations, Cheshire Campus, Human Resources, MPhil, Digital, English, Technology, Award-Winning, ong, Photoshop, Inspiration, Interactive, Filmmaking, Bio-engineering, Exchange, Internships, Digital, g, Internship, Adobe, Books, Scanning, Cultures, Online, Lecture Theatres, Workshops, Poet Laureate,

Healthcare Science	12	
Biology and Conservation	14	
Forensic and Analytical Science	19	
Environment and Geography	20	
Computing and Digital Technology	24	
Engineering	28	
Research in Science and Engineering	32	
Research in Healthcare Science	34	

# Healthcare Science

The School of Healthcare Science has over 20 years' experience delivering high quality healthcare science programmes and providing excellent teaching and student support, as recognised by the Quality Assurance Agency for Higher Education.

All of our postgraduate degree programmes are underpinned by the latest research in Faculty. Research in the School was rated 'internationally excellent', with some rated 'world-leading' in the most recent research assessment exercise. Our research group in biomedical science, for example, is now among the top dozen in the UK.

Facilities in the School are excellent. We have high specification teaching and research laboratories for specialist areas such as blood biochemistry, biomechanics, motor control, exercise performance, cell and molecular biology and tissue culture. We also have a brand new clinical skills laboratory and a pioneering point-of-care testing facility.

Our new £3m building for the Healthcare Science Research Institute has specialist facilities for work on genetics and cell biology, nutrition, orthopaedics, gerontology, exercise science, bioengineering and the advanced study of physiology. It also houses one of the few magnetic resonance imaging (MRI) scanners to be found outside a hospital setting.

Our degree programmes are accredited by professional bodies, for example, the Institute of Biomedical Science, the General Dental Council, and Health Education England.



## Biomedical Science

(Cellular Pathology, Clinical Chemistry, Haematology, Medical Microbiology, Transfusion Science)

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: 2-3 years</b>	<b>Fee: UK/EU £520 per 20 credit unit/ £780 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

At least a second class UK Honours degree (or international equivalent) in biological or biomedical science is usually required. Alternatively, you may be admitted with an equivalent professional qualification or significant relevant proven professional experience. Existing Fellows of the Institute of Biomedical Science are eligible for exemption from certain units of study. Students applying with HNC medical laboratory science plus 10 years experience will be considered on an individual basis.

**International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

The course offers two main study paths: general or named route. The general route focuses on the biological aspects of disease processes whilst the alternative named route includes study of one of the following specialist pathology options: Cellular Pathology; Clinical Chemistry; Haematology; Medical Microbiology or Transfusion Science. With both routes you will gain up-to-date, relevant and applied experience of biomedical science and pathology specialisms; acquire in-depth knowledge of a biomedical science specialism together with broad knowledge of the subject base; and acquire skills for practice at Higher Specialist Level. We collaborate extensively with hospitals in the Greater Manchester area and can offer opportunities for research projects in clinically relevant areas. Re-accreditation by the Institute of Biomedical Science is in progress.

### Units

- Analytical Science • Biological Aspects of Disease • Current Issues in Biomedical Science • Ethics in Healthcare Science • Evidence Based Practice • Research Methods • Scientific Communication • Project • Specialist pathology options

You will be assessed by critical reviews, presentations, self-managed study, extended essays and examinations. Evidence based practice and a major research project completes the MSc for all routes.

### Career prospects

The programme creates wide-ranging opportunities for employment in fields such as hospital science; biomedical and pharmaceutical industries; or public health and transfusion laboratories. It provides preparation for the Higher Specialist Institute of Biomedical Science examination and Advanced Practice in Biomedical Science. You will also be well-placed for careers in research or teaching or to pursue studies towards becoming a Doctor of Philosophy.

 **For more detailed information on this course visit [mmu.ac.uk/11047](http://mmu.ac.uk/11047)**

## Dental Technology

(Removable Prosthodontic Technology, Fixed Prosthodontic Technology, Orthodontic Technology)

MSc

<b>Full-time: 1-2 years</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: 3-5 years</b>	<b>Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

A UK Honours degree (or international equivalent) in Dental Technology, or an equivalent professional qualification, or significant and relevant proven professional experience is required. Students applying with HNC in Dental Technology plus 10 years experience will be considered on an individual basis. Part-time students will normally be working in an orthodontic laboratory. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

**International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

The network includes optional specialist studies in fixed prosthodontics, removal prosthodontics and orthodontics. Work-based learning will take place in a variety of healthcare settings in the NHS and the private sector. Emphasis is on evidence-based, patient-centred teaching and learning, with a focus on the dental team.

In the identified routes you will study advanced aspects in the practice of the relevant disciplines which will form half of the MSc programmes. The other half is made up of core units in research methodology, a choice of two from there units in ethics, an in-depth study of a dental disease, or a scientific review of a selected methodology/process. The Dental Technology Route allows you to study a mix of dental technology units.

The School offers excellent facilities including specialist purpose-built dental laboratories. We welcome students from a wide range of backgrounds in commercial practice and the NHS, or with an interest in advanced areas of dental technology.

The programme, made up predominantly of work-based learning and independent study, is supported by a series of short courses at the University. A variety of assessment methods are used including data analysis, oral presentations, posters, critical reviews and examinations.

### Career prospects

The qualifications allow application for the post of senior dental technologist and above within the NHS. Successful programme completion would also allow those in the private sector to carry out more demanding work with an associated higher earning potential. It is also suitable for a career in research, teaching or to pursue studies towards a professional Doctorate in Dental Technology, MPhil or PhD.

 **For more detailed information on this course visit [mmu.ac.uk/11225](http://mmu.ac.uk/11225)**

# Biology and Conservation

The School of Science and the Environment has a well-established reputation in the fields of biological and ecological management and is home to world class research and education in sustainability issues.

Research in the School was rated 'internationally excellent' with some rated 'world-leading' in the most recent research assessment exercise. Our Masters programmes in behaviour and conservation are run by a large group of research active staff with strong links to a variety of research institutions, national organisations and non-governmental bodies in the UK and overseas. We have research specialisms in behavioural and environmental biology.

There is a research colloquium each term in which invited speakers talk about areas of research directly relevant to our MSc programmes.

There are opportunities for placements and collaborative research with UK conservation bodies, zoos and welfare organisations such as the RSPCA. There is a choice of field courses – to the primeval forest in Poland or the national parks of Northern Tanzania – and opportunities for research projects in the Philippines, China, South America, East Africa as well as the UK.

We have modern laboratories for teaching and research in animal behaviour and communication, conservation genetics, taxonomy and general ecology. Our facilities are excellent and include a specialist biological recording facility in Shrewsbury which is a unique centre of excellence for species evaluation in invertebrates and plants, wildlife legislation, identification of difficult taxa, computerising field data and innovative research methods. It has close links to the Field Studies Council and the Botanical Society of the British Isles.



## Animal Behaviour

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,700 Non-EU international £12,500</b>
<b>Part-time: 2-5 years</b>	<b>Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit. MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

At least an upper second class UK Honours degree (or international equivalent) in a subject such as ecology, biology, zoology, botany, animal behaviour or environmental science is normally required. Applicants from different academic backgrounds or without formal qualifications – but with equivalent experience – will also be considered. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

The MSc in Animal Behaviour addresses the interaction between environment, experience and physiology in the development and dynamics of behaviour. There is an applied element in terms of how the principles of animal behaviour can be applied to practical problems such as animal welfare and conservation. Students can gain experience of laboratory studies (of invertebrates) and field work. The programme features a strong numerical and research-orientated approach. A range of elective units are available, including Zoo Conservation Biology which takes place at Chester Zoo. There is also a residential field course in Poland or Tanzania.

The MSc is completed by a research based project which can be carried out overseas or in the UK. We have strong links in many countries worldwide and are currently developing a project in Kenya which students may join.

### Units

• Species Conservation • Genetics of Populations • Zoos and Conservation • Avian Biology and Conservation • Behavioural Biology • Statistics and Research Design • Practical Techniques (including field course) • Project

### Study pattern

Course delivery is flexible and most lectures take place in the evening. Lectures, other course materials and assessment information is available via our online learning platform, Moodle. You will be assessed mostly through coursework, although some units have a formal examination. Teaching begins in October and finishes with the field courses in mid-May/July.

### Career prospects

Graduate career routes include: animal management, pest control and agriculture, teaching and environmental education with organisations such as environmental consultancies, government research and advisory bodies, zoos and NGOs. A number of students are already in relevant jobs and are taking one of our biology/conservation Masters degrees as part of in-service training. Many students go on to study at PhD level.



For more detailed information on this course visit [mmu.ac.uk/11056](http://mmu.ac.uk/11056)

## Biological Recording

MSc

<b>Part-time: 2-5 years</b>	<b>Fee: UK/EU £520 per 20 credit unit (plus residency fees). Please see <a href="http://www.sste.mmu.ac.uk/recording">www.sste.mmu.ac.uk/recording</a></b>
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**Location: The Gateway facility, Shrewsbury SY1 1NB**

### Entry requirements

At least an upper second class UK Honours degree (or international equivalent) in a subject such as ecology, biology, zoology, botany, animal behaviour or environmental science is normally required. Applicants from different academic backgrounds or without formal qualifications – but with equivalent experience – will also be considered.

### The course

The Biological Recording programme is designed to develop your ability to use and collect biological records and subject them to critical analysis. It is run in association with the Field Studies Council and the Botanical Society of the British Isles.

### Units

• Managing Biological Recording • Research Methods in Biological Recording • Site Assessments Using Vegetation and Invertebrates • Identifying Difficult Invertebrate Groups • Identifying Bryophytes for Recording and Conservation • Identifying Difficult Higher Plant Groups • Bird Survey Techniques • Identification and Survey Techniques • Project

Students can also select up to three units in total from the University Certificate course which offers another 40+ identification units.

### Study pattern

The MSc is part-time, studied mainly at weekends on a residential basis at the Gateway facility, Shrewsbury and Field Studies Council centres. The MSc takes a minimum of two years to complete (usually three years) and is compatible with full-time work. All assessment is continuous.

### Career prospects

Our students have an excellent record of promotion and recruitment to jobs in ecology and biological recording, especially those with an emphasis on high quality field skills and record interpretation.



For more detailed information on this course visit [mmu.ac.uk/11236](http://mmu.ac.uk/11236)



## Bird Conservation

### MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: 2-5 years</b>	<b>Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

#### Entry requirements

At least an upper second class UK Honours degree (or international equivalent) in a subject such as ecology, biology, zoology, botany, animal behaviour or environmental science is normally required. Applicants from different academic backgrounds or without formal qualifications – but with equivalent experience, for example, having worked in the field of bird conservation for some years – will also be considered.

**International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

#### The course

The MSc in Bird Conservation aims to provide students with detailed background on the evolution, taxonomy, ecology and behaviour of birds and then apply this knowledge to a wide range of practical conservation issues. You will develop your understanding of how evolution has shaped many aspects of bird biology in response to the demands of flight. You will evaluate avian life history strategies, biogeography and population biology and how this information is used to design appropriate conservation measures. You will consider applied avian conservation management in relation to climate change, land-use practices, renewable energy development and other anthropogenic impacts. There is a residential fieldtrip to either Poland or Tanzania which will provide you with practical experience of the essential techniques in the field of bird conservation. The MSc is completed by a project which can be delivered in the UK or overseas, often in collaboration with an external organisation. There are also opportunities to work within MMU research projects in Tanzania, Kenya, the Philippines, Mauritius and Madeira.

#### Units

- Avian Biology and Conservation
- Countryside Management
- Species Conservation
- Genetics of Populations
- Zoos and Conservation
- Behavioural Biology
- Statistics and Research Design
- Practical Techniques (including field course)
- Project

#### Study pattern

Course delivery comprises timetabled classroom activities, lab work, seminars, independent group work, field excursions and independent reading, research and assignment work.

#### Career prospects

You will develop the knowledge and practical skills required for a career in avian research, conservation and consultancy. Other career routes will include animal management, agriculture and pest control, and teaching and environmental education with organisations such as environmental consultancies, government research and advisory bodies, zoos and NGOs. Some students will go on to study at PhD level.

 **For more detailed information on this course visit [mmu.ac.uk/11275](http://mmu.ac.uk/11275)**

## Conservation Biology

### MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: 2-5 years</b>	<b>Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

#### Entry requirements

At least an upper second class UK Honours degree (or international equivalent) in a subject such as ecology, biology, zoology, botany, animal behaviour or environmental science is normally required. Applicants from different academic backgrounds or without formal qualifications – but with equivalent experience – will also be considered. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

#### The course

The MSc Conservation Biology programme aims to provide students with an advanced understanding of the science which underpins conservation. Students can gain experience of essential techniques and fieldwork. The programme has a strong numerical and research-orientated approach. You can also gain experience in the increasingly important field of conservation genetics. The course has an international outlook and provides opportunities for students to gain conservation experience overseas. There is a residential field course which can be in either Poland or Tanzania. Our facilities have recently been updated and you will engage with a large community of research active staff. There are exciting opportunities to complete your MSc research project abroad, for example you may join a project investigating the problems of conserving large mammals outside protected areas in Kenya. We also have links to research projects in many other countries.

#### Units

- Ecological Techniques and Analysis
- Methods in Behavioural and Ecological Research
- Species Conservation
- Biodiversity, Adaptation and Change
- Molecular Aspects of Conservation
- Field Course
- Project

#### Study pattern

Course delivery is flexible and most lectures take place in the evening. Lectures, other course materials and assessment information is available via our online learning platform, Moodle. You will be assessed mostly through coursework, although some units have a formal examination. Formal teaching begins in October and finishes with the field courses in mid-May or mid-July. Student research projects are usually completed by the end of September.

#### Career prospects

Graduate career routes include: animal management and captive breeding, pest control and agriculture, environmental education with organisations such as environmental consultancies, teaching government research and advisory bodies, zoos and NGOs. We also support students setting up their own research projects abroad. Some students are already in relevant jobs and take this programme as part of their in-service training. Others will carry on to PhD level study.

 **For more detailed information on this course visit [mmu.ac.uk/11052](http://mmu.ac.uk/11052)**

## Conservation Genetics

### MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: 2-5 years</b>	<b>Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

#### Entry requirements

At least an upper second class UK Honours degree (or international equivalent) in a subject such as ecology, biology, zoology, botany, animal behaviour or environmental science is normally required. Applicants from different academic backgrounds or without formal qualifications – but with equivalent experience – will also be considered. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

#### The course

The MSc in Conservation Genetics addresses the theoretical background and develops applied skills in this new and rapidly expanding field. You will be trained in the use of molecular tools for aspects of taxonomy and classification, species conservation and in the application of the principles of genetics to the conservation management of small populations. You will develop problem solving approaches to different evolutionary and population genetics scenarios. A range of elective units are available and there is a residential fieldtrip to either Poland or Tanzania which will provide you with practical experience of the essential techniques in the field of conservation genetics.

The MSc is completed by a research-based project which can be completed in the UK or overseas, often in collaboration with an external organisation. There are also opportunities to work within MMU research projects in Tanzania, Kenya, the Philippines, Mauritius and Madeira.

#### Units

- Genetics of Populations
- Statistics and Research Design
- Practical Techniques (including a field course)
- Zoos and Conservation
- Avian Biology and Conservation
- Behavioural Biology
- Species Conservation
- Project

#### Study pattern

Course delivery comprises timetabled classroom activities, lab work, seminars, independent group work, field excursions and independent reading, research and assignment work.

#### Career prospects

Graduate career routes will include animal management, agriculture and pest control, teaching and environmental education with organisations such as environmental consultancies, government research and advisory bodies, zoos and NGOs. Some students will go on to study at PhD level.

 **For more detailed information on this course visit [mmu.ac.uk/11274](http://mmu.ac.uk/11274)**

## Case study: Dr Martin Jones

**Senior Lecturer in Ecology**  
MSc Programme Leader

"The courses do have a strong emphasis on field work, but we also have very good, recently refurbished lab facilities. We have designated spaces for Masters students so you will have access to computer labs and spaces for group and individual work. One new feature we have is the 'Observer' system, which is an up to date and very sophisticated system for recording animal behaviour during lab work and out in the field.

We have support staff for IT work, technical services and fieldwork as well. We have very good international links, and many of our students carry out their research projects abroad, within East Africa, South East Asia, and many other parts of the world.

Completing a masters course is often a very good stepping stone to go on to a PhD. Many of our students go on to funded PhD places in this country or abroad.

Masters study also provides a level of specialism and expertise to give you an extra leg up if you choose to go straight into employment."



## Countryside Management

### MSc

**Part-time by distance learning: up to 3 years** **Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit.**  
MSc = 180 credits

#### Entry requirements

Applicants should be able to demonstrate experience or interest in countryside management through either a relevant UK Honours degree (or international equivalent) or equivalent qualification and/or appropriate work/volunteer experience. Typically, this multi-disciplinary programme attracts students from a wide range of backgrounds.

#### The course

The course develops an in-depth knowledge of habitat ecology and management, conservation of biodiversity, and management of geological and landscape features in combination with a sound understanding of policy, sustainability, access issues, environmental education, managing people and project management.

You will benefit from practical, in-depth case studies involving practitioners from English Nature, RSPB, National Trust and Peak District National Park. There is also an opportunity to take part in a residential fieldtrip and the annual Countryside Management conference hosted in Manchester.

#### Units

- Countryside Management
- Identification and Survey Techniques
- Research Methods in Biological Recording
- Practical Techniques (including field course)
- Project

As a distance learning course comprising of study packs, workshops, fieldwork, conferences and work related assignments, students are only required to attend University hosted events three times a year. Additional support is offered throughout by email or phone and more frequent meetings with staff can be arranged as necessary. The first two years are composed of three units each (one per term). Units are divided up into four assignment-related workbooks. The final year consists of your MSc project. A mix of assessments includes portfolios, practical reports, completing consultations, poster presentations and fieldwork – plus completion of a final year dissertation.

#### Career prospects

Recent graduates now work for a wide range of local authorities and organisations with interests in ecology, conservation and the countryside; including NGOs, government agencies and environmental consultancies.

 **For more detailed information on this course visit [mmu.ac.uk/11110](http://mmu.ac.uk/11110)**

## Zoo Conservation Biology

### MSc

**Full-time: 1 year** **Fee: UK/EU £5,700**  
**Non-EU international £13,500**

**Part-time: 2-5 years** **Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit (excluding the 20 credit work placement which is £1,520).**  
MSc = 180 credits

**Suitable for international students. See pages 39-41.**

#### Entry requirements

At least an upper second class UK Honours degree (or international equivalent) in a subject such as ecology, biology, zoology, botany, animal behaviour or environmental science is normally required. Applicants from different academic backgrounds or without formal qualifications – but with equivalent experience – will also be considered. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

#### The course

This MSc in Zoo Conservation Biology is run in close collaboration with the North of England Zoological Society (Chester Zoo) and is designed to produce graduates who want to develop careers in the research, management and re-introduction of captive populations.

The theory units are studied at Chester Zoo. There is also a three month work placement which can take place at any zoo in the UK or overseas and we will help you organise this. A wide variety of elective units in conservation and animal behaviour are available, including a field course in Tanzania. The programme is completed with a research project relevant to zoo conservation.

#### Units

- Zoos and Conservation
- Species Conservation
- Genetics of Populations
- Avian Biology and Conservation
- Behavioural Biology
- Statistics and Research Design
- Practical Techniques (including field course)
- Project

#### Study pattern

Course delivery is flexible and most lectures take place in the evening. Lectures, other course materials and assessment information is available online via our online learning platform, Moodle. You will be assessed mostly through coursework, although some units have a formal examination. Formal teaching begins in October and finishes with the field courses in mid-May or mid-July. Student research projects are usually completed by the end of September.

#### Career prospects

This course is run in close co-operation with The North of England Zoological Society (Chester Zoo). It is designed to produce graduates who wish to develop careers in the research, management and re-introduction of captive populations.

 **For more detailed information on this course visit [mmu.ac.uk/11059](http://mmu.ac.uk/11059)**

## MSc fieldwork in Tanzania and Kenya

We are working with the College of African Wildlife Management and the Kenya Wildlife Service and are able to offer some unique fieldwork experiences in Tanzania and Kenya.

#### Research projects

We are currently undertaking a number of research studies on:

- The ecology and genetics of the black rhino to try to understand why their breeding rates are very low in some Kenyan reserves.
- The distribution of crop raiding by elephants and strategies for reducing predator attacks on livestock.
- The impact of pastoralism and other habitat changes on animal behaviour and biodiversity conservation.

#### MSc student research projects

You will be able to stay for six weeks at one of our research bases in Tanzania or Kenya and collect data for your own research project.

You can also join our two week Tanzania Field Course which takes place in June every year. There are visits to some of the most famous wildlife sites in the world, including the Ngorongoro Crater and the Serengeti National Park. We study some of the human impacts on, and management issues in, these protected areas as well as some of the factors affecting group size and mating systems of large mammals.



## Forensic and Analytical Science

### MSc

**Full-time: 1 year** **Fee: UK/EU £4,700**  
**Non-EU international £12,500**

**Part-time: 3 years** **Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit.**  
MSc = 180 credits

**Suitable for international students. See pages 39-41.**

#### Entry requirements

At least an upper second class UK Honours degree (or international equivalent) in a subject such as chemistry, forensic, analytical or environmental science is normally required. Applicants from different academic backgrounds or without formal qualifications – but with equivalent experience – will also be considered. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

#### The course

You will develop specialist knowledge of the key areas and underlying principles of analytical and forensic science and its multidisciplinary nature. You will study aspects of analytical, environmental, forensic and genetic sciences and develop transferable skills to prepare you for practice as a professional scientist. You will learn to select, plan, apply and evaluate practical techniques for the analysis and quantification of complex samples and scenarios. You will also develop your skills in the acquisition, collation, analysis and interpretation of data and evidence in accordance with professional practice. You will gain invaluable hands-on experience of using a range of analytical instruments and you'll work on your own research project which may be undertaken with an external organisation.

#### Units

- Analytical Process and Forensic Case Handling
- Statistics and Research Design
- Advanced Analytical Methods
- Environmental Forensics
- Frontiers in Science
- Genetics of Populations
- Project

#### Study pattern

The course is taught via lab work, simulated crime scene investigation in our dedicated forensics suite and short field excursions. Course delivery comprises timetabled classroom activities, lab work, seminars, independent group work, field excursions and independent reading, research and assignment work.

#### Career prospects

You will be well placed to take advantage of existing employment opportunities in the forensic, analytical and genetic science sectors. Key recruitment areas exist in separation science, toxicology, atomic spectroscopy, analytical chemistry, environmental forensics, DNA profiling and forensic services. There is also the option of continuing your research career and pursuing PhD level studies.

 **For more detailed information on this course visit [mmu.ac.uk/11272](http://mmu.ac.uk/11272)**

# Environment and Geography

The School of Science and the Environment has a well established reputation in the fields of environmental and ecological management and hosts world class research and education in atmospheric and sustainability issues. We have been awarded several Green Apple awards for excellence in Environmental Education and Practice.

Our Masters programmes are practically based and heavily supported by laboratory work, case studies, tutorials, fieldwork and projects. They are run by a large group of research active staff with strong links to a variety of research institutions, national organisations and non-governmental bodies in the UK and overseas. A very wide range of subjects and practical techniques are available for study. There are opportunities for environmental science students to undertake a Masters dissertation project based on applied research in environmental management through an optional summer placement with a range of public, private and voluntary sector employers.

Our weekly *Café-Scientific* students the opportunity to debate and discuss conservation and environmental management issues with teaching staff, hear from outside speakers and reflect on their own learning.

Research in the School was rated 'internationally excellent' with some rated 'world-leading' in the most recent research assessment exercise. We are home to leading research groups such as the Centre for Aviation Transport and the Environment – whose researchers were awarded Nobel Certificates in 2007 for their contribution to the UN Intergovernmental Panel on Climate Change – and the Centre for Earth and Ecosystem Responses to Environmental Change. We have further research specialisms in behavioural and environmental biology, Earth systems science, human impacts on climate, coastal and offshore hydrodynamics and urban regeneration.

Our facilities are excellent and include:

- High specification teaching and research laboratories with equipment to assess aspects such as pollution monitoring, soil or water quality and sediment description. We have a 400 MHz nuclear magnetic resonance spectrometer and a tandem liquid chromatography/mass spectrometer allowing students hands-on experience of cutting-edge purification and structural analysis techniques.
- Microbiology laboratories equipped with a wide range of equipment enabling characterisation of the surfaces that 'bugs' stick to, as well as kit to visualise 'biofilms' on surfaces.
- New state-of-the-art computing facilities for environmental and spatial GIS (geographical information system) modelling.
- Specialist computing equipment to support various climate models such as the Cray-CX1 supercomputer, the first of its kind in the UK, capable of running full year stratospheric and tropospheric simulations.



## Geographical Information Systems Geographical Information Technologies Applied Geographical Information Systems MSc

**Part-time by distance learning: 3 years** **Fee: UK/EU please visit [unigis.org](http://unigis.org)**  
**Non-EU international please visit [unigis.org](http://unigis.org)**

**Suitable for international students. See pages 39-41.**

### Entry requirements

Normal entry requisites are: a relevant UK Honours degree (or international equivalent) or an HND/Foundation degree and relevant experience; or relevant professional qualifications, and experience. Each application is considered individually, based on qualification and experience. Enthusiasm and commitment are also important. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### Course Overview

UNIGIS is a Distance Learning Postgraduate Network in Geographical Information Systems (GIS) run jointly by Manchester Metropolitan University and the University of Salford. The UNIGIS network has 20 years experience of success in delivering GIS postgraduate courses. Our highly regarded programme is designed to meet the needs of professionals working in the GI industry – or those wishing to enter the sector. UNIGIS aims to provide a deeper and balanced education in GIS. Three separate pathways are offered up to MSc level:

### Geographical Information Systems (GIS)

Providing a broadly based postgraduate qualification in the field of GIS permitting some choice in application selection. Develop in-depth knowledge of the issues involved in applying GIS to solving spatial problems with an understanding of the constraints imposed by application area and the interactions between data, methods, people and technology.

### Applied Geographical Information Systems (Applied GIS)

Helps develop an in-depth knowledge of GIS based methods for monitoring social/human and natural environments. Establish an effective understanding of the spatial interaction of social/human and environmental factors and develop the capability to extract information from a variety of sources and to analyse and assess within a GIS framework.

### Geographical Information Technologies (GI Technologies)

Aids critical understanding of the software engineering practices and standards that underpin database and web application development and the methodologies for implementing those practices in a GIS context. A critical understanding of the issues involved in designing the storage and use of geographical data in databases and web-based applications is forged. Also key is proficiency in the design, implementation and evaluation of small scale database and web-application projects.

### Common Units Year 1

- Foundations of GIS
- Spatial Data Infrastructure
- Databases

### Year 2

- Methods in GIS (Core)

### GIS

Choose two from:

- Distributed GIS
- Environmental Applications of GIS
- Remote Sensing
- Social Applications of GIS
- Spatial Databases & Programming

### Applied GIS

Choose two from:

- Environmental Applications of GIS
- Remote Sensing
- Social Applications of GIS

### GI Technologies

Compulsory

- Distributed GIS
- Spatial Databases & Programming

All study routes employ web-based delivery and aim to provide the conceptual and technical framework required for an in-depth understanding of GIS. Each route has either core or elective units available and all incorporate a project and dissertation which involves the design and execution of an original study.

### Career prospects

As a UNIGIS student you will be joining an extensive Geographical Information Systems (GIS) community, with representatives in over 30 countries. The application of GIS is growing rapidly in areas such as urban and regional planning, transportation and land use interaction, and retail marketing.



**For more detailed information on this course visit [unigis.org](http://unigis.org)**

## Environmental Management and Business

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: up to 3 years</b>	<b>Fee: UK/EU £780 per 30 credit unit</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

Applicants will normally have at least a second class UK Honours degree (or international equivalent) in a relevant subject such as Geography, Environmental Management or Business Studies. Relevant work or entrepreneurial experience will also be considered. All applications will be considered on their own merit. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

This innovative programme combines taught elements of sustainability and environment with business focused study – equipping graduates with relevant skills for future entrepreneurship or environmental management roles in the public or private sector. The course is designed to provide students with a clear vision and interpretation of sustainable development along with a systematic understanding of the complex interaction between businesses, regulatory frameworks, policy making and wider social processes. The programme has been created from an innovative partnership between The School of Science and the Environment and the Business School.

### Units

- Policy for Sustainable Development • The Sustainable Business Challenge • Research Design and Methods
- Accounting, Society and Environment • Organisational Change and Transition • Managing Organisational Performance
- Leadership Ethics • Project

This programme is offered on a full-time or part-time basis in order to meet the learning needs of both busy professionals and new graduates. By combining the expertise of two Schools there is a broad range of units across sustainable development and business. A mix of continuous assessment methods includes essay writing, practical reports, portfolios, consultations and fieldwork. MSc students will also complete a dissertation.

### Career prospects

This course aims to instil an understanding of sustainability and the environment alongside a keen sense of business and organisational management needs, thereby equipping graduates with the relevant skills and knowledge required of future entrepreneurs or managers operating within environmental sectors in public, business and non governmental organisations.

 **For more detailed information on this course visit [mmu.ac.uk/11111](http://mmu.ac.uk/11111)**

## Environmental Management and Sustainable Development

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: up to 3 years</b>	<b>Fee: UK/EU £780 per 30 credit unit</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

A good UK Honours degree (or international equivalent) in a subject such as environmental science or management, sustainable development, social sciences, geography, planning, law, business or the majority of science subjects is usually required – or, alternatively, relevant environmental experience. All applications will be considered on their own merit. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

Designed with today’s environmental managers in mind, emphasis is placed on integrating the scientific, social, economic and political factors into environmental decision making. The course provides systematic understanding of the scientific background; critical awareness of the state of knowledge and the burden of proof requirement; comprehensive knowledge of the policy and regulatory frameworks; and a practical understanding of management methodologies. The programme’s vocational aspect is supplemented by in-depth case studies, field practitioner expertise, and the opportunity for a placement-based research project.

### Units

- Policy for Sustainable Development • Science for Sustainable Development • Management for Sustainable Development
- Research Design and Methods • Project

This cross-discipline programme is offered both on a part-time distance learning and full time basis in order to meet the learning needs of both busy professionals as well as new graduates. A continuous variety of assessment methods includes essay writing, practical reports, portfolios, consultations and fieldwork. MSc students will complete a dissertation. In addition to the virtual learning environment, Moodle, there is a dedicated website containing all the information that EMSD students need in one place.

### Career prospects

This course aims to provide relevant knowledge and skills required of environmental managers operating at a strategic level in the public, business and non-governmental sectors. Recent graduates have been employed by local authorities, the environmental and sustainable departments of major companies, regulatory authorities and research organisations. Others have gone on to create their own successful environmental companies.

 **For more detailed information on this course visit [mmu.ac.uk/11112](http://mmu.ac.uk/11112)**



## Sustainable Aviation

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: up to 3 years</b> <b>Distance learning option available</b>	<b>Fee: UK/EU £780 per 30 credit unit</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

Many applicants will already be actively employed within the aviation sector. Other applicants will require at least a second class UK Honours degree (or international equivalent) in a relevant environmental or business subject area. These applicants may be offered a vocationally based Masters project. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

The University’s Centre for Aviation Transport and the Environment (CATE) has been very influential upon the growth and development of the industry both regionally and globally. Key contributions include the United Nations Global Atmosphere Panel on Climate Change (IPCC) report on Aviation and the Environment. Consequently, the course has access to many of the tools and expertise necessary to assess the environmental impacts of aviation.

This MSc examines the role of the air transport industry in supporting city and regional development as well as the positive and negative economic, social, community and environmental impacts of aviation. It provides training in the science and business of aviation and gives the opportunity to investigate and carry out real projects allied to aviation, the economy and the environment.

### Units

- Policy for Sustainable Development • Sustainability and Air Transport • Environmental Management at Airports • Research Design and Methods • Project

Students will develop detailed aviation industry knowledge and become active researchers in existing investigative programmes within research teams or industry groups.

Continual assessment via essays, reports, briefing papers, case studies, posters, oral presentations and dissertation.

### Career prospects

The UK Government and air transport industry is among the most advanced in the world in the development of strategies to promote the sustainable development of aviation. There is a growing need for education and training in sustainable aviation and for employees in the sector to have this expertise.

 **For more detailed information on this course visit [mmu.ac.uk/11113](http://mmu.ac.uk/11113)**

# Computing and Digital Technology

We conduct high quality research in areas such as intelligent systems, image and sensory computation, logic, peer-to-peer computing, computation, novel and natural computing, informatics and computational fluid dynamics. Research in the School was rated 'internationally excellent' with some rated 'world-leading' in the most recent research assessment exercise. MSc projects are often linked to ongoing research in the School.

Recent multimillion pound investments have strengthened the School's excellent facilities, including ten new state-of-the-art teaching laboratories equipped with high end PCs, Apple Macs and specialist software with software tools which work on the three main operating systems Windows, Linux and Mac OS. Teaching and research is supported by a suite of research laboratories including advanced graphics workstations and NEC SX61 and SX8 vector supercomputers.

In addition we have a state-of-the-art computer usability lab which captures and analyses human behaviour as we interact with computers, websites, gadgets and video games; and a purpose-built multimedia studio complete with high definition vision mixing, HD cameras and full audio and video recording facilities.

Our virtual learning environment, Moodle, allows course material to be accessed anywhere at any time.

The School is a member of the Oracle Academy and many of our degree programmes are accredited by the British Computing Society, the professional body for IT.

## Typical entry requirements for Masters degrees in Computing

For the majority of our Masters programmes, you will normally have at least a second class undergraduate honours degree in a computing subject, or good sub-degree qualification in computing along with substantial work experience in computing.

However MSc Computing and MSc Information Systems are open to non-computing graduates with at least a second class honours degree.



## Computing

### MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,200</b> <b>Non-EU international £12,500</b>
<b>Part-time: 3 years</b>	<b>Fee: UK/EU £465 per 20 credit unit/£700 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

This Masters degree is open to non-computing graduates with at least second class UK Honours degree (or international equivalent), or to people with a good sub-degree qualification in computing and substantial relevant work experience in computing. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

This is a long-established course designed to enable a career change to IT or update and broaden knowledge and skills if already working in the field. Key areas of study include object oriented programming, multimedia and internet applications, and information systems. You will also select three specialist units from the following: artificial intelligence systems; internet programming; mobile computing; enterprise programming; information systems management and strategy; advanced database systems; multimedia technologies; multimedia authoring; natural computing; software architectures; ubiquitous computing; and computer music and sound.

The units on offer are regularly updated to reflect new developments in IT and may vary. It is possible to switch between MSc Information systems and MSc Computing as you develop your areas of specialism and own interests in IT. A major independent practical project completes the MSc.

### Units

- Information Systems • Multimedia and Internet Applications
- Object Oriented Programming • Project

With flexibility a priority, students can choose their study workload to suit their changing circumstances. Part-time courses usually take three years but can take longer as required. Classes are on certain days of the week to facilitate part timers' attendance and to allow those studying full-time to undertake some part-time employment if necessary. Some students undertake practical project work while attending work placements. Extensive use of a specialist virtual learning environment is available. Assessment will be through coursework, examination and dissertation.

### Career prospects

The course provides scope for entry into a wide range of industries or for PhD study, including in the School of Computing, Mathematics and Digital Technology. The majority of programmes allow you to keep your options open while still allowing for some specialisation.



For more detailed information on this course visit  
[mmu.ac.uk/11084](http://mmu.ac.uk/11084)



## Advanced Computing

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,200</b> <b>Non-EU international £12,500</b>
<b>Part-time: 3 years</b>	<b>Fee: UK/EU £465 per 20 credit unit/£700 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See page 39-41.

### Entry requirements

You will normally have at least a second class UK Honours degree (or international equivalent) in a computing-related subject, or exceptionally, a good sub-degree qualification in computing and very substantial work experience in computing or a closely-related area. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

You will study six specialist, advanced units from a regularly updated range on offer. Different units are available from year to year to ensure flexible study patterns. We are a member of the Oracle Academy and highly rated in terms of research. Our supervision and facilities are also excellent.

Wide-ranging course units combine with a flexible approach which allows students to undertake practical project work while attending work placements. With one-third of the course project-based, it may be possible to undertake yours in collaboration with an external organisation or within the School. The part-time route is especially suitable if you have industrial experience and wish to update your knowledge. Especially useful in the case of missed classes, the online virtual learning environment, Moodle, provides extensive access to lectures, course materials and assessment information. Assessment will be through coursework, examination and dissertation.

### Units

- 3D Computer Animation • Artificial Intelligence Systems
- Computer Games Programming and Design • Computer Music and Sound • Enterprise Programming • Information Systems Management and Strategy • Internet Programming
- Mobile Computing • Multimedia Authoring • Multimedia Technologies • Natural Computing • Softwares Architectures
- Ubiquitous Computing • Project

### Career prospects

This course will equip you for a range of IT positions in the private and public sectors and is also a good foundation for further study. Our MSc graduates have entered a wide range of industries or gone onto PhDs, including in the School of Computing, Mathematics and Digital Technology.

 **For more detailed information on this course visit [mmu.ac.uk/11085](http://mmu.ac.uk/11085)**

## Information Systems

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,200</b> <b>Non-EU international £12,500</b>
<b>Part-time: 3 years</b>	<b>Fee: UK/EU £465 per 20 credit unit/£700 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See page 39-41.

### Entry requirements

You will normally have at least a second class undergraduate UK Honours degree (or international equivalent) in a non-computing subject, or a good sub-degree qualification in computing and substantial work experience in computing. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

Aiming to equip you whether you want to work in the IT industry, are already employed in it, or anticipate a research path ahead, this course allows a breadth of study while allowing for some specialisation through unit choice and project. It is possible to transfer between MSc Information Systems and MSc Computing as you develop your own interests in IT.

Supported by a dedicated team of technical staff, the School has excellent computing facilities including specialist Mac and PC laboratories with industry standard software and a state-of-the-art computer usability lab. Research in the school was rated highly in the most recent national Research Assessment Exercise, with some of our research rated as world leading.

### Units

- Information Systems Management and Strategy • Multimedia and Internet Applications • Object Oriented Programming
- Information Systems • Project

In addition, a range of optional specialist units adds to this versatile Information Systems qualification. Units may vary from year to year, reflecting the rapidly-changing IT industry. The project is non-technical.

Classes are concentrated on certain days of the week to facilitate part-time students' attendance and allow full-time students to undertake part-time employment if necessary. Especially useful in the case of missed classes, the online virtual learning environment – using Moodle – provides extensive access to lectures, course materials and assessment information. Assessment will be through coursework, examination and dissertation.

### Career prospects

In keeping with the pace of change, and the wide variety of professional roles in the IT industry, most of our courses offer a breadth of study along with some specialisation depending on unit choice and final project. Our MSc graduates have successfully gained employment in IT and a wide range of industries, or have gone on to further study along the PhD route.

 **For more detailed information on this course visit [mmu.ac.uk/11088](http://mmu.ac.uk/11088)**



# Engineering

Our Masters programmes are designed to meet the needs of industry which looks to employ postgraduates who can learn independently and apply critical thinking to real-world problems. Employers recognise the advanced skills and problem solving capacity of the engineering MSc graduate.

Engineering facilities in Faculty are excellent, with a new £4m heavy engineering workshop for research and teaching in surface engineering, materials and dynamics, and state-of-the-art kit including rapid prototyping machines and water jet cutters.

Our research was rated 'internationally recognised' in the most recent research assessment exercise. Areas of research in the School include: control engineering; durability of engineering structures; materials science; application of power electronic devices and circuits to flexible AC transmission systems; computer and digital system design; instrumentation and electronics; microprocessor engineering; and affective computer interaction which looks at how understanding of machine emotional intelligence and communication of emotions can improve the performance of those who operate them. Research Groups include the Computer Modelling and Control Group, the Imaging and Intelligent Systems Group and groups in transport engineering and defence security applications.

The School of Engineering is an enhanced partner of the Institution of Engineering and Technology who, along with the Institution of Mechanical Engineering, provide accreditation for our degree programmes. The majority of our Engineering Masters programmes are certified with the EUR-ACE® European quality label meaning that on completion of your MSc you will have fulfilled the academic part of CEng recognition. On completion of further professional competencies in the workplace, you can achieve chartered status enabling you to practise engineering in any of the EU member states. We are one of only five UK universities including Cambridge to have gained this prestigious certification.



Certified by EUR-ACE® European quality label



Certified by EUR-ACE® European quality label

## Electronic Engineering

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,200</b> <b>Non-EU international £12,500</b>
<b>Part-time: 2 years</b>	<b>Fee: UK/EU £465 per 20 credit unit/£700 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

September or January start date

### Entry requirements

At least a second class UK Honours degree in engineering or science is usually required. EU/international equivalents or equivalent usually professional qualifications, or unclassified degrees in engineering or science with relevant professional experience are also accepted. Other equivalent qualifications will be considered on merit. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

This course covers the key components needed to design and implement modern electronic systems; the use of modern embedded systems for single chip solutions and higher power electronics; and links to renewable energy systems, fuel cells and hybrid vehicles.

You will study the application of photonic systems and examine possible future uses. Programming studies will improve your skills in the integration and control of electronic systems and link to image processing, the study of which is delivered by our world-leading imaging group. A project completes the MSc, allowing you to specialise in your chosen area of interest.

### Units

- Power Electronic Systems • Electronics and Embedded Systems Design • Programming • Photonics and Sensor Systems
- Image Processing • Integrated Management Systems (optional)
- Masters Research Project

Assessment is through a combination of written reports, oral presentations, practical assignments and written examinations. A dual start date of September and January is available.

### Career prospects

The broad field of skills in electronic engineering will allow graduates to embark on a career in electronics systems engineering, design and development in electronic engineering and electronic power engineering. Power electronics are at the heart of the global energy problem.

Employers in nuclear power, renewable energy and transport need electronic engineering graduates who can implement efficient electronic power conversion systems. Electronic engineering graduates are also sought after to work in companies where the latest FPGA technologies are used to further minimise electronic components.



For more detailed information on this course visit [mmu.ac.uk/11089](http://mmu.ac.uk/11089)

## Mechanical Engineering

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,200</b> <b>Non-EU international £12,500</b>
<b>Part-time: 2 years</b>	<b>Fee: UK/EU £465 per 20 credit unit/£700 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

September or January start date

### Entry requirements

At least a second class UK Honours degree in engineering or science is usually required. EU/international equivalents or equivalent usually professional qualifications, or unclassified degrees in engineering or science with relevant professional experience are also accepted. Other equivalent qualifications will be considered on merit. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

Your studies will span advanced mechanical sciences theory, simulation and practice. You will build complex models of dynamic, static and thermo fluid systems using latest industry standard software such as ADAMS and ANSYS. You will use finite element analysis to evaluate heat, stress and fluid flow problems. Failure mechanisms in real world systems and components will be investigated through fatigue analysis; you will also examine multi-body dynamic systems and turbulent fluid dynamic motion. Measurement systems train you in gathering data for checking computer analysis and design work. A management unit develops personal and professional skills, whilst the product design unit shows how the design process flows using real world products; and you will learn from industrial case studies. Your chosen specialist Masters project makes up one third of the overall course.

### Units

- Finite Element Analysis • Computer-aided Fatigue Analysis
- Simulation of Mechanical Systems • Product Design and Development • Measurement Systems • Integrated Management Systems (optional) • Masters Research Project

You will be assessed through a combination of written reports, oral presentations, practical assignments and examinations.

### Career prospects

Gaining this MSc can lead to greater professional recognition and accelerated career development. Cross-sector from rail and aerospace to the manufacturing and utilities industries, employers are keen to take on postgraduates who can learn independently and apply critical thinking and advanced problem-solving skills to real-world problems. Work could include everything from thermodynamic analysis of a high-pressure gas line to fatigue analysis of a train suspension component. The job market in engineering and technology fields is buoyant with most maintaining good economic performance. You will also be well placed to pursue further study such as a PhD or an Engineering Doctorate.



For more detailed information on this course visit [mmu.ac.uk/11168](http://mmu.ac.uk/11168)



Certified by EUR-ACE® European quality label

## Engineering with Management

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,200</b> <b>Non-EU international £12,500</b>
<b>Part-time: 2 years</b>	<b>Fee: UK/EU £465 per 20 credit unit/£700 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

Option of January start date

### Entry requirements

At least a second class UK Honours degree in engineering or science is usually required. EU/international equivalents or equivalent usually professional qualifications, or unclassified degrees in engineering or science with relevant professional experience are also accepted. Other equivalent qualifications will be considered on merit. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

An exciting collaboration between the University's Business School and School of Engineering, this course aims to give engineers a deeper understanding of business issues. You will study a number of engineering units to help keep your business skills and knowledge in an engineering context. The business units cover the key components of business management and give engineers valuable knowledge and insights into how people and organisations behave, an understanding of financial issues facing business and know-how to improve your management skills.

Because of the wide-ranging nature of this course, you can choose from any of the advanced engineering units available including design, mechanical analysis, measurement systems and programming. You will carry out a research project which can be academic or industry based.

### Core units (all with optional work-based learning as extra)

- Accounting and Finance for Managers • Understanding People and Organisations • Strategy, Environment and Markets
- Information Systems Management • Project • Integrated Management Systems

### Elective units

- Product Design and Development • Measurement Systems
- Electronics and Embedded Systems Design • Programming
- Photonics and Sensor Systems • Communications • Image Processing • Power Electronic Systems • Finite Element Analysis • Computer-aided Fatigue Analysis • Simulation of Mechanical Systems • Fieldbus Technologies • Industrial Ethernet Systems

You will be assessed through a combination of written reports, oral presentations, practical assignments and written examinations. There is a dual start date of September (main intake) and January available for this course.

### Career prospects

Engineers with a strong grasp of modern management techniques and tools are in demand by industry. They can work high up in the operational level of a company to implement lean and high value engineering techniques. The industries you will be able to enter are wide-ranging and include production, process, transport and power. You will also be well-placed to pursue further study such as PhD or an Engineering Doctorate.



For more detailed information on this course visit [mmu.ac.uk/11091](http://mmu.ac.uk/11091)



Certified by EUR-ACE® European quality label

## Industrial Communication and Automation

MSc

<b>Full-time: 1 year</b>	<b>Fee: UK/EU £4,200</b> <b>Non-EU international £12,500</b>
<b>Part-time: 2 years</b>	<b>Fee: UK/EU £465 per 20 credit unit/£700 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

A second class UK Honours degree in engineering or science, or EU/international equivalent, or equivalent professional qualification, or unclassified degree or HND in engineering or science with relevant professional experience is usually required. Other equivalents will be considered on merit. **International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

Industrial networks are transforming the way we design plants and factories, automate machines and produce goods. This highly regarded, specialist course covers the key components in industrial networking, communication protocols and advanced automation. Incorporating expertise in the School gained from close industry collaboration, you will study technologies relevant to communications for production and industry. You will learn how machines are networked, how data is managed and how systems operate; as well as how to make industrial processes more energy efficient and optimised for peak productivity and performance. You will also undertake a research project. Accreditation from the Institution of Engineering and Technology is being sought for this new course.

### Units

- Fieldbus Technologies • Industrial Ethernet Systems and the Design of Networked Automation Systems • Embedded Systems Design • Power Electronics • Communications • Integrated Management Systems

We offer industry-standard facilities combined with unparalleled commercial collaboration: our Automation Systems Centre hosts the Competence Centre for PROFIBUS International in the UK ([www.profibus.com](http://www.profibus.com)). An estimated 1,400 worldwide member companies and organisations recognise the additional qualifications that can be gained along with our main MSc. These are: Certified PROFIBUS Engineer; Certified PROFINET Engineer; Certified PLCopen Engineer and Certified AS-I Engineer.

### Career prospects

You will be able to apply your advanced systems and industrial IT skills to a range of industries, including the power, petrochemical and water industries. Graduates from this course may enter a wide variety of engineering and automation careers, for example: a 'chip' engineer; a software engineer or a project engineer. Graduates will also be well placed to pursue further study such as a PhD or an Engineering doctorate.



For more detailed information on this course visit [mmu.ac.uk/11195](http://mmu.ac.uk/11195)

## Product Design

MSc/MA

<b>Full-time: 53 weeks</b>	<b>Fee: UK/EU £4,700</b> <b>Non-EU international £12,500</b>
<b>Part-time: 106 weeks</b>	<b>Fee: UK/EU £520 per 20 credit unit/£780 per 30 credit unit.</b> <b>MSc = 180 credits</b>

Suitable for international students. See pages 39-41.

### Entry requirements

At least a second class UK Honours degree in engineering or science, or EU/international equivalent, or equivalent professional qualification, or unclassified degree in engineering or science with relevant professional experience is usually required for entry on to the MSc. Other equivalents will be considered on merit.

**International students please see [mmu.ac.uk/international](http://mmu.ac.uk/international) or page 40.**

### The course

This new course is an innovative collaboration between Manchester School of Art, the Faculty of Science & Engineering and Business School. It brings together students from creative and manufacturing backgrounds to study together on projects that challenge personal approaches to product design, engage with the technical constraints of manufacturing and explore the creative use of materials and processes. You will develop advanced skills in contemporary digital design and manufacturing technologies, embracing the creative opportunities they offer product designers. The business unit develops project planning and management skills, raises understanding of markets and marketing opportunities and highlights the financial factors that impact on product development within commercial manufacturing environments.

### Units

- Contextualising Design Practice • CUTE Values for Product Design • Material & Emotional Values for Product Design
- Advanced Digital Design • Commercial Aspects of Product Design • Final Major Project

You will learn through individual and group projects, presentations and portfolios of research. You will develop a portfolio of work with reference to professional business practice, providing experience of what it is like to work in contemporary design and manufacturing environments. You will reflect on your work during the year via your own blog which will act as a key resource for your final written submission.

### Career prospects

Graduates will develop skills suitable for design-led roles in industries such as engineering and manufacturing, consultancy, management and research and development within a range of industries, or within academic research and teaching. The programme will also prepare you for the practicalities and challenges of establishing and running your own product design/manufacturing business.



For more detailed information on this course visit [mmu.ac.uk/11219](http://mmu.ac.uk/11219)



## Case study: Holly Preston

### Part-time student and staff researcher

Based in Manchester Metropolitan University's Centre for Aviation Transport and the Environment (CATE), my research is focused on aviation and climate stabilisation under the EU Emissions Trading Scheme.

As my work progresses, I am developing more advanced professional skills – my writing skills, for example, are now sharpened to a high academic standard – as well as more sophisticated ideas and arguments of my own which allow me to find new, original ways to expand my work.

I benefit from all kinds of opportunities at Manchester Metropolitan University. I have submitted and published articles in journals and I also had the opportunity to present within a professional capacity, such as at the international Transport, Atmosphere and Climate conference in Germany – an amazing experience!

The research unit I work for, and indeed the whole University, is very cosmopolitan and I am working with people from all over the world. It's a great place to work: the projects are unique, incredibly interesting and based around really current, topical issues. There is also a supportive wider research community through which I've got to know PhD students from other departments. I enjoy working here and feel very supported. It's a really great place to be.



## Research in science and engineering

Four research centres carry out ground-breaking research in the fields of Environmental Science, Materials Engineering, Computer Science and Engineering.

### Centre for Materials Engineering Research

This group specialises in novel materials, the evaluation of their properties and the modification and characterisation of surfaces for a wide range of applications. There are three main research groups:

The Organic Polymer Materials Group specialises in polymer degradation and stabilisation, processing and recycling, fillers, pigments, paints and polymer composites.

The Surface Engineering Group carries out research using physical vapour deposition processes, chemical vapour deposition processes and atmospheric pressure processes. A wide range of functional films have been produced and characterised including antimicrobial coatings, tribological coatings, photocatalytic and superhydrophilic surfaces, barrier layers for packaging and transparent conductive oxide layers.

The Nanotechnology Group focuses on functional polymer materials, zeolites, graphene electrochemistry, nano-particulates, fullerene-containing polymers, optronic/photonic materials and LC/GC mass spectroscopic analysis.

### Centre for Computing and Informatics Research

The Centre for Computing and Informatics Research brings together pure and applied computer science research, knowledge transfer and public engagement activities. The CCIR is organized around broad, over-arching themes:

- Our research in **knowledge engineering** covers artificial neural networks, machine learning, computational and fuzzy logic and conversational agents.
- The **novel computation** theme includes molecular computing, synthetic biology, network theory, natural computation and collective dynamics.

- Researchers in **networks and distributed systems** focus on the intelligent management and optimisation of large-scale distributed systems and data-centric computing.

- Work in **image and sensory computation** includes face and voice interpretation, human motion analysis and reconstruction, feature-based algorithms, 3D modelling and visualization, computer animation, games technology and novel data analysis.

### Engineering and Technology Centre

Researchers aim to improve the application of theory to the design and control of instrumentation, sensing systems, machines and inspection processes. Strong links with industry and practical research with real-world applications characterise the Centre's work. Research is organised into three broad areas:

The Imaging and Sensing Systems group combines:

- Image engineering and visualisation, which focuses on the application of computer vision techniques to analyse and process images from industrial systems for fault detection, typically on the railway infrastructure.
- Sensing systems focuses on the development of techniques such as radar to remotely detect and identify concealed threat items, ranging from handguns to IEDs. A team of 10 researchers works in the imaging and sensing area drawing on a range of funding.

The Sustainability and Transport group examines:

- The maximum power point in photovoltaic cell arrays when used during differing light conditions.
- The condition of rotating machinery in wind turbines and their effect on energy conversion.

- How intelligent vehicle dynamic control systems can be developed to reduce fuel consumption while delivering good dynamic performance.
- How lightweight and sustainable materials can be incorporated into vehicle structures.
- Advanced fluid flow and heat transfer in to nuclear reactor design and building engineering.

The Design, Materials and Manufacture group explores:

- How metal cutting can be affected by tool design and surface coatings.
- How user-centred design tools can be developed to improve the design of systems, products and services.
- How tools can be developed to identify the value in the product service supply chain.

### Environment Centre

The Centre for Earth and Ecosystem Response to Environmental Change focuses on the biological, chemical and physical processes that operate within Earth systems, and their impacts upon global ecosystems and sustainability.

The Centre for Mathematical Modelling and Flow Analysis develops the complex systems and models that inform policy on climate change, sea level rise and flooding, renewable energy sources, and coastline preservation and management.

The Centre for Aviation, Transport and the Environment (CATE) is an internationally recognized centre of expertise. Research is conducted for government, UN Agency and industry customers including: emissions measurements and modelling; modelling of global climate impacts; biofuels; airport environmental capacity; community noise disturbance; carbon management; and climate change adaptation strategies.

 **Discover more about our work  
at [mmu.ac.uk/research](http://mmu.ac.uk/research)**

## Case study: Michael Carroll

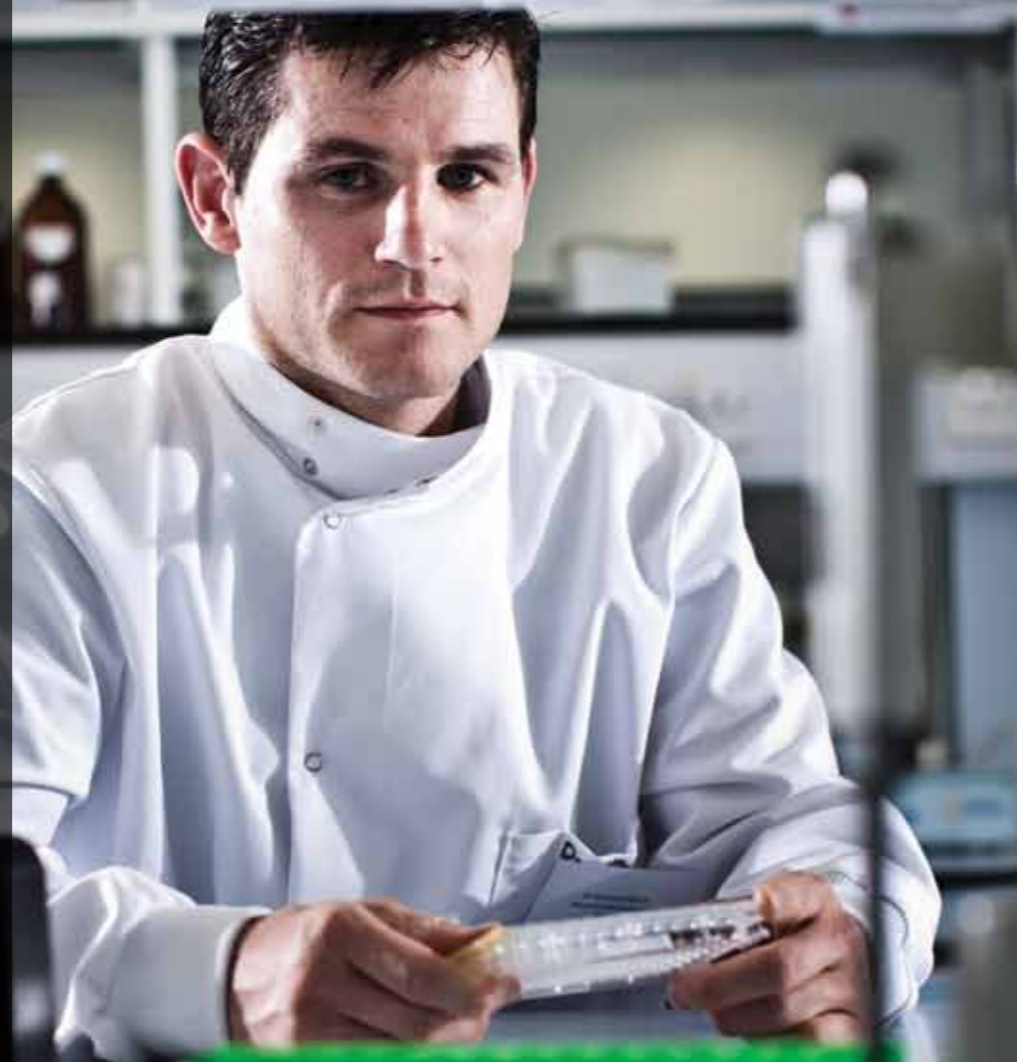
### Lecturer in Cell and Molecular Science

Here at Manchester Metropolitan University, I am involved in the MSc Biomedical Science course, on both the taught and research routes. My personal research focuses on embryology and reproduction medicine.

The facilities here are superb. We have fully equipped laboratories for you to conduct your research, which are managed by a fantastic team of lab technicians.

Undertaking a postgraduate degree equips you with an advanced knowledge in your specialist area and allows you to develop the skills you need to enhance your employment prospects in both research and clinical work. The courses also provide a solid grounding for you to progress on to PhD study, should you wish.

Studying for a postgraduate degree is more about the science; it's also about gaining valuable life skills. Dealing with failed experiments, enthused by exciting results and realising that hard work does pay off. These are the attributes that are invaluable to progress as a postgraduate, and in life. Manchester Metropolitan University strives to facilitate a stimulating and vibrant environment to enable you to develop professionally, and personally.



## Research in healthcare science

Our Healthcare Science Research Institute has an international reputation for research into the characteristics, limitations and adaptability of the human motor system in health and disease through an integrative approach that ranges molecular biology to whole body studies of human movement.

We hold a range of major external grants including awards from the UK Research Councils, The Wellcome Trust, the EU Framework 7 Research Programme and the Erasmus mundus EU programme.

Our home is a new purpose built centre in the John Dalton building in central Manchester which is equipped with an impressive range of state-of-the-art equipment. We have extensive collaborations with other internationally recognised groups both in the UK and overseas.

Opportunities exist to pursue research leading to PhD, MPhil, and MSc degrees, which are relevant to professional practice in the healthcare and biomedical sciences. Exciting new opportunities at our EU partners' institutions are also offered through the international PhD Erasmus Mundi Programme. Our staff contribute to a range of taught undergraduate and postgraduate degrees and courses, including research project supervision.

Our expertise is grouped in to three areas. Many research projects involve expertise from two or more groups as well as external collaborators. These groups are:

- Integrative Physiology.
- Biomedical, Cellular and Molecular Biology.
- Musculoskeletal Mechanics and Neural Control.

Discover more about our research by visiting [mmu.ac.uk/irm](http://mmu.ac.uk/irm)

### In the Loop – Microbiology Research

Microbiology research is active across both the School of Healthcare Science and the Faculty of Science and Engineering. Collaboration between microbiology and materials science has enabled the development of a unique, well funded interdisciplinary expertise, studying the interactions between microorganisms and inert surfaces. Particular attention is paid to oral microbiology and food microbiology. In addition there is considerable expertise in medical microbiology and in fermentation microbiology.

### Biomedical Research Group

The group investigates:

- How human tissue, blood flow and mechanics can be modelled to help improve healthcare or sporting performance.
- How user interfaces can be developed to promote rehabilitation for long-term conditions such as cerebral palsy.
- How engineering materials, such as polymers, can be used to help engineer human tissue.

### Translational Health Research

Expertise is available through our Clinical Academic Network for the study of novel methods for the treatment and diagnosis of disease. Current projects include the role of point of care testing in healthcare provision and the quality assessment of medical and dental materials. We also investigate new technologies such as proteomics for the diagnosis of disease.

 [Discover more about our work at mmu.ac.uk/research](http://mmu.ac.uk/research)

## Research degrees

We offer the following research study options: PhD, MPhil and MSc (by Research). You will study in a research-active environment that supports innovative, multi-disciplinary research. We will help you to enhance your current knowledge and skills and we offer specialist supervision across the breadth of science and engineering subjects.

As a postgraduate researcher, you will be supported by:

- A supervisory team of at least two academic members of staff and, if appropriate, multi-disciplinary supervision.
- Access to state-of-the-art facilities, laboratories and workshops in our home, the John Dalton building.

- The School of Research, Enterprise and Innovation, which provides access to collaborative research, consultancy, training and specialist facilities within the Faculty of Science and Engineering.
- Opportunities to join fieldwork and research projects in the UK and overseas.
- Skills development, collaborative projects and placement opportunities with external companies in relevant industry sectors.

### Information and advice for applicants

Our website has all the information you need to help you make your application as well as guidance on how to write your research proposal – see [mmu.ac.uk/research/research-degrees](http://mmu.ac.uk/research/research-degrees)

For videos of our current research students talking about their work visit [www.sci-eng.mmu.ac.uk/pgvideo](http://www.sci-eng.mmu.ac.uk/pgvideo)

### Contact us

Before you make a formal application please feel free to submit a draft research proposal – we will be happy to provide you with feedback. Alternatively, you may wish to discuss your proposal in person.

Contact the research degrees administration group [sciengresearchdegrees@mmu.ac.uk](mailto:sciengresearchdegrees@mmu.ac.uk)

# Essential information

## Entry Requirements

This gives you an overview of the minimum entry requirements for our postgraduate programmes of study. In individual areas of study, however, you may be required to achieve grades higher than the minimum requirements.

Please check the individual course entry for the programme you wish to apply for which details the typical entry requirements for that course.

Satisfying the typical entry requirements may not, however, guarantee the offer of a place. Applications are considered on their own merit and in competition with others, with account being taken of examination results already achieved, predicted grades in forthcoming examinations, research project proposals, personal statements and academic references. In some cases, work experience or success in other fields can be accepted as an equivalent to formal qualifications.

### Taught MSc programmes

You should have at least a second class UK honours degree (or an international equivalent), or a postgraduate diploma, or a professional qualification recognised as being equivalent to an honours degree. Other qualifications or work experience may be acceptable if it demonstrates appropriate knowledge and skills to Honours degree standard.

If you successfully complete 60 credits you are awarded a Postgraduate Certificate (PgCert). If you successfully complete all of the taught units (120 credits) you are awarded a Postgraduate Diploma (PgDip).

### MSc (by Research) and MPhil

You should have a first or second class UK honours degree (usually a 2.1) or an international equivalent. All applications will be considered on their merit. Ability and background knowledge in relation to the proposed research, together with professional experience, publications, written reports or other appropriate evidence of accomplishment will be taken into consideration.

Opportunities exist to transfer from Masters (by Research) to MPhil, and all students registered for MPhil have the opportunity to transfer to PhD after completion of about 9 to 15 months of full-time study (or 15 to 21 months part-time), providing progress on the work demonstrates that development to this level can be achieved.

### PhD

To apply for a PhD direct, you should have a UK Masters degree (or equivalent from an overseas institution), in a discipline which is appropriate to the proposed research, and includes sufficient training in research methods and the execution of a research project. If you do not meet these criteria but have had appropriate research or professional experience at postgraduate level which has resulted in published work, written reports or other appropriate evidence of accomplishment, this will be taken into consideration.

### PhD (by published work)

The University offers two routes for PhD by published work. These routes provide an alternative for candidates who have acquired substantial experience in a working research environment, as a result of which a number of publications have been produced. Only published work that is available and accessible in the public domain will be eligible for consideration. Further information on these two routes is available in the Code of Practice and Regulations for Postgraduate Research Programmes of the University at: [mmu.ac.uk/research](http://mmu.ac.uk/research)

### International students

If you need to check your eligibility, visit our website [mmu.ac.uk/international](http://mmu.ac.uk/international) and check your specific country page for more detailed entry requirements and which international qualifications we accept. We also consider work experience and other factors so do include everything you think relevant in your application.

If you are not a national of a majority English-speaking country, you will need to provide evidence of your English proficiency. The level of English we require will depend on the qualification you wish to study and in addition to the entry requirements detailed on the course page, you will also need a minimum of IELTS 6.5 with no less than 5.5 in any component for taught masters (MSc or MA) and no less than 6.0 in any section for postgraduate research (MRes, MPhil or PhD).

## Funding and financial support

Many postgraduate students are self-financed, however financial support may be available for both taught courses (normally for one year) and research (normally up to three years) through a range of studentships and sponsorships.

### Tuition fees for taught courses

The fees for taught courses, both full-time and part-time are provided in the course listings in this guide. Fees are correct at the time of going to press but may be subject to change and will be confirmed at the time of enrolment. The part-time fees stated are for the first year and, owing to the flexibility of part-time courses, denote the maximum fee for Year 1. Actual fees may vary depending on the units selected and the time taken to complete the course. For further information on fees please contact us on +44 (0) 161 247 2937.

### Studentships

University Studentships are offered on an annual basis for students wishing to study for PhD, MPhil, MRes or Masters by Research (MSc) degrees. They are normally held for up to three years and provide the home tuition fees and a subsistence bursary of around £12,000 per annum. Studentships are attached to specific research projects. Industrial CASE awards, which are allocated to the industrial partner (i.e. your employer), can also become available.

### Visit [mmu.ac.uk/postgraduate](http://mmu.ac.uk/postgraduate)

### Sources of UK funding for Studentships

(England, Wales and Northern Ireland)

Awards currently available for full-time postgraduate students usually cover University fees and a maintenance grant. Applications can be made through the School offering the course or the research place. The application deadline for Research Council awards is usually late April.

### Biotechnology and Biological Sciences Research Council (BBSRC)

Awards are available for qualifying students. Visit [bbsrc.ac.uk](http://bbsrc.ac.uk)

### Engineering and Physical Sciences Research Council

Awards for doctoral research may be available through Doctoral Training Grants. Contact the School directly. Visit [www.epsrc.ac.uk](http://www.epsrc.ac.uk)

### Natural Environment Research Council

Awards are available for qualifying students. Visit [www.nerc.ac.uk](http://www.nerc.ac.uk)

### Trusts, grants and other sources of funding

- Industrial organisations/your employer
- Professional and Career Development Loans. Visit [www.gov.uk](http://www.gov.uk) for more information
- Charitable Trusts
- Research Grants
- Research Degrees

International student please see pages 39-41.

## How to apply

### How to apply for a postgraduate taught course

Applications for full-time and part-time taught courses should be made on the Manchester Metropolitan University standard application form, available at [mmu.ac.uk/applicationform](http://mmu.ac.uk/applicationform)

After completing the application form, please e-mail to [direct@mmu.ac.uk](mailto:direct@mmu.ac.uk) or send by post to:

Direct Admissions Team  
Manchester Metropolitan University  
Business School & Student Hub  
All Saints Campus  
Lower Chatham Street  
Manchester  
M15 6BH

The University will inform you of the outcome of your application. Some offers may be conditional upon you satisfying the specified entry requirements.

### How to apply for a postgraduate research degree

You can apply for admission to a postgraduate research degree either by responding to a specific advertisement for a studentship in the local or national press or by applying speculatively to the University.

To apply for a Professional doctorate, PhD, MPhil, MRes or Masters by Research you will need to complete the Application Form to Study for a Postgraduate Research Degree

[mmu.ac.uk/study/postgraduate/apply](http://mmu.ac.uk/study/postgraduate/apply). You should also contact the research degrees coordinator for your chosen subject area to arrange a preliminary discussion about your proposed research topic.

If your application is successful you will be required to have an interview. When the University is satisfied that your proposed project is generally sound, your references have been received and that the appropriate supervision and resources are available, you will be sent a letter offering you a place. Enrolment for a research degree normally takes place at the start of each academic term, i.e. September, January and April, although some programmes may only have one enrolment period per academic session.

Following enrolment, in order to register for the degree you will be required to produce a research proposal with the help of your proposed supervisory team, and submit it to your Faculty Research Degrees Committee for approval within three months (full-time) or six months (part-time) of enrolment.

International student please see pages 39-41.

### Disclaimer

Whilst the University has made every effort to ensure that the information contained in this course guide is accurate and up-to-date, we cannot give any warranty that this is the case, nor guarantee that places will be available for any particular courses. The University shall not be responsible for any loss or damage howsoever arising from your use of this publication (except as required by law). The availability of courses offered may be subject to a minimum level of interest being shown by applicants in any given year. Use of this publication is subject to Manchester Metropolitan University's terms and conditions which can be found at [www.mmu.ac.uk/legal](http://www.mmu.ac.uk/legal)

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This publication is available in alternative formats. Please telephone +44 (0) 161 247 1692.



# International students

The Greater Manchester area is home to more international students than any other UK region outside London and we welcome over 3,000 international students from 130 countries to Manchester Metropolitan University every year.



Our campuses are situated in the dynamic, cosmopolitan city of Manchester and in the more relaxed area of nearby Cheshire. Both locations offer amazing study, leisure, sport, social and entertainment opportunities, as well as excellent student accommodation.

Manchester's cosmopolitan character and ethnic mix generates a truly dynamic atmosphere that has earned the city the unofficial title of the most popular student city in the UK. As the world's first industrialised city, Manchester has its roots firmly in innovation and business and as a celebrated hub of creativity and culture, the city offers unrivalled student experiences. While exploring its unique history, arts venues and world-class sports, leisure and shopping opportunities, you will always find something to interest and amaze you.

Students studying at the University's Cheshire campus really can have it all: it's the same university, but a very different experience. The Cheshire campus lies in the heart of rolling countryside and offers students the chance to study in a relaxed, friendly community in safe, peaceful surroundings, yet with easy access to some of the most culturally-renowned cities in the world.

For more information on what Manchester and Cheshire have to offer please visit [mmu.ac.uk/international](http://mmu.ac.uk/international)

**Supporting your study**  
We recognise that international students sometimes need extra assistance. We have specialist teams to provide the right support for you from application through to graduation and beyond. The University's dedicated student services team offers international students career advice, counselling, chaplaincy, and learning support.

**Career support**  
At Manchester Metropolitan University, we work hard to improve our students' employability. The Careers and Employability Service provides valuable help and advice for international students, providing a Careers Information Centre, with books and online resources offering details of many graduate vacancies, opportunities to meet employers on campus and workshops to learn how to write effective CVs and practise successful interview techniques. We also offer courses for developing teamwork, leadership, project management and communication skills. *Going Global* is an online resource which is available to support students in finding work outside the UK. With comprehensive country-specific career information, *Going Global* offers access to job research resources, top company listings, and information around issues of concern for foreign professionals.

**MMU International**  
If this is the first time you have lived away from your home and family we understand that the thought of spending time in a different country may be a little overwhelming, so we do our best to help you to prepare.

MMU International is the International Office at the University. Many of the MMU International staff speak several languages and, having spent time in different countries, are uniquely placed to understand your needs as an international student. The team regularly visits many countries to inform students about opportunities for study at the University. MMU International also provides international students with advice on a wide range of matters from social events and immigration to day-to-day living in the UK. There is a comprehensive three-day welcome programme to help you settle into university life.

The programme provides information about enrolment at the University, help with opening bank accounts and there are activities to help you meet other international students. The International team also runs the Airport Welcome Service which helps get you to your accommodation.

**MMUnion**  
The Students' Union is led by a team of students who are elected by students and represents the rights and interests of students at the University. Once you have enrolled at the University you automatically become a member of the MMUnion and have access to a range of services and facilities. There are more than 100 clubs and societies, covering a range of interests and activities, for you to join.

For more information please visit: [mmunion.co.uk](http://mmunion.co.uk)

**The International Society**  
The International Society is committed to promoting international friendship and celebrating cultural diversity and has more than 3,000 members representing over 120 different nationalities from all the universities and colleges in Manchester. It hosts regular social events, arranges community-based projects and organises trips to other UK cities and places of interest, such as London and the Lake District. It is free to join and membership entitles you to some discounted international flights too.

For more information, please visit: [internationalsociety.org.uk](http://internationalsociety.org.uk)



# International students: entry requirements and application

You can find country-specific information about many international qualifications on the University's international website. It's important that you have sufficient knowledge of English and improving your English with us can be the important first step towards making your studies more enjoyable, achieving better exam results and boosting your employment prospects.

As a guide, for most postgraduate courses you will need to achieve IELTS 6.5 or above with no less than 5.5 in any component for taught masters (MSc or MA) and no less than 6.0 in any section for postgraduate research (MRes, MPhil or PhD).

Our British Council accredited English Language Centre can help you to make rapid progress in the Academic English you need through our intensive courses.

## IELTS Plus University Preparation Courses

For students who need a full introduction to academic English, this course will improve each aspect of English, including reading, writing, speaking and listening, and help you develop important academic study skills. At the end of this course you will take an IELTS test.

## Pre-Masters Academic English Language Courses

Our intensive Pre-Masters Academic English courses will help you to boost your language skills to meet our entry requirements and guarantee your place on your chosen postgraduate degree course. Please note a minimum IELTS score of 4.5 or above is required.

## English language service

Free English language support is available throughout your studies, if you need it, to help you make the most of your time at the University. You will learn from our team of qualified and experienced English teaching professionals. During the course, you will develop your English naturally and confidently with dynamic lessons in small classes. You'll also have regular one-to-one meetings with your personal tutor who will check your progress and give you useful advice about how to maximise your progress.

For more details visit [mmu.ac.uk/efl](http://mmu.ac.uk/efl)



## English Language Centre

IELTS Plus University Preparation Courses						Pre-Masters Academic English Courses				
Entry levels	Year 1	September	January	April	June (take IELTS exam)	Entry levels	June	July	August	September (Year 2)
IELTS 4.0		3 terms				IELTS 5.5 (4.5 or above in all areas)	3 terms			Masters entry*
IELTS 4.5		2 terms				IELTS 5.5 (5.0 or above in all areas)	2 terms			Masters entry*
IELTS 5.0				1 term		IELTS 6.0 (5.5 or above in all areas)			5 weeks	Masters entry*

\*Joining your Masters course is conditional on passing the Academic English Course and meeting all the requirements of your offer letter.

## Applying for your chosen course

Once you've decided which course to apply for, you will need to submit your application. Many international and EU students use a recruitment consultant or education adviser based in their home country to help them. The University works with a number of education advisers worldwide and you may find that we have one in your country. They will be able to tell you more about the University and how to present yourself in a way that will interest admissions tutors, and some will offer you assistance with your visa and pre-departure briefings. To check if there is a University appointed education adviser in your country visit [mmu.ac.uk/international](http://mmu.ac.uk/international)

## Visa information

If you do not hold an EU/EAA passport you need to make sure that you have the correct visa for the duration of your course. Please see [mmu.ac.uk/international](http://mmu.ac.uk/international) for further information.

## Funding and financial support

It's not just your course fees you have to think about when working out the cost of your studies. You must also take into account the cost of accommodation, food and general living expenses. Many postgraduates are self-financed, however financial support may be available. For non-EU international students, the University, the UK government and other UK organisations offer a variety of scholarships.

For more details of scholarships for international students see [mmu.ac.uk/international](http://mmu.ac.uk/international)

## Study in your home country

If you would like to study in your home country, you can undertake one of our programmes at a private provider's institution and gain Manchester Metropolitan University credits and certification for your chosen programme. This will enable you to benefit from our expertise and research in an environment that suits your educational needs and personal circumstances.

Alternatively, you may choose to undertake a course that has been designed by a private education provider in your country and validated by us. This allows you to undertake your course of study with tutors that have worked on the design of the programme in consultation with, and the approval of, MMU while benefiting from their own specialist support.

For further information on the University's courses available in your country please visit [mmu.ac.uk/international](http://mmu.ac.uk/international)

**Wherever you live in the world, we welcome your application to study with Manchester Metropolitan University.**

Full information for international students is available via  
**Web:** [mmu.ac.uk/international](http://mmu.ac.uk/international)  
**Telephone:** +44 (0) 161 247 1022  
**Email:** [international@mmu.ac.uk](mailto:international@mmu.ac.uk)

## Case study: James Xu

### PhD student from China

Moving away from your family and becoming accustomed to a new language and culture means that you become much more independent. Make sure you plan your work and your time well, and remember that staff and resources are available to help you if you are struggling.

At the start of your degree, you are assigned a supervisor and together you develop a long-term research plan. My supervisor is very supportive and we meet to discuss my work regularly. All the teaching staff are very approachable, even if they are not directly connected to your project.

MMU offers many resources to help you get the most from your degree. I have travelled to conferences and taken courses to improve my IT, writing and leadership skills.

After my PhD I am looking to teach at MMU or in China. At MMU, there are paid opportunities for research students to help with lab demonstrations, and you can take a 'new to teaching' course, to give you a taste of what it is like.



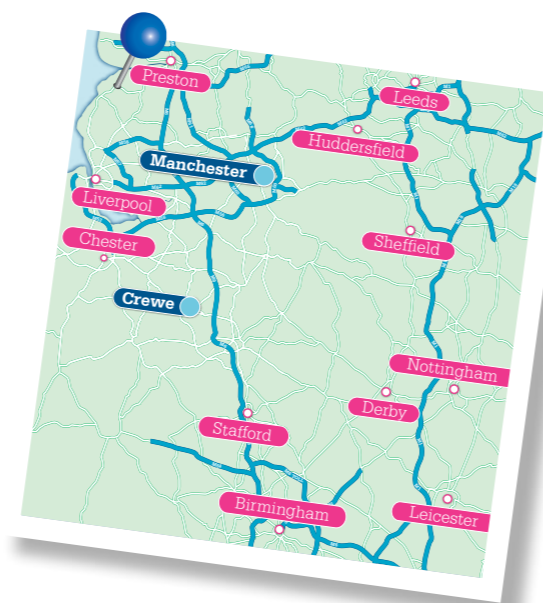
James Xu is studying for a PhD in Electronic Engineering

# Manchester and the North West of England

Manchester is truly an international city, with a world-class transport infrastructure to the rest of the UK and the world, and home to one of the largest international airports.

Just minutes from the centre of Manchester, the University is adjacent to many of the city's main bus routes and just a short walk from the mainline railway stations.

Our Cheshire campus in Crewe is just 36 miles (58km) south of Manchester. It's easy and fast to travel to Crewe from Manchester, London and Birmingham as well as local market towns and the historic city of Chester.



# Come and meet us at our Postgraduate Courses Fairs

Our Courses Fairs are flexible drop-in events where you can find out about our range of postgraduate and professional courses, speak to academic staff and get advice on careers and student finance.

Courses Fairs will be held at both our Manchester and Cheshire campuses on the following dates:

**Wednesday**  
**4 September 2013**  
**4-6pm**

**Wednesday**  
**20 November 2013**  
**2-6pm**

**Wednesday**  
**12 March 2014**  
**2-6pm**

**Wednesday**  
**14 May 2014**  
**3-6pm**

# Stay connected

Live web chats

 [mmu.ac.uk/chat](http://mmu.ac.uk/chat)

If you would like to speak to one of our advisors about applying to Manchester Metropolitan University or applying for student finance or accommodation, join one of our live web chats.

Any questions?

 [mmu.ac.uk/ask](http://mmu.ac.uk/ask)

You'll find lots of useful information on our website, and our Frequently Asked Questions section should answer many of the queries you have.

 [mmu.ac.uk/postgraduate](http://mmu.ac.uk/postgraduate)

# Get social!

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 [twitter.com/manmetuni](https://twitter.com/manmetuni)



[mmu.ac.uk](http://mmu.ac.uk)

