MANCHESTER
1824

The University of Manchester

Mechanical, Aerospace and Civil Engineering

postgraduate brochure

‘There is no limit to the number of top-rated course assessments - 96% make our criteria of Academic Excellence, and research here has a pedigree of its own.’

The Virgin 2008 Alternative Guide to British Universities

The University of Manchester . . .

- carries out research in a wider range of academic areas than any other UK university
- attracted almost £248 million in research funding in the last year
- has more than 5,700 academic and research staff
- has completed the largest and most ambitious buildings and investment programme ever seen in British higher education - more than £400 million to date and a further £250 million by 2015
- has one of the largest and best resourced academic libraries in the country
- has a careers service that has been voted the best in the UK for six consecutive years
- is the most targeted university by the UK's top 100 graduate employers
- enjoys the best of both worlds: city life and campus community

There has never been a better time to be part of The University of Manchester. Choose to be a postgraduate student here and you can join us in achieving our ambitious goals for the future.

Look **closer**.....achieve **more**

contents

The University of Manchester




The University of Manchester is one of Britain's most famous and forward-thinking universities, with a rich heritage stretching back 180 years and an exciting agenda for the future.

And you could be part of it . . .

The birth of the computer, the founding principles of modern economics, the research that led to the splitting of the atom - all these and many more world-altering innovations have their roots here, at The University of Manchester. Today, we are one of the top universities for biomedical research, while our international centres exploring cancer research, world poverty, environmental sustainability and social change are producing answers to global problems that truly change lives.

Our mission is to become one of the top 25 universities in the world by 2020, attracting the best students, teachers, researchers - and reputation. It's a goal that we're well on the way to achieving, backed by a major multi-million pound investment programme in facilities, staff and buildings.

Targeted by thousands of graduate recruiters, and with a thriving research community, nowhere can offer you better prospects that The University of Manchester. Decide to study here and you will be welcomed into the prestigious ranks of an institution famous for cutting-edge innovation and enterprise, situated at the heart of one of the world's most exciting student cities.

Research, discovery and innovation

As a postgraduate student at The University of Manchester, you'll have the opportunity to make a major contribution towards research excellence in your field. Whether studying for a taught postgraduate award, or a research degree, you will help to push the boundaries of creativity.

Our worldwide reputation for pioneering research and proactive relationships with industry and public services make us both a centre for academic excellence and a force for positive change. Many major advances of the 20th century began in our laboratories, such as the work by Rutherford leading to the splitting of the atom and the development of the world's first programmable computer, "The Baby", in 1948.

Today, research remains at the heart of the University. We research in a wider range of academic areas than any other UK university and virtually all of our research has been assessed as being at international or national standards of excellence. We are confident of continued improvement on our impressive Research Assessment Exercise ratings as we increase the number of first-rate professorships, build on our strong links to industry, and continue to invest in world-class facilities.

Each year, the University attracts around £250 million of research funding from external sources, bringing our total research expenditure to almost £400 million per year and enabling us to develop cutting-edge research facilities, staff, programmes and discoveries. We are among the top three universities for grant funding from the main UK engineering, science and bioscience-research councils.

Throughout your studies, you'll be encouraged to adopt innovative approaches to research, breaking down limitations and discovering new interdisciplinary ways of working. Thinking in a cross-disciplinary way is opening up exciting new areas of study and discovery in our 23 academic Schools and our new University Research institutes.


GAP

'The university has been climbing The Times rankings, as well as reclaiming its place as the university with the largest number of applicants.'

The Times Good University Guide 2009

You'll also benefit from the University's first-class facilities for students and researchers, which are currently expanding still further as we continue the process of investing £650 million in the largest and most ambitious capital building programme ever seen in British higher education.

Transferring knowledge, encouraging enterprise

Manchester has an impressive track record when it comes to turning ideas into commercial reality. Your academic work as a postgraduate student could contribute towards business and economic development in the commercial world.

University of Manchester Intellectual Property Ltd (UMIP) is the technology transfer company that manages our commercialisation and is responsible for handling the 200 or so invention disclosures submitted by academics across the University every year. UMIP helps to attract world-class academics to our ranks by providing a dynamic, first-class support system for them to participate and succeed in commercialisation projects. More than 100 companies (known as spin-outs) have been created in the last few years based on our current research, both benefiting the University and contributing significantly to Manchester's economy.

Career opportunities

Choose to study at Manchester and you will be in good company. Twenty-three Nobel Prize winners have worked or studied here and our alumni have an impressive track record of becoming leaders in their fields.

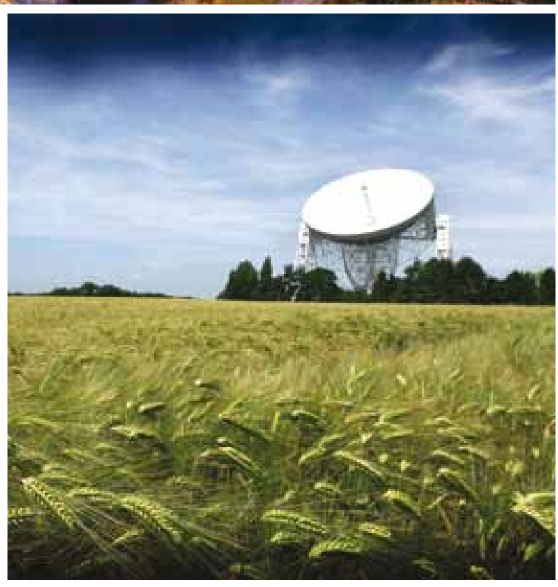
High-profile Manchester graduates include philosopher Wittgenstein, flight pioneer Arthur Whitten-Brown, novelist Anthony Burgess and women's rights campaigner Christabel Pankhurst. Today, our alumni can be found in top positions in business, politics and the arts, including Sir Terry Leahy, Chief Executive of Tesco; George Richards, President of Trinidad and Tobago, international architect Norman Foster and actor and writer Meera Syal.

Embarking on postgraduate study is a major step, as you invest significant time and money in furthering your career and knowledge. It is therefore encouraging to know that Manchester's graduates are sought after all over the world. Last year, over 3,800 employers specifically targeted University of Manchester students, and we have the largest programme of on-campus interviews and careers fairs in the UK. Voted the best in the UK by employers for six consecutive years, our Careers Service carries out extensive work to ensure employers meet and recruit our students, including a diverse range of services dedicated to postgraduates.

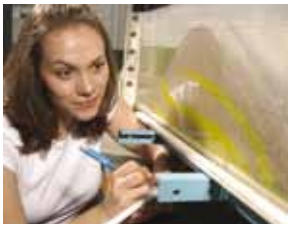
World-class facilities and support

Big, yet closely connected, the University's dynamic campus gives you the best of both worlds - city life and campus community. We offer everything you need to make the most of your time in Manchester - including one of the UK's largest and best-resourced academic libraries, premier IT services and extensive dedicated student support services.

An impressive range of sports facilities, restaurants, bars, cafes and a shopping centre are all conveniently located within the campus area. The University also boasts its own cultural attractions, including The Manchester Museum, Whitworth Art Gallery and Contact Theatre, with Jodrell Bank Observatory and Visitor Centre based further afield in Macclesfield. The largest Students' Union in Europe provides excellent support services, some of the most active student societies in the country and four live venues, including the famous Academy, which has long been attracting the best top and upcoming bands.



Mechanical, Aerospace and Civil Engineering at Manchester


As one of the largest Schools in Europe that incorporates Mechanical, Aerospace and Civil Engineering, we offer you a challenging and diverse learning environment. A degree from The University of Manchester is an international passport to success, and many of our students achieve excellence on a worldwide stage. Our programmes are aimed at producing top quality graduates. We hope you will rise to that challenge.

Outstanding Research Assessment Exercise results

Our work is applicable to diverse industry sectors: aerospace, manufacturing, civil, process industries, medical, nano-engineering, energy, environment, transport and nuclear.

Research Highlights

Many grants have been awarded on topics as wide ranging as the resilience of electricity networks to climate change, on autonomous systems in aerospace and on long-term coastal sediment systems. Research grants involving computational fluid dynamics for marine turbines for the Energy Technologies Institute and on thermal hydraulics for Magnox are being extended as a result of their success, to mention a few.

Key research themes

The School has five research groups reflecting our vision of Mechanical, Aerospace and Civil Engineering as well as many expert groups which offer coherent activity on specific disciplines, including Advanced Flow Diagnostics and Instrumentation; Bioengineering; Built Environment; Coastal Processes; Computational Fluid Dynamics; Construction Science; Dynamics and Aeroelasticity; Energy and Multiphysics; Engineering Design and Optimisation; Experimental Aerodynamics; Geo-Engineering; Impact and Explosion; Management of Projects; Marine Energy; Nuclear Graphite; Reliability, Availability, Maintenance and Safety; Smoothed Particle Hydrodynamics (SPH); Structures and Fire and Turbulence Mechanics

Collaboration with Industry

The School has extensive collaboration with industry, city councils and government organisations, not only in terms of research and collaborative work but also in the design and content of all taught programmes.

Career Opportunities

Our students have the support of one of the best university careers service within the sector. And the employability rate of our graduates is high. On a weekly basis there is industrial representation within the school as well as individual programme and staff links.

Entry requirements

Academic qualification overview:

The minimum academic entry requirement for a postgraduate programme (taught or research) will be a Lower Second UK Honours degree, or international equivalent, in a relevant science or engineering discipline. For some programmes, including our PhD and EngD research degrees, the minimum academic entry requirement will normally be an Upper Second UK Honours degree, or international equivalent. Please visit our School website for further information on individual programme requirements www.manchester.ac.uk/mace.

English language:

Applicants who are non-native English speakers need to provide evidence of having achieved the required level in the following English language qualifications:

For most MSc programmes:

- IELTS overall score of 6.5 with no component less than 5.5;
- Internet based TOEFL 90 with minimum component scores Reading 22; Listening 21; Writing 21; Speaking 23;

Management of Projects:

- IELTS overall score of 6.5 with writing 6 and no other component less than 5.5;
- Internet based TOEFL 90 with minimum component scores Reading 22; Listening 21; Writing 21; Speaking 23;

Pharmaceutical Engineering:

- IELTS overall score of 7 with no component less than 5.5;
- Internet based TOEFL 95 with minimum component scores Reading 22; Listening 21; Writing 21; Speaking 23;

Scholarships/sponsorships

There are a number of funding opportunities available to applicants planning to start a taught or research postgraduate degree course at the School of Mechanical, Aerospace and Civil Engineering, please visit our website for further information www.manchester.ac.uk/mace

Our students and graduates...

"I completed my first degree in Mechanical Engineering in Iran University of Science and Technology (IUST, Iran 1998). I then worked for a year as a junior design engineer, designing energy test rooms (Ashena Tech. Co. 1998-1999). Following that I worked in a Manufacturing Company (Iran Radiator Co. 2000-2002) as a senior design engineer for a year and then was appointed as the head of design department focusing on designing automotive radiators and industrial heat exchangers. I moved to UK in 2002 where I completed a MSc. course in Advanced Manufacturing Technology and Systems Management (UMIST, 2002-2003, Distinction dissertation on Thin film metal oxide coating on glass). I continued the research on laser manufacturing as an Academic Visitor (UMIST, 2003-2004) and then completed a PhD in Biomechanics (The University of Manchester, 2004-2009) working on Laser surface texturing and coating of Ti-6Al-4Vfor improving biocompatibility. I started working as a Postdoctoral Research Associate in the School of Biomedicine, University of Manchester in January 2010 where I am working on Improving the Biocompatibility of Heart Stents in collaboration with Johnson and Johnson."
Nazanin Mirhossieni, graduated 2009,

"After recently completing my PhD studies, I have joined ALSTOM Aerospace. I have been working at the AMF (Aerospace Manufacturing Facility), responsible for a range of design activities, including stress and aerodynamic analysis.
"My postgraduate study was funded by Airbus UK. I found the support from the company subject matter experts invaluable. During my three years of PhD studies, I learnt a lot about techniques and approaches to problem-solving that can be adapted to any engineering situation."
Kailash Sunneechurra, Senior Design Engineer
ALSTOM Aerospace

"After graduating from The University of Manchester EngD scheme in 2006, I joined my sponsoring organisation (Teradyne Diagnostics Solutions) in a research management role, responsible for managing development projects for the Ford and Honda Motor companies. I found my technical research background and the formalised management training invaluable when managing large research projects.
"I have recently rejoined the School of Mechanical, Aerospace and Civil Engineering to manage an executive education programme for senior BP Engineering Managers."

Dr Moray Kidd, Deputy Director
BP Engineering Management Programme
School of Mechanical, Aerospace and Civil Engineering

programme details

taught programmes

MSc in Advanced Manufacturing Technology and Systems Management

Course description

This programme is one of the best-established of its kind in the UK, having evolved from the successful MSc programme in Machine Tool Technology, and is regularly updated in line with subject developments and changing industrial practices.

Advanced Manufacturing Technology and Systems Management has developed into a broadly-based multi-discipline subject area, demanding expertise in many diverse topics.

The programme structure requires in-depth study of various topics, ranging from the fundamentals of manufacturing processes, to the management of manufacturing systems. More specialised study takes place in the dissertation project, where you will undertake an individual research project of industrial relevance.

The programme has a strong practical orientation and it aims to equip you with the theoretical and practical experience to enable you to analyse and investigate problems, and to engage in design, development and research involving manufacturing technology, and in the management of manufacturing systems. Although intended primarily for those wishing to pursue an industrial career, the programme is equally relevant as preparation for research in advanced manufacturing technology and systems management.

Course structure

The programme consists of course units covering the broad areas of manufacturing technology and computing, and systems and management. The material is presented through lectures, laboratories and small projects of an individual or group nature. Much of the laboratory and project work enables you to gain 'hands-on' experience and you will have extensive access to computer terminals outside the timetabled laboratory periods.

At the final stage of the MSc, the dissertation project takes a variety of forms and may be of an analytical, computational, design, or experimental nature. Most of the projects are linked to longer-term ongoing research programmes.

You must take the eight compulsory course units for the taught component of the MSc. Seven units have 36 hours of lectures each and each unit accounts for 15 credits. The Research Methods unit accounts for a further 15 credits and is assessed entirely by coursework, of which, about 90 hours are allocated in addition to 18 hours of lectures. A total of about 70 hours is recommended or allocated for coursework on the other seven units.

Typical units are Manufacturing and Management Systems; CIM and e-Manufacture; 3D Product Modelling, Reverse Engineering and Rapid Manufacture; Advanced Machining Technology; Advanced Manufacturing Processes ; Robotics, Metrology and Modelling of Materials in Manufacture; Micro & Nano Fabrication and Research Methods. For more detailed unit specifications, please refer to the School's website.

Progression and assessment

The taught element of the programme is assessed by means of coursework and examination. On completion of the course units, you are formally assessed through written examinations. Following successful completion of the taught part of the programme, you proceed to the dissertation lasting approximately three months.

Career opportunities

Graduates are well equipped to take up a wide range of manufacturing engineering opportunities in industry, or pursue research in advanced manufacturing technology and systems management.

Duration

Full-time – 12 months

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	No	No	No
MSc Research	Yes	No	No	No

MSc in Aerospace Engineering

Course description

The School of Mechanical, Aerospace and Civil Engineering has a long, strong and unique tradition in the UK in aerospace design, helicopters, heat transfer, aerodynamics, computational fluid dynamics and flow diagnostics, structures and manufacturing. This programme exploits and builds on those strengths and recognises particular combinations of subjects unique to Manchester. The programme also exploits our strong links with BAE Systems, Airbus, Rolls-Royce, MoD/DSTL, USAF, North West Aerospace Alliance, ADS, MBDA, EADS-IW and others.

This MSc aims to produce high quality graduates with specialist training in Aerospace Engineering, who will be suitable for employment in the engineering industries and consultancies. Aerospace engineering graduates are highly valued and are currently in great demand. The Manchester programme specifically seeks to serve this growing industry requirement. The programme is suitable for: engineering graduates; engineering professionals working in technical/commercial management who want to specialise in aerospace engineering; engineering specialists/generalists; consultants; industry analysts, etc.

Course structure

The taught part of the programme is organised in mandatory units and optional units taught in semesters 1 and 2. You must choose one optional unit each semester at the beginning of the programme. Typical core course units include: Aerospace Design, Research Methods, Aerodynamics, Propulsion, Systems. Typical optional course units include: Composites, Helicopters, CFD, Engineering Optimization, Flight Simulation, Heat Transfer, Aeroacoustics.

Facilities include:

- Aerospace structures and composite materials research laboratory
- Computing laboratory with parallel computing clusters
- Finite Element and Computational Fluid Dynamics
- Flight Simulator
- Heat transfer rigs for gas turbine related experiments
- Impact and explosion research facilities
- Instrumentation for flow and heat transfer measurements
- Low and high speed wind tunnels
- Low speed water tunnel
- Manufacturing and laser processing research laboratory
- Optical diagnostic systems for flow measurement and visualisation
- Shock tubes
- Systems and dynamics research infrastructure

Progression and assessment

To obtain an MSc qualification, you must pass the taught element of the programme and complete a satisfactory dissertation. To pass the taught element, you must attend and satisfy examination and coursework requirements in each of the course units. The period May to September involves work on the dissertation topic of the programme (although a start on the project will be made in semester 2).

Project dissertations may be carried out either on campus, or within industry; external bodies will be selected and agreed with the University. A list of projects will be made available at the beginning of the programme. A suitable academic project supervisor will be appointed to you. For research based outside the University, an external project supervisor will also be appointed, with the agreement of the programme director.

Career opportunities

Previous graduates have successfully moved into:

- Airframe manufacturing
- Consultancy and management
- Defence laboratories
- Gas turbine and aircraft systems industries
- Postgraduate research

Duration

Full-time – 12 months

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	No	No	No
MSc Research	Yes	No	No	No

programme details

taught programmes

MSc/ PGCert/ PGDip in Maintenance Engineering and Asset Management

Course description

Maintenance Engineering and Asset Management is a critical field that is of significant managerial and technical importance to UK and international industry. It is estimated that 10% of typical plant cost is spent every year maintaining that plant. Maintenance can make the difference in competitiveness on a global scale. Maintenance managers can make major impacts on their companies' bottom line and often report at board level.

Maintenance Engineering and Asset Management is a key element in increasing the competitiveness of industry. It is a sophisticated discipline which embraces management techniques, organisation, planning and the application of substantial electronic, engineering and analytical know-how to manufacturing processes, transport, power generation and the efficient operation of industrial, commercial and civic buildings. The programme aims to give companies the technical and managerial expertise to thrive in the global marketplace.

On completion of the course, you will be able to obtain one of the following qualifications:

- MSc
- Postgraduate Diploma (PGDip)
- Postgraduate Certificate (PGCert)

Course structure

The programme is divided into course units which cover various aspects of applied management and technology in the field. It is designed in such a way that, after enrolment, the people already working in the industry can benefit from the structure and content of the course to enhance their capability in Maintenance and Asset Management. Our teaching staff are internationally recognised professionals, with years of experience working in industry and academic institutions.

Assessment

Each format of teaching is followed by a major assignment for each unit, which is applied as follows.

- Full-time students – applied at the University
- Part-time students – applied in the workplace

An examination also takes place, either at the University, or at higher education institutes or the British Council in the student's home country, for part-time distance learning students.

Dissertation

The dissertation project is intended to address a real issue in Maintenance Engineering and Asset Management. It is studied in depth, relating problems in the field to theory, case studies and solution reported in the literature, often creating innovative proposals and field trials. You will have access to laboratory resources where appropriate.

Career opportunities

Most graduates who have entered the programme to date already occupy senior maintenance-related engineering positions within their organisations. Most continued in this discipline in their organisations, often in a more senior position.

Course options

	Full-time	Part-time*	Full-time distance learning	Part-time distance learning
MSc	Yes 12 months	Yes 36 months	No	Yes 36 months
PGDip	Yes 12 months	Yes 24 months	No	Yes 24 months
PGCert	Yes 12 months	Yes 12 months	No	Yes 12 months

* Home (UK/EU) students only

MSc in Management of Projects

Course description

This programme aims to provide state-of-the-art project management education at postgraduate level.

Course structure

The programme commences in mid-September. For the first two semesters, you will follow a programme of lectures, tutorials and assignments. This programme involves examinations in January and in May/June.

The programme is based on a template of five core units and three optional. Following the successful completion of eight modules, you will undertake a dissertation.

The dissertation should relate to a real project situation. However, when this is not possible, dissertation topics related to the programme content can be agreed.

The core course units typically include:

- Commercial Management
- Management of Projects
- People and Organisations
- Project Planning and Control
- Project Management Research Methods

Optional units typically include:

Semester 1

- Business Projects Involving IS/IT
- Conflict Management and Dispute Resolution
- Environmental Assessment
- Project Finance

Semester 2

- Business Projects Involving IS/IT
- Commercial Contract Management
- Infrastructure in Development
- Project Managing Humanitarian Aid
- Risk Management

The remaining months are spent on a research project and the submission of a dissertation.

Progression and assessment

During the first two semesters, you will follow a programme of lectures, tutorials, assignments and examinations. Following the successful completion of eight course units you will spend the remaining months on a research project leading to the submission of a dissertation.

Facilities

More information on facilities and research in engineering management in our School can be found on Management of Projects special interest group pages.

Duration

Full-time – 12 months
Part-time – 36 months

Course options

	Full-time	Part-time*	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	Yes	No	No
MSc Research	Yes	No	No	No

*Home (UK/EU) students only

programme details

taught programmes

MSc in Management of Projects: Commercial Project Management

Course description

This programme aims to develop your critical understanding of the factors that influence commercial management; in particular, the principles and practice of competitive bidding and bid evaluation.

Course structure

The programme commences in mid-September. For the first two semesters, you will follow a programme of lectures, tutorials and assignments. This programme involves examinations in January and in May/June. You will spend the remaining months on a research project and the submission of a dissertation, The programme is based on a template of five core units and three optional or directed units. Following the successful completion of eight units (120 credits), you will undertake a dissertation. The dissertation, should relate to a real project situation. However, when this is not possible, dissertation topics related to the programme content can be agreed.

The core course units typically include:

- Commercial Management
- Management of Projects
- People and Organisations
- Project Planning and Control
- Project Management Research Methods

Optional and directed course units typically include:

Semester 1

- Business Projects Involving IS/IT
- Conflict Management and Dispute Resolution
- Project Finance

Semester 2

- Commercial Contract Management (compulsory)
- Risk Management

Duration

Full-time – 12 months
Part-time – 36 months

Course options

	Full-time	Part-time*	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	Yes	No	No
MSc Research	Yes	No	No	No

*Home (UK/EU) students only

MSc in Management of Projects: Construction Project Management

Course description

This programme aims to develop your critical understanding of the factors that influence construction project management within the context of, and applied to, construction projects.

Course structure

The programme commences in mid-September. For the first two semesters, you will follow a programme of lectures, tutorials and assignments. This programme involves examinations in January and in May/June. You will spend the remaining months on a research project and the submission of a dissertation.

The programme is based on a template of five core units and three optional units. Following the successful completion of eight units (120 credits), you will undertake a dissertation. The dissertation should relate to a real project situation. However, when this is not possible, dissertation topics related to the programme content can be agreed.

The core course units are common to each route and typically include:

- Commercial Management
- Management of Projects
- People and Organisations
- Project Planning and Control
- Project Management Research Methods

Optional and directed course units typically include:

Semester 1

- Conflict Management and Dispute Resolution
- Environmental Assessment
- Project Finance

Semester 2

- Commercial Contract Management
- Infrastructure in Development
- Project Managing Humanitarian Aid
- Risk Management

Duration

Full-time – 12 months
Part-time – 36 months

Course options

	Full-time	Part-time*	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	Yes	No	No
MSc Research	Yes	No	No	No

*Home (UK/EU) students only

programme details

taught programmes

MSc in Management of Projects: Engineering Project Management

Course description

This programme aims to develop your critical understanding of the factors that influence engineering management within the context of, and applied to, engineering projects.

Course structure

The programme commences in mid-September. For the first two semesters, you will follow a programme of lectures, tutorials and assignments. This programme involves examinations in January and in May/June. You will spend the remaining months on a research project and the submission of a dissertation.

The programme is based on a template of five core units and three optional units. Following the successful completion of eight units (120 credits), you will undertake a dissertation. The dissertation, should relate to a real project situation. However, when this is not possible, dissertation topics related to the programme content can be agreed.

The core course units are common to each route and typically include:

- Commercial Management
- Management of Projects
- People and Organisations
- Project Planning and Control
- Project Management Research Methods

Optional and directed course units typically include:

Semester 1

- Conflict Management & Dispute Resolution
- Environmental Assessment
- Project Finance

Semester 2

- Commercial Contract Management
- Infrastructure in Development
- Project Managing Humanitarian Aid
- Risk Management

Duration

Full-time – 12 months
Part-time – 36 months

Course options

	Full-time	Part-time*	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	Yes	No	No
MSc Research	Yes	No	No	No

*Home (UK/EU) students only

MSc in Mechanical Engineering Design

Course description

This MSc course combines elements of engineering analysis with design synthesis to develop your problem-solving ability. You will develop a combination of creative thinking and in-depth engineering analysis to demonstrate feasibility.

The programme focuses on the development of concepts to a mature engineering level, proving feasibility using modern computational methods; this is the current philosophy in the design field. The ability to design large multi-function engineering systems, or structures and components, made from different materials, under complex loading, is of fundamental importance. Design problems of these types are particularly challenging and interesting and form a major area of study on the programme.

Course structure

You follow a number of compulsory and optional course units over two semesters, which typically include:

- Composites
- Engineering Design
- Engineering Optimisation
- Finite Elements
- Reliability and Maintainability
- Research Methods
- Structural Integrity

Progression and assessment

You are required to submit written coursework, and examinations are set at the end of each semester. In total, you undertake approximately eight experimental laboratory classes, eight computational exercises and numerous design type exercises. The dissertation is carried out over approximately four months during the summer period, assuming successful completion of examinations.

Career opportunities

Graduates are well equipped to take up a wide range of opportunities in theoretical and applied research, or professional posts in project appraisal, implementation and management, or structural design and analysis.

Duration

Full-time – 12 months

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	No	No	No
MSc Research	Yes	No	No	No

MSc Renewable Energy and Clean Technology

This programme is administered by The School of Electrical and Electronic Engineering – please make your application to them.

Course description

Replacing fossil fuels with renewable forms of energy and developing energy efficient technologies for electronics, transport and buildings are all at the heart of reducing global CO2 emission. The engineering and science required to create a new, low carbon, renewable energy landscape represents a defining challenge for the 21st century. As we move towards the middle of this century the use of electrical energy will become dominant and ultimately the renewable generation and exploitation of electrical energy is at the heart of this subject.

This subject is multidisciplinary requiring knowledge of energy sources, energy conversion and storage, and power distribution. The optimal exploitation of renewable energy sources depends critically on the local environment and on the way in which climate change will influence that environment.

The REaCT MSc course is designed to provide a sound engineering background into the technology of renewable generation of electricity, its conversion into a form which can be efficiently distributed, and to provide technology insight into the new grid distribution systems which will be needed to exploit renewable power. A truly low carbon economy will also depend on successful energy demand reduction technologies, not only for transport and electronics but also for space heating and heat loss in both domestic and industrial buildings. To plan and organise such dramatic changes in any given geographical location requires knowledge of the energy flow in society and on the dynamics of optimal energy provision in response to climate change.

Course structure

The course structure addresses these inter-related themes using the expertise drawn from the School of Electrical and Electronic Engineering, the School of Mechanical, Aerospace and Civil Engineering, The Tyndall Centre for Climate Change and the Sustainable Consumption Institute. The lecture provision is consolidated with laboratory classes and computer based modelling exercises which provide a strong practical dimension to the course. The MSc dissertation project, which takes place during the summer, is designed to give practical experience in the development of renewable energy and planning of low carbon resources.

The course consists of seven taught units, a project feasibility study and associated dissertation. Laboratory work and other course work tasks are spread throughout the teaching period. The University's e-learning environment is used as a repository for all course related information and for information exchange between students and lecturing staff.

The course includes the following seven taught units:

- Introduction to Renewable Energy and clean Technology Concepts
- Understanding energy as a 'system' driving modern society
- Solar Energy Technologies Wind and marine Energy Technologies
- Interfacing of Clean Energy SystemsSmart Grids and Sustainable Electrical SystemsZero Carbon Built Infrastructure

Four taught units are delivered in the first semester and three taught units in the second semester. The project feasibility report and dissertation project form part of the second semester teaching.

Progression and assessment

Each taught unit is assessed by coursework or laboratory report, with written examinations at the end of each semester. During the second semester, you also produce a feasibility study, which then forms the basis of your dissertation project. The feasibility study will be assessed by means of a feasibility report.

Students who pass the taught element and feasibility study will progress to the project stage. A final dissertation is submitted in September.

Career opportunities

The move to low carbon societies is recognised to be an urgent priority by all national governments of both developed and emerging nations. The REaCT MSc provides a sound training in the key technology areas required to contribute to what amounts to a new industrial revolution. The course develops the broad understanding of energy utilisation in response to climate change which is required for planning new resources at a regional level. These skills provide the basis for a strong professional contribution in this rapidly expanding employment sector.

Duration

Full-time 12 months

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
MSc	Yes	No	No	No

This programme is administered by the School of Electrical & Electronic Engineering

Postgraduate Admissions
School of Electrical & Electronic Engineering
B29, Sackville Street Building
Sackville Street
The University of Manchester
Manchester M13 9PL

Web: www.manchester.ac.uk/eee/react
Email: pgt-eee@manchester.ac.uk
Tel: +44(0) 161 306 4701

programme details

taught programmes

MSc in Structural Engineering

Course description

The programme aims to provide theoretical and practical training in Structural Engineering, leading to a masters degree by examination and dissertation. The content reflects current and likely future practice in structural analysis, design, appraisal, experimental techniques and the use of computers.

Course structure

The programme comprises taught course units and a research project.. Course units include: Elastic and Plastic Analysis of Structures; Structural Dynamics and Stability; Reinforced Concrete Structures; Steel Structures; Research Methods; Conservation of Structures; Fire Engineering; Earthquake Engineering; Finite Elements and Computational Mechanics.

Progression and assessment

The programme commences in mid-September. Initially you follow a programme of lectures, tutorials and assignments with course units assessed by coursework assignments, project work and examinations in January and in May/June. You will spend the remainder of the academic year on a research project, culminating in the submission of a dissertation in September.

Career opportunities

Graduates are well-equipped to take up a wide range of opportunities in theoretical and applied research, or professional posts in project appraisal, implementation and management, or structural design and analysis.

Duration

Full-time – 12 months

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	No	No	No
MSc Research	Yes	No	No	No

MSc in Thermal Power and Fluid Engineering

Course description

This programme is suitable for engineering and science graduates and also engineering professionals who wish to:

- enhance their expertise in engineering thermodynamics, fluid mechanics and heat transfer
- develop their competence in the use of state-of-the-art analytical, computational and experimental methods in the analysis of heat and fluid flow systems for both industrial and research applications

The programme aims to produce postgraduate specialists with:

- advanced understanding of heat and fluid flow processes and their role in modern methods of power generation
- in-depth understanding of numerical and experimental techniques in heat and fluid flow

You will gain training in the theory and practice of a broad range of industrially relevant topics within the fields of thermodynamics and fluid mechanics. The programme is designed specifically to meet the needs of the modern engineer, both in industry and in research or education establishments.

Special emphasis is placed on laboratory work, both to help you gain insight through experimentally observed phenomena, and also to give you practical experience of a wide range of measurement and data analysis techniques. The programme aims to produce engineers with the theoretical and practical skills to enable them to engage in design, analysis, development and testing in areas relating to internal combustion engines, turbines, fluid flows and heat transfer.

All academics that support this course, either through teaching or through supervision of dissertation projects, carry out research in a wide range of fluid mechanics and heat transfer topics.

Course structure

The taught part of the programme consists of 5 compulsory modules and three optional modules from a choice of four. The course units provide essential groundwork for the dissertation and typically include: Fluid Mechanics; Heat Transfer; Computational Fluid Dynamics; Research Methods; Combustion & Internal Combustion Engines; Gas Turbines & Fuel Cells.

Progression and assessment

You are required to submit written coursework, and examinations are set at the end of each semester. In total, you undertake approximately ten experimental laboratory classes, five computational exercises and two essay-type submissions. The research project is carried out over approximately six months, assuming successful completion of examinations.

Duration

Full-time – 12 months

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
MSc Taught	Yes	No	No	No
MSc Research	Yes	No	No	No

programme details

Distance learning programmes

PG Certificate in Pharmaceutical Engineering (elearning)

Course description

The course is designed primarily for those working within the pharmaceutical industry who wish to develop their careers through a distance learning course. It will give students an all-round education in the manufacture of pharmaceutical products. It is particularly relevant to professionals who are seeking a more detailed understanding of the issues involved in setting up and running large scale plant for the manufacture of drugs and other pharmaceuticals.

The course is designed for those who wish to make a shift in their career without the difficulties of attending a full-time course outside of their place of work. Assignments will be given which reflect current issues within their companies and the course will be supervised by those with direct experience of the pharmaceutical industry together with academics from engineering groups at the University of Manchester. It will appeal to engineers, chemical engineers, mechanical building services and control engineers, industrial and manufacturing pharmacists, chemists and bio-chemists.

Following an overview of the industry and analysis of the common processes for making and packaging drugs in their various physical forms, quality issues will be discussed in detail together with the implications for the design and operation of full-scale plant. The course will also evaluate the relationship between the various types of production process, plant design and performance.

Course structure

Students may take up to four individual units with or without assessment as Continual Professional Development (CPD). Four assessed units can be consolidated to make a Post Graduate Certificate.

The units are:

Unit 1

The Pharmaceutical Industry

This unit gives a general summary of the way the pharmaceutical industry is shaped and the major driving forces that make the manufacture and commercialisation of pharmaceuticals different from the manufacture of other chemical products.

Unit 2

Pharmaceutical Processes

The processes for making pharmaceutical products make radically different demands on the chemist (or biochemist) and engineer. It affects in detail the whole design of the plant, how it operates, the control processes within the plant and how the final product is stored and dispatched. This unit describes in detail those differences and its effect on plant economics.

Unit 3

Pharmaceutical Quality

This unit captures the principles of the complex quality and regulatory framework within which the Pharmaceutical industry works, explains the differences in approach to quality and regulation throughout the world and considers the consequences for successful management of pharmaceutical projects.

Unit 4

Facilities – design construction, operation and maintenance

This unit describes how the functional requirements described in unit 2 can be married with the regulatory requirements described in unit 3 via the selection of the proper equipment and the appropriate design, construction operation and maintenance of the manufacturing facility. Issues of sustainability and the reduction of carbon emissions will be discussed in details

Progression and assessment

For those who choose to take the assessed form of the course, the examinations for each unit will take the form of a rolling assessment completed by the end of each unit.

Duration

Part-time 24 months

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
PG Cert	No	No	No	Yes

Specific entry requirements

Postgraduate Certificate entry

Academic entry qualification for the Certificate from the UK: A good first class degree in an engineering or science subject, or a combination of educational and professional qualifications plus relevant experience.

Entry qualification for individual units taken as CPD

For individual course units taken without examination there are no special requirements but an engineering or other relevant science background is highly desirable.

programme details

research programmes

PhD degrees

- **Aerospace Engineering**
- **Civil Engineering**
- **Environmental Engineering**
- **Management of Projects**
- **Mechanical Engineering**
- **Nuclear Engineering**

Additional programme titles may also be available related to specific areas of research activity within the School's specialists interest groups; details of these can be found on the School's website.

Course information

If you are a postgraduate student who relishes the opportunity to undertake a research project with intellectual, scientific, industrial, or commercial challenges, a PhD is for you. Those from industrial backgrounds may also find it possible to partake in this level of graduate work, which is particularly valuable to your training and development.

Depending on your education and work experience, you may register directly for a PhD degree. Some students, however, will initially register for an MPhil degree, where, if satisfactory progress is made after one year, you will progress onto the second year of a PhD.

For both a direct PhD and MPhil-PhD degree, the period of study would be three years full-time or the part-time equivalent. You would also be permitted to register as a writing-up student for 12 months at the end of the degree to complete your thesis.

This programme route is also available as a split-site option, which enables overseas students to split their studies between the UK and their home country. If you would like to take this route, a supervisor must be appointed in the UK and overseas, and confirmation of free time and study plan must be approved by both supervisors.

Application requirements

You may be admitted to a PhD degree only if an appropriate research environment is available for the duration of your degree. This should include the availability of appropriate academic staff to provide supervision and training, other research-support staff, research facilities and learning resources.

If you do not meet the above criteria, but hold a bachelors degree with Lower Second class Honours (or equivalent qualification), you may be admitted to the degree of MPhil in the first instance. Following completion of one year's registration, you will be required to demonstrate, through a formal progress report and meeting, that you have achieved a satisfactory performance in terms of a standard consistent with the award of the degree of MPhil, in order to be allowed to progress to year 2 of PhD registration.

Teaching and learning

The Degree of Doctor of Philosophy (PhD) is awarded by the University in recognition of the successful completion of a period of supervised research and training, the results of which show convincing evidence of your capacity to pursue research and scholarship and make an original contribution and substantial addition to knowledge. The results of this research shall then be embodied in a thesis or other appropriate form and must contain material of a standard appropriate for peer-reviewed publication.

All PhD candidates must undertake a skills audit at the beginning of their degree, and annually thereafter throughout their degree, to determine their research, transferable and generic skills requirements. The audit will provide the basis for a planned programme of skills training and development. The outcomes of the audit and programme of skills development must be agreed by both you and your supervisory team. Your supervisory team will be responsible for ensuring that you have access to the required skills training and development opportunities.

You should demonstrate satisfactory progress before the end of the first year of your research degree by submitting a substantial progress report, which will be discussed at a formal progress meeting with your supervisory team and an independent assessor. Satisfactory performance in the report and progress meeting by those registered for MPhil in the first instance will normally result in transfer to registration for PhD.

Duration

Full-time – 36 months
Part-time – 72 months

Course options

	Full-time	Part-time	Full-time split site*	Part-time split site*
PhD	Yes	Yes	No	Yes

* subject to Faculty approval

Entry dates:

January, April, July, September.

programme details

research programmes

MPhil degrees

- **Aerospace Engineering**
- **Civil Engineering**
- **Environmental Engineering**
- **Management of Projects**
- **Mechanical Engineering**
- **Nuclear Engineering**

The Degree of Master of Philosophy (MPhil) is awarded by the University in recognition of the successful completion of a period of supervised research and training, the results of which show convincing evidence of your capacity to pursue research and scholarship and represent original work that is appropriately located by you within a wider field of knowledge and investigation. The results of this research shall then be embodied in a thesis, or other appropriate form.

All MPhil candidates must undertake a skills audit at the beginning of their degree and annually thereafter throughout their degree to determine their research, transferable and generic skills requirements. The audit will provide the basis for a planned programme of skills training and development. The outcomes of the audit and programme of skills development must be agreed by both you and your supervisory team. Your supervisory team will be responsible for ensuring that you have access to the required skills training and development opportunities.

You may decide not to write up your research for an MPhil degree, but may instead apply to transfer to PhD as a result of your MPhil work. Responsibility for making decisions about those who are registered for an MPhil and wish to transfer to PhD rests with the School's postgraduate committee. Significant factors affecting the decision will be research progress and the likelihood of successfully completing the project at an appropriate level for PhD.

Application requirements

You may be admitted to an MPhil degree only if an appropriate research environment is available for the duration of the degree. This should include the availability of appropriate academic staff to provide supervision and training, other research support staff, research facilities and learning resources.

Teaching and learning

An MPhil degree provides research opportunities if you wish to qualify for a masters degree by the submission of a research thesis. This should detail the results of original work in any one of the School's research fields. The total time required to complete this programme is a minimum of 12 months full-time, or the equivalent part-time study. You may also register as a writing-up student for 12 months at the end of the degree to complete your dissertation.

Subject to satisfactory progress, it is possible to transfer to PhD at the end of the degree, requiring a further two years full-time study, or four years part-time.

Duration

Full-time – 12 months
Part-time – 24 months

Course options

	Full-time	Part-time	Full-time split site*	Part-time split site*
PhD	Yes	Yes	No	Yes

* subject to Faculty approval

Entry dates:

January, April, July and September.

MSc research degrees

- **Aerospace Engineering**
- **Advanced Manufacturing Technology and Systems Management**
- **Civil Engineering**
- **Management of Projects (including Commercial, Construction and Engineering pathways)**
- **Mechanical Engineering**
- **Mechanical Engineering Design**
- **Structural Engineering**
- **Thermal Power and Fluid Engineering**

The programme is designed for postgraduate students who seek to:

- pursue a career in research and/or teaching both in the UK and other countries
- pursue a career in industry or commerce
- further their professional knowledge and standing, by studying and carrying out research in engineering

There is emphasis on self-motivation, particularly when undertaking the dissertation. You are strongly encouraged to build on the formal teaching by studying preprints, published papers and conference proceedings, attending seminars, presentations and group meetings, in order to expand and develop your knowledge of your field and other areas of engineering.

Course aims

The lecture units aim to develop and expand your knowledge and understanding of your chosen research area.

The aims of the research project are to develop:

- your ability to work independently and constructively within a research group in the laboratory or theory environment
- the intellectual and communication skills necessary for you to present and articulate research findings in verbal and written formats
- your skills in numerical manipulation and statistical analysis of data using sophisticated software

Intended learning outcomes

On completion of the MSc programme a successful student will be able to:

- critically assess a project to evaluate the best strategy to achieve the desired outcome
- plan and manage a research project to appropriate timescales and respond and adapt to changing circumstances
- use sophisticated computer software to analyse data
- link the research findings into knowledge obtained variously: in lectures; read in journals; encountered in the laboratory, or obtained by the student from self-questioning, from the lecturers, supervisors and from other research group colleagues (including other students)

Teaching and learning

This programme normally consists of a 120-credit research project and an additional 60 credits of taught content, creating a standard 180-credit postgraduate MSc programme. The programme will last one year and is divided into two phases.

In semester one (September to January), four taught units to the equivalent of 60 credits are taken and assessed. You will choose these from a selection offered by the School from our current postgraduate taught programmes. Units should be agreed by both you and your research supervisor prior to enrolment on this programme and will include a research methodology unit.

Upon successfully completing the taught phase of the programme, you will progress onto the research phase to work full-time on your chosen research project (February to August). This programme is therefore designed to allow you to combine masters level taught units with research skills and training development. A list of taught courses on offer for the MSc by Research will be available shortly. For some idea of the optional units possibly on offer, please see our 'Taught degrees' pages.

Duration

Full-time – 12 months

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
MSc	Yes	No	No	No

Entry date:

September.

programme details

research programmes

EngD research degree

Course description

The Engineering Doctorate is a flagship programme, which provides the opportunity for outstanding engineers to work in industry while obtaining a doctorate level qualification. This programme route ensures engineers who aspire to senior management roles in industry can gain practical experience of working in industry whilst expanding their knowledge through further study. A typical Engineering Doctorate lasts four years and is built around a research proposal which is developed by the University and industrial partners.

Research engineers are expected to spend around three-quarters of their time working directly with their collaborating company. Packages of training courses are tailored to your needs in order to develop management skills, as well as specialist technical subjects. This taught component is assessed and forms an integral part of the degree.

For further information visit the Manchester Engineering Doctorate Programme website and Nuclear Engineering Doctorate Scheme offered by the Dalton Institute:
www.manchester.ac.uk/dalton

Teaching and learning

A Professional, Engineering or Enterprise Doctorate is awarded by the University in recognition of the successful completion of a period of advanced study and research, the results of which show convincing evidence of your capacity to pursue research and scholarship and make an original contribution and substantial addition to knowledge. Such degrees are equivalent to the intellectual challenge of a Doctor of Philosophy (PhD) degree, but are enhanced by additional taught material in professional and technical areas, designed to meet the specific needs of a professional group external to the University and develop your capability of working within a professional context.

Duration

Full-time – four years
Available for UK/EU students only.

Course options

	Full-time	Part-time	Full-time distance learning	Part-time distance learning
EngD	Yes	No	No	No

Entry dates:

January, April, July and September.

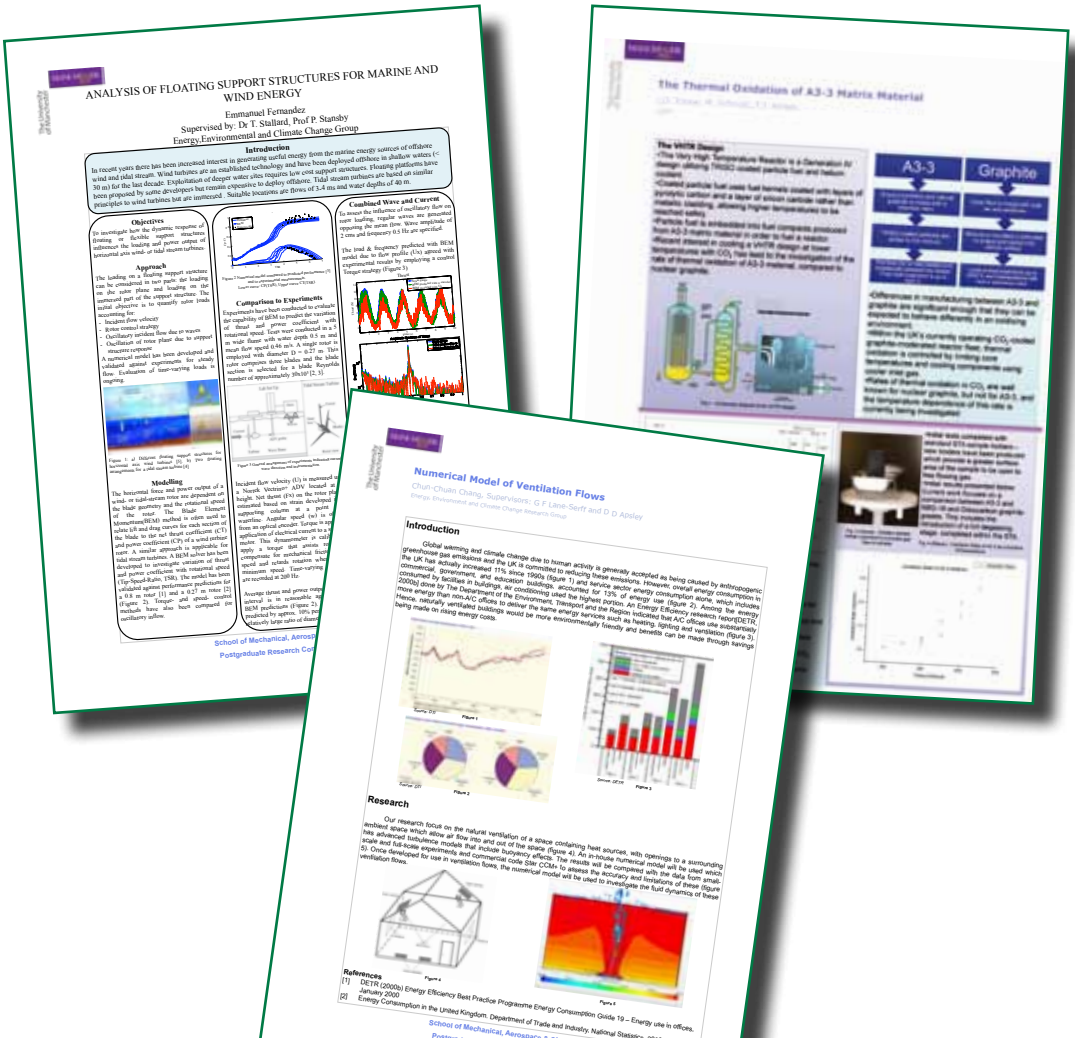
Postgraduate
Research Conference

www.manchester.ac.uk

programme details

Each year the School holds a Postgraduate Research Conference where all current postgraduate research students, together with their supervisors, have the opportunity to showcase their research.

The conference has become an annual event which is supported by the Faculty of Engineering & Physical Sciences (EPS). The focus of the conference is on the presentation of current postgraduate research by the school's MPhil, PhD and EngD researchers. It covers all aspects of research within the School including Aerospace, Energy, Environment & Climate Change, Extreme Loading & Design, Manufacturing & Laser Processing and Nuclear Engineering. Oral presentation sessions of a number of papers from the 60+ submitted take place as well as a poster display which visually illustrate research topics. A selection of posters are below:



Research groups

The School has a range of research groups which reflect our vision of Mechanical, Aerospace and Civil Engineering.

Aerospace

This group undertakes research directly relevant to the aerospace industry and also of a quite fundamental nature.

Manchester has a distinguished history in turbulence modelling (from Osborne Reynolds to Brian Launder) and also in fluids (e.g. Lamb and Goldstein), reflected in aerodynamics and heat transfer research today, coupled with computational fluid dynamics (CFD) and allied to interests in dynamics, composite structures and aeroelasticity.

There is a strong industrial linkage with EADS and Airbus and the group is a preferred academic partner for BAE Systems in experimental aerodynamics and dynamic loads. EU collaboration is particularly strong. There are excellent test facilities for dynamics and aerodynamics, with large wind tunnels at the Goldstein Laboratory.

Specialist Interest Groups (SIG)

- Advanced Flow Diagnostics and Instrumentation
- Computational Fluid Dynamics
- Dynamics and Aeroelasticity
- Experimental Aerodynamics
- Multi-Physics
- Turbulence Mechanics

Energy, Environment and Climate Change group

Energy, environment and climate change research are strongly interlinked. The challenges for energy research will increase against a background of climate change, changing energy provision within the contexts of uncertain world politics, increasing world population, increasing pollution and the need for control and remediation.

The group's environmental research covers hydro/morphodynamic and geotechnical processes, particularly associated with pollution dispersion/migration and sediment transport, the built environment and urban aerodynamics.
There is a strong underpinning capability in computational fluid dynamics and soil mechanics, multi-phase flows, sprays, turbulence modelling and heat transfer.

Specialist Interest Groups (SIG)

- Coastal Processes
- Built Environment
- Geo-Engineering
- Manchester Bobber

Research centres

- The Joule Centre – Created in 2005 with funding from the Northwest Development Agency for energy research on both the supply and demand side
- The Tyndall Centre – Created in 2000, this is a distributed national centre for research into climate change mitigation and adaptation, with Manchester leading on decarbonisation of energy systems / and long-term coastal processes

Extreme Loading and Design group

To ensure a safe society from accidental events (fires, impact, gas explosions, errors in design, etc), natural occurrences (hurricanes, earthquakes, flooding, etc), or terrorist attacks, there is a need to understand both material and whole structural response under extreme loads.

Manchester has a well-known track record in researching the behaviour of structures under fire, explosions, impact energy absorption, dynamic response and high strain rate material response.

The design research team is interwoven with the extreme loading investigations through research into risk and reliability methods. In addition, the design team also concentrates on through-life support of systems, equipment and components. This work comprises conditioning monitoring, single processing, damage detection, and project management.

Specialist Interest Groups (SIG)

- Construction Science
- Impact and Explosion
- Management of Projects
- Reliability, Availability, Maintenance and Safety
- Structures and Fire

Management of Projects group

The research of the Management of Projects special interest group is strongly aligned with the School's taught programmes in the fields of: Commercial Management; Configuration Management; Engineering Management; Project Management and Life Cycle Management.

The group is part of the Centre for Research in the Management of Projects (CRMP), with corresponding research groups at University College London and Manchester Business School.

The group's aim is to support research into diverse aspects of the management of projects. Its research relates to several major research themes in mechanical, aerospace, civil engineering and built environment fields. It predominantly falls within the disciplines of:

- Commercial Management
- Project, Program and Portfolio Management

Current research interests include:

- Application of Neural Networks, Fuzzy Logic, Regression Analysis
- Application of Problem Structuring Methods (PSMs) in Project Management (eg. Soft Systems Methodology)
- Conflict and Dispute Resolution
- Contract Price Prediction and Cost Estimating
- Knowledge Management and Organisational Learning
- Management of Emergency and Urgent Projects
- Procurement Strategy and Systems
- Project Finance
- Risk Management
- Supplier Decision-Making: Decision to Bid and Bid Price Determination
- Value Management

programme details

research groups

Manufacturing and Laser Processing group

In recent years, the nature of manufacturing research has shifted in response to new drivers, resulting in paradigms such as micro/nano manufacturing, sustainable manufacturing, digital manufacturing and innovative material processing (IMP) technologies. This group is not only active in these fields, but also takes a leading role in many of them at an international level.

The manufacturing research group collaborates with over 70 companies in the UK and abroad. Main research themes are:

- Micro/Nano Manufacturing
- Green/Sustainable Manufacturing
- High-Speed Machining
- Materials Modelling
- Rapid Prototyping and Additive Manufacturing
- Bio-medical Manufacturing
- Composite Manufacturing and Materials Modelling
- Digital Manufacturing
- Micro/Nano Metrology
- High Precision, Micro/nano Machine Design
- Non-conventional Manufacturing Technology (Macro-scale)

Research centres

- Laser Processing

Nuclear group

Nuclear energy is the only large-scale provider of low-carbon electricity in the UK, accounting for 22% of our current electricity production. In 2006, there were 23 nuclear reactors operating in the UK, including: eight Magnox reactors, the last due to close in 2010; 14 Advanced Gas Cooled Reactors (AGRs), the last due for decommissioning in 2023, and one Pressurised Water Reactor, due for decommissioning in 2035.

The UK Government must not rule out the possibility that new nuclear build might be necessary at some point in the future in order to meet our ambitions on reducing carbon emissions.

The Government is committed to ensuring that the country continues to sustain its existing nuclear power stations and deal with historic liabilities through the Nuclear Decommissioning Authority.

Internationally, the Generation IV Forum (GIF) has been established, with the objective to identify and pursue research and development needed to develop reactors that could be commissioned from 2030 (or earlier), and which could provide: competitively priced electricity; improved proliferation resistance; exceptional safety performance and waste minimisation advancing on current technology. The GIF collaboration includes the USA, Argentina, Brazil, Canada, France, Korea, Japan, South Africa, Switzerland and UK.

Nuclear Decommissioning Engineering is a major research theme in MACE and is well supported by EPSRC and the Nuclear Decommissioning Agency. The UK has a number of nuclear facilities, fuel reprocessing plants, reactors and research facilities that are now no longer required. A number of 'end of life' options have been considered and a total systems approach to determine the optimum decommissioning strategy for the diverse range of legacy nuclear plants is being undertaken.

Specialist Interest Groups (SIG)

- Computational Fluid Dynamics
- Energy and Multiphysics
- Nuclear Graphite
- Reliability, Availability, Maintenance and Safety
- Turbulence Mechanics

Research centres

- Dalton Institute

How to apply

Please visit the School's Postgraduate admissions pages to find out how to apply for a course:

www.manchester.ac.uk/mace

Email: pg-mace@manchester.ac.uk
Tel: +44 (0)161 306 9219

Course fees

Please see web pages for details – www.manchester.ac.uk/mace

facilities and support




As you'd expect from a world-class institution, The University of Manchester provides a wide range of comprehensive support services and facilities. Here is a brief outline - use the web links to find out more.

Academic Advisory Service

This service, open to all students, offers confidential academic advice and information on matters relating to your academic work and anything affecting your academic progress.

tel +44 (0)161 275 3033
email caas@manchester.ac.uk

www.manchester.ac.uk/academicadvisoryservice

Accommodation

With more than 9,200 rooms, The University of Manchester has more university-managed accommodation than any other university in the country, almost all of which is within two miles of campus. A number of residences are reserved exclusively for postgraduates; in others, every effort is made to room graduate students together.

tel +44 (0)161 275 2888
fax +44 (0)161 275 3213

www.manchester.ac.uk/accommodation

In addition to the University's Halls of Residence, Manchester has a sizeable stock of private accommodation for rent.

tel +44 (0)161 275 7680
fax +44 (0)161 275 7684
email manchesterstudenthomes@manchester.ac.uk

www.manchesterstudenthomes.com

Careers Service

A team of careers professionals who specialise in working with postgraduates offer personal support, training and development opportunities and extensive careers information to postgraduates. Our Careers Service has been voted the best in the UK by employers for five consecutive years; recognition for the work we do to ensure leading employers get the chance to meet and recruit our students.

www.manchester.ac.uk/careers

Childcare

There are two nurseries for children between six months and five years of age.

tel +44 (0)161 272 7121 (Dryden Street Nursery)
tel +44 (0)161 200 4979 (Echoes Nursery)

www.manchester.ac.uk/studentexperience/childcare

Counselling

The Counselling Service can help you with any personal problems that might affect your work or wellbeing. All help is free and entirely confidential

tel +44 (0)161 275 2864
email counsel.service@manchester.ac.uk

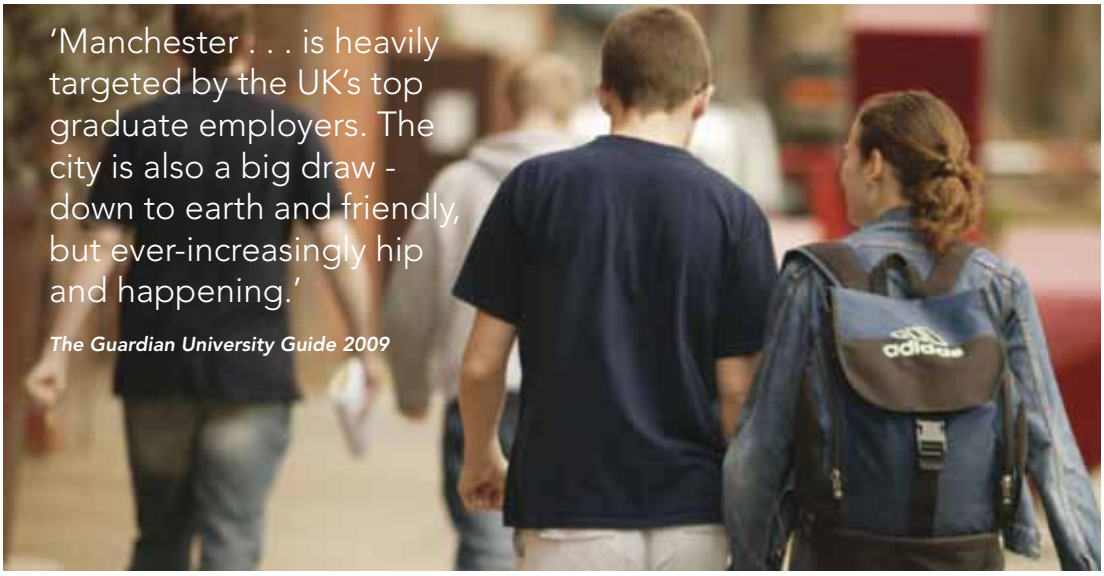
www.manchester.ac.uk/counselling

Cultural facilities

Some of the city's finest cultural venues are right here on the University campus.

Manchester Museum
www.manchester.ac.uk/museum

Whitworth Art Gallery
www.manchester.ac.uk/whitworth



Contact Theatre
www.contact-theatre.org

Jodrell Bank Observatory and Visitor Centre
www.manchester.ac.uk/jodrellbank

Disability support/applicants with additional support needs

We welcome applications from people with additional support needs and all such applications are considered on exactly the same academic grounds as other applications. If you have additional needs arising from a medical condition, a physical or sensory disability, or a specific learning disability, you are strongly encouraged to contact the University's Disability Support Office to discuss your needs, any arrangements that may be necessary and the extent to which appropriate support is available.

tel +44 (0)161 275 7512/8518
fax +44 (0)161 275 7018
minicom +44 (0)161 275 2794
email dso@manchester.ac.uk

www.manchester.ac.uk/dso

International postgraduates

Around 3,000 students from outside the UK are welcomed into postgraduate study at the University every year, representing nearly 180 nationalities. A range of facilities and services are available to make your application and move to Manchester to smoothly, including an arrival guide, a free airport collection service and an orientation programme.

www.manchester.ac.uk/international

IT services

IT Services provides staff and students with extensive computing facilities, as well as a variety of services around the campus for postgraduate research staff.

www.manchester.ac.uk/itservices

Library and information services

The John Rylands University Library (JRUL) is one of the best-resourced academic libraries in the UK and is widely recognised as one of the world's great research libraries.

www.manchester.ac.uk/library

Religious support

There are two chaplaincy centres for the major Christian churches. St Peter's House provides chaplains for the Anglican, Baptist, Methodist and United Reformed Churches, while the Roman Catholic Chaplaincy is at Avila House. Hillel House provides facilities for Jewish worship. Prayer facilities are on campus for Muslim students and there are student societies for many religions.

Sport

We have an active Athletic Union, a diverse Campus Sport programme and a huge variety of health and fitness classes, as well as numerous volunteering and scholarship opportunities.

www.manchester.ac.uk/sport

Student Services Centre (SSC)

The SSC is the place to go in order to complete all your administrative transactions with the University. A team of specialist advisers provides advice and information to all students.

tel +44 (0)161 275 5000
email ssc@manchester.ac.uk

www.manchester.ac.uk/ssc

Students' Union

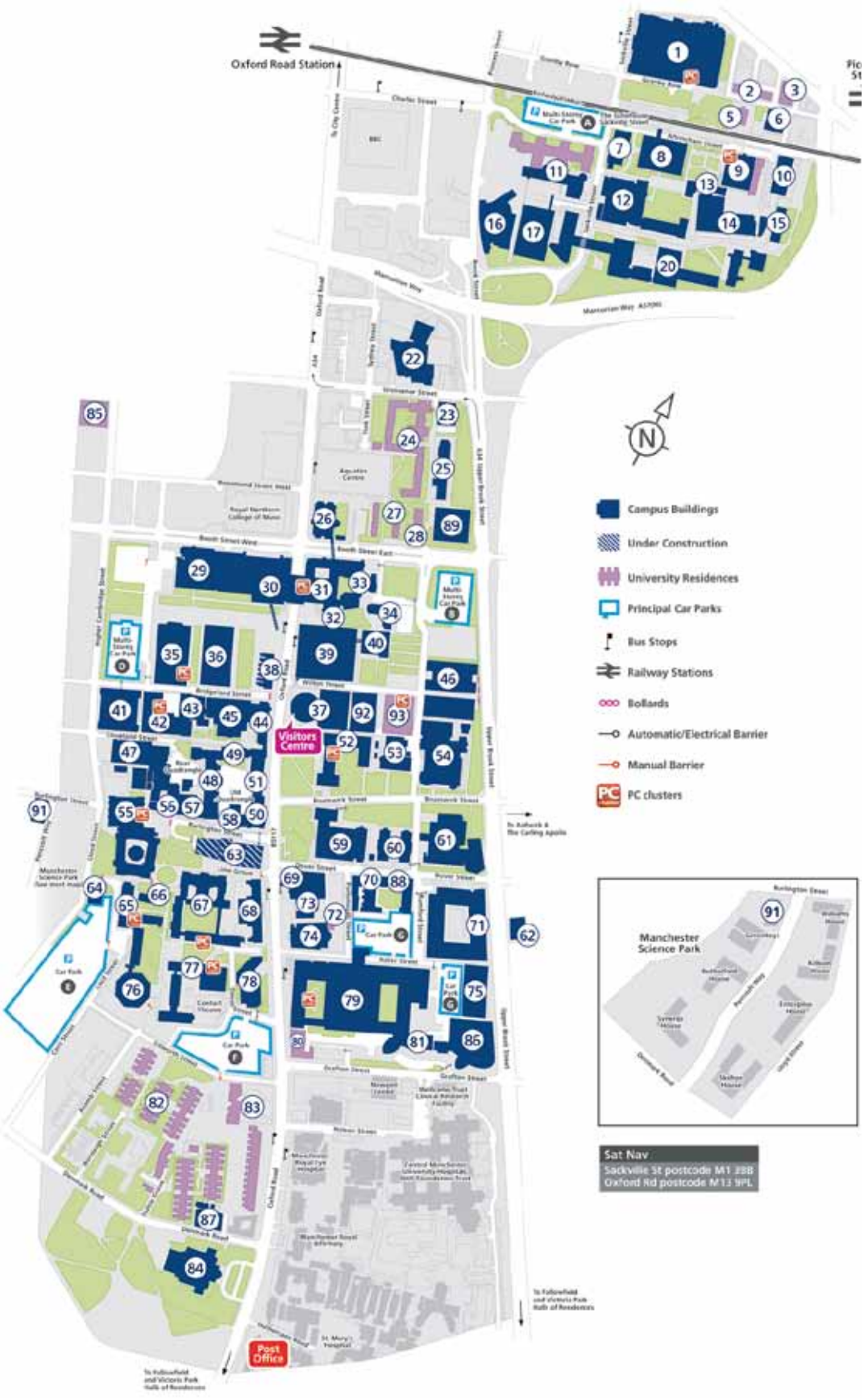
The University of Manchester Students' Union (UMSU) is the largest Students' Union in Europe offering everything from live bands to welfare advice, cheap stationery to student representation. UMSU has some of the largest and most active student societies in the country and complements the University's overall provision of support and welfare services.

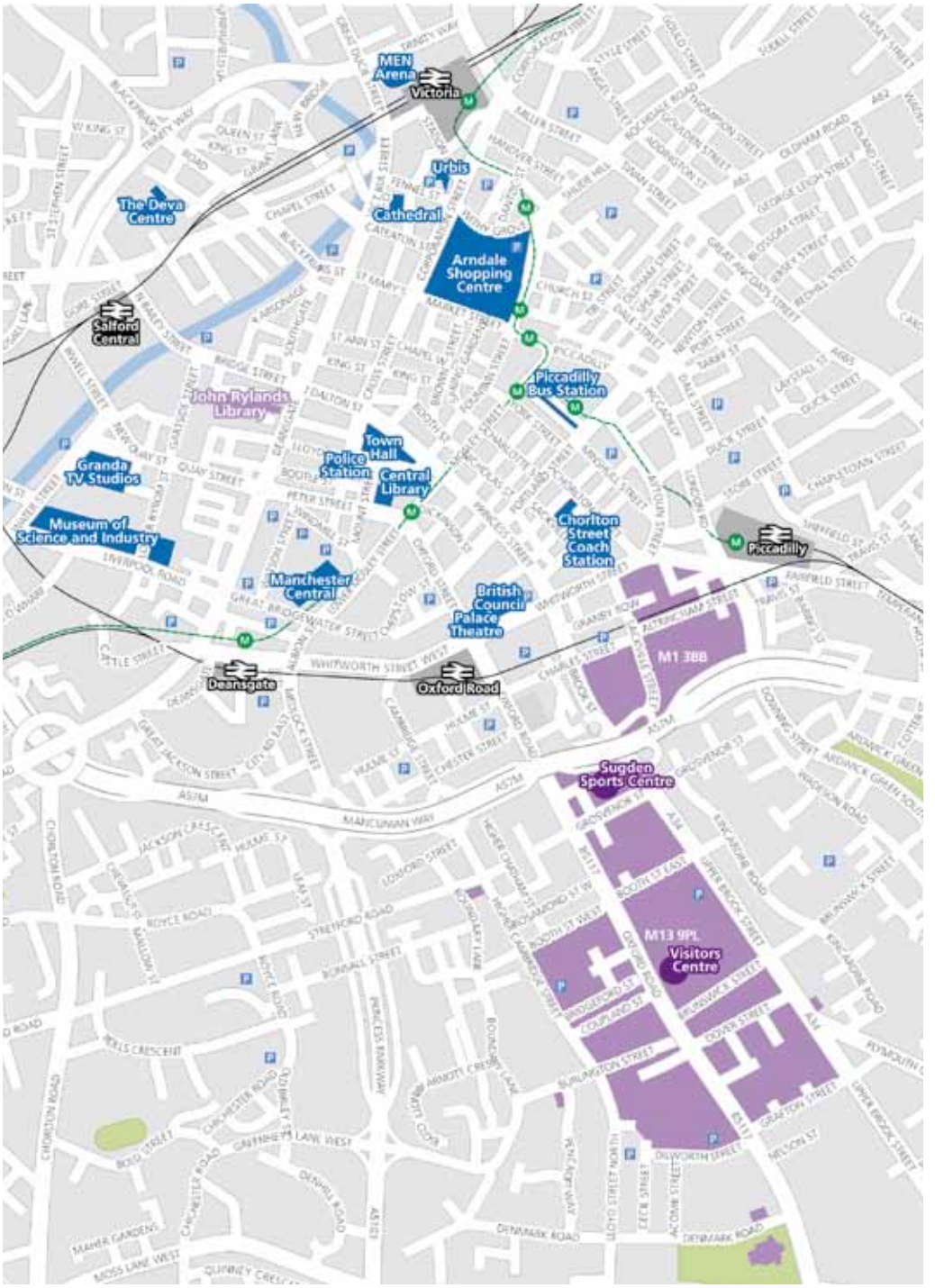
www.umsu.manchester.ac.uk

campus map

1 Sackville Street Building
2 Lambert Hall
3 Fairfield Hall
5 Chandos Hall
6 Echoes Day Nursery
7 Paper Science Building
8 Renold Building
9 Barnes Wallis Building / Students' Union / Wright Robinson Hall
10 Vision Centre / Moffat Building
11 The Manchester Conference Centre and Weston Hall
12 Pariser Building
13 Staff House Sackville Street
14 The Mill
15 Morton Laboratory
16 Manchester Interdisciplinary Biocentre - John Garside Building
17 George Begg Building
18 Faraday Tower
19 Faraday Building
20 Ferranti Building
21 Maths and Social Sciences Building
22 Sugden Sports Centre
23 Oddfellows Hall
24 Grosvenor Halls of Residences
25 Materials Science Centre
26 Manchester Business School East
27 Bowden Court
28 Ronson Hall
29 Manchester Business School West
30 Precinct Shopping Centre
Harold Hankins Building
Devonshire House
31 Crawford House
32 St Peters House / Chaplaincy
33 Crawford House Lecture Theatres
34 Prospect House
35 Humanities Bridgeford Street
36 Arthur Lewis Building
37 University Place Blocks 1 and 2
37a University Place Hall Block 4
37b University Place Block 3
38 Waterloo Place
39 Kilburn Building
40 Information Technology Building
41 Dental School and Hospital
42 Martin Harris Centre for Music and Drama
43 Coupland Building 1
44 The Manchester Museum
45 Rutherford Building
46 Alan Turing Building
47 Coupland Building 3
48 John Owens Building
49 Beyer Building
50 Whitworth Hall
51 Whitworth Building
52 Williamson Building
53 Roscoe Building
54 Schuster Building
55 The Joyn Rylands Library
56 Schunck Building, Burlington Rooms
57 Student Services Centre
58 Christie Building
59 Simon Building
60 Zochonis Building
61 Chemistry Building
62 Dryden Street Nursery
63 Staff House Burlington Street
65 Mansfield Cooper Building
66 Stephen Joseph Studio
67 Samuel Alexander Building
68 Students' Union Oxford Road (also at number 9)
69 William Kay House
70 Dover Street Building
71 Michael Smith Building
72 Vaughan House
73 Avila House RC Chaplaincy
74 Holy Name Church
75 AV Hill Building
76 AQA
77 Ellen Wilkinson Building
78 The Academy
79 Stopford Building
80 Horniman House
81 The Manchester Incubator Building
82 Whitworth Park Halls of Residence
83 Grove House
84 The Whitworth Art Gallery
85 Opal House
86 Core Technology Facility
87 Denmark Building
88 Newman Building
89 Lamb Building
91 McDougall Centre

campus map


Oxford Road Station
Campus Buildings
Under Construction
University Residences
Principal Car Parks
Bus Stops
Railway Stations
Bollards
Automatic/Electrical Barrier
Manual Barrier
PC clusters
Visitors Centre
Post Office
Manchester Science Park
Sat Nav
Sackville St postcode M1 3BB
Oxford Rd postcode M13 9PL



From Piccadilly Gardens Bus Station

(a short walk from Piccadilly Rail Station), take buses 40, 41, 42, 43, 44, 45, 46, 142, 143, 149, 249, 157, W2 or 11. Ask for The University of Manchester Precinct Centre.

From Victoria Rail Station

Either take the Metrolink tram, or walk to Piccadilly Gardens Bus Station (not the Rail Station) and follow the directions above.

Parking

Please note that parking near the School is available in several car parks on campus and in a new multi-storey car park.

how to apply

Our preferred method of application for all postgraduate programmes is via our online application form:

www.manchester.ac.uk/pgapplication

If you are unable to apply online and require a printed application form, contact the Postgraduate Admissions Office:

tel +44 (0)161 275 4740
email pg-admissions@manchester.ac.uk
(remember to include your postal address)

contact details

address

Student Recruitment & Admissions Office
School of Mechanical, Aerospace & Civil Engineering
The University of Manchester
Pariser Building
Sackville Street
Manchester M13 9PL
United Kingdom

tel +44 (0)161 306 9219 (Taught programme enquiries)
tel +44 (0)161 275 4345 (Research programme enquiries)
email pg-mace@manchester.ac.uk
email research-mace@manchester.ac.uk
website www.manchester.ac.uk/mace

Mechanical, Aerospace & Civil Engineering

For further information please contact:

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School of Mechanical, Aerospace & Civil Engineering
The University of Manchester
Pariser Building
Sackville Street
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United Kingdom

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