MANCHESTER 1824

The University of Manchester

CHEMICAL ENGINEERING

POSTGRADUATE COURSES

SHAPE YOUR FUTURE

Learn today, lead tomorrow

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SHAPE YOUR FUTURE: CAREERS

We are ranked 2nd in the UK for research power in Engineering.
Overall research quality in REF 2021

Ranked top ten globally for action towards the UN Sustainable Development Goals.
THE University Impact Rankings 2022

28th best university in the world, 9th in Europe and 6th in the UK.
QS World Rankings 2023

Manchester has been voted the top city to live in the UK, and the third best in the world.
The Economist's Global Liveability Index 2022 and Time Out Magazine survey (2021) respectively

Read more about our rankings and reputation including REF results.

CAREER CATEGORIES

Master's courses at The University of Manchester are designed to build the specialist knowledge and skills you need to enhance your employability and tackle the challenges facing our world today.

Our degrees are delivered with sustainability at their core, to give you the best grounding for the careers of the future. There are common themes and ideas that underpin our master's, which we have illustrated throughout this brochure. Look out for the following across our courses:

A ENERGY CAREERS: our master's courses equip you with first-class analytical skills that prepare you for careers in a world that is working through the energy transition.
B BUILDING SUSTAINABLE FUTURES CAREERS: securing existing infrastructures and planning for future sustainable developments are key aspects of our postgraduate courses.
C LEADING CHANGE CAREERS: a changing world requires new leadership, and our master's courses develop you as decision-makers and forward-thinkers.
D INNOVATING TECHNOLOGY CAREERS: as global priorities evolve, so do technological solutions. Our master's degrees train you in the most current technology and encourage innovations for our future.
E RESEARCH FOR NEW HORIZONS: our master's courses can lead you to further study with postgraduate research programmes (PhDs) where you will investigate solutions and methods for future science and engineering practitioners.

CAREERS SERVICE

As a postgraduate student you may already have a career path in mind, but we'll do all we can to help you get there. We'll give you the opportunities to develop your skills and networks, and support tailored to your needs.

Our first-class Careers Service offers support and advice throughout your time at The University of Manchester, to help you make the most of your time here and best prepare you for your future. From CV and application advice to employer workshops and our job platform Career Connect, the Careers Service for students and graduates can help to put you in the best position to secure employment and act as a launchpad for your long-term career aspirations.

SUSTAINABILITY

LEADING THE WORLD ON SUSTAINABLE DEVELOPMENT

The quality and scale of our research, when compared against the UN's Sustainable Development Goals (SDGs), has been ranked in the top ten globally by the Times Higher Education University Impact Rankings in 2022.

The 17 SDGs are the world's call to action on the most pressing challenges and opportunities facing humanity and the natural world, and we are playing a leading role in tackling them.

As one of the world's leading research institutions, as well as being the only university in the UK to have social responsibility as a core goal, The University of Manchester is proactively tackling the SDGs in four ways – through our research, learning and students, public engagement activities and responsible campus operations.

Our 2021/22 SDG report outlines how we are tackling the SDGs.

OUR MASTER'S COURSES CONNECT WITH THE FOLLOWING UNITED NATIONS SUSTAINABILITY DEVELOPMENT GOALS:

- Goal 7: Affordable and clean energy
- Goal 9: Industry, innovation and infrastructure
- Goal 12: Responsible consumption and production
- Goal 15: Life on land

FACILITIES AND RESOURCES

In our £12 million James Chadwick Building you will have access to modern lab spaces and a famed pilot scale area with a range of large-scale industrial processing equipment. It is one of the biggest and best equipped of any European university.

See our outstanding facilities for yourself through our virtual open day.

THE FUTURE OF LEARNING IN MANCHESTER

Our Home for Engineering and Materials is transforming the way our students study, research, and shape the world forever. Now, more than ever, is the time to study at The University of Manchester.

At the heart of the building's design is a desire to bring together all disciplines, in one connected and dynamic environment. The space supports a variety of teaching and learning styles, through blended lecture theatres, multi-purpose study spaces and over 250 state-of-the-art laboratories. There is also a range of technical spaces to help encourage students to shape their own learning environment.

We want our facilities to show ambition as well as recognise the real-world challenges that students will face in addressing some of the most pressing issues of our time. Our Home for Engineering and Materials boasts some of the most unique, industry-leading equipment and instrumentation in the sector to meet today's requirements and those of the future.

Explore Our Home for Engineering and Materials.

MSC ADVANCED CHEMICAL ENGINEERING

Read more about this course

Modern chemical engineering is a vast subject extending far beyond its traditional roots in oil and gas processing. As well as dealing with chemical reactors, distillation, and the numerous unit operations that take place in a processing plant, there is an increasing need for chemical engineers with skills in rapidly changing sectors such as renewable energy, sustainable resources and processing, and biotechnology. Advanced Chemical Engineering is a multidisciplinary masters, tackling global challenges informed by industrial needs and innovative research.

THIS COURSE COULD LEAD YOU TO A CAREER IN ONE OF THE FOLLOWING CATEGORIES:

A ENERGY CAREERS
B BUILDING SUSTAINABLE FUTURES CAREERS
D INNOVATING TECHNOLOGY CAREERS

WHERE DO OUR GRADUATES WORK?

- Unilever
- Shell Petroleum Development Co
- GlaxoSmithKline (GSK)
- Chevron
- ExxonMobil
- AkzoNobel
- Jacobs
- Schlumberger
- Intel
- Procter & Gamble

WHAT DO OUR GRADUATES DO?

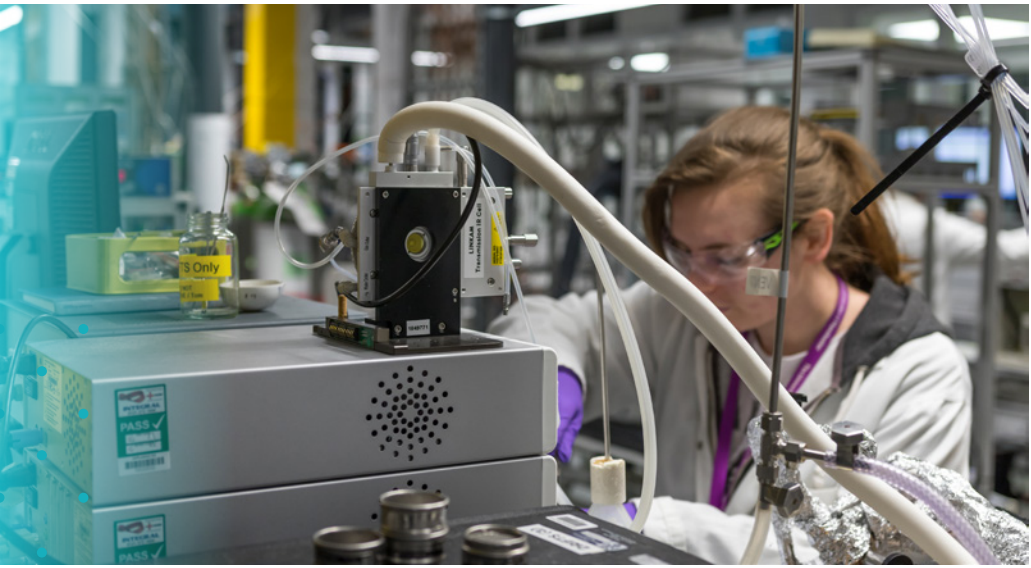
- Professor
- CEO/Business President
- Chemical/Process Engineer
- Technical Services Manager
- R & D Manager
- Managing Director
- Environmental/Sustainability Engineer
- Petroleum Engineer
- Application Engineer
- Engineering/Scientific Consultant

"I really enjoyed the versatility of the prospects that the course offered due to the diverse range of modules included. The mix of students was also really nice; off the top of my head between 15 – 20 nationalities were represented. The funny thing is, Nigerians still made up over 60% of the class, so I felt right at home."

Nasiru Mohammed
MSc in Advanced Chemical Engineering

COURSES IN RELATED SUBJECT AREAS:

MSc Renewable Energy and Clean Technology
MSc Geoscience for Sustainable Energy
MSc Petroleum Geoscience (Exploration and Reservoir Development)



UNITED NATIONS SUSTAINABILITY DEVELOPMENT GOALS:

The Department of Chemical Engineering contributed to The University of Manchester's no.1 THE Impact Ranking. Our 2021/22 SDG report specifically highlights the Department as developing 'a free, award-winning carbon footprint tool that can be tailored to different industrial sectors. The tool offers a quick and easy method for identifying carbon hot spots and opportunities for reducing emissions and enables organisations to accurately assess and manage their carbon emissions.

The MSc course offers electives on 'Sustainable Resources and Processing' and 'Sustainable Energy Systems'

ENTRY REQUIREMENTS AND PREREQUISITES:

A 2.1 (upper second-class honours) first degree in Chemical Engineering or a closely related engineering discipline, or equivalent qualifications/experience. Applicants with a 2.2 will be considered and are welcome to apply.

IELTS: at least 6.5 overall with no sub-test below 6.0.

This course is accredited by the Institution of Chemical Engineers (IChemE).

MSC ADVANCED PROCESS INTEGRATION AND DESIGN

Read more about this course

A specialised master's in Chemical Engineering, the MSc Advanced Process Integration and Design started in the Department of Chemical Engineering (UMIST) over twenty years ago. The course was a result of emerging research from the Centre for Process Integration, initially focused on energy efficiency, but expanded to include efficient use of raw materials and emissions reduction. Much of the content of the course stems from research related to optimizing processes using conventional and renewable energy supplies with an emphasis on making processes more sustainable.

The MSc aims to enable students with a prior qualification in chemical engineering to acquire a deep and systematic conceptual understanding of the principles of process design and integration in relation to the energy and chemicals sectors of the process industries.

THIS COURSE COULD LEAD YOU TO A CAREER IN ONE OF THE FOLLOWING CATEGORIES:

A ENERGY CAREERS
B BUILDING SUSTAINABLE FUTURES CAREERS
E RESEARCH FOR NEW HORIZONS

WHERE DO OUR GRADUATES WORK?

- The University of Manchester
- ExxonMobil
- Shell
- BP plc

UNITED NATIONS SUSTAINABILITY DEVELOPMENT GOALS:

The Department of Chemical Engineering and Analytical Science contributed to The University of Manchester's no.1 THE Impact Ranking. Our 2021/22 SDG report specifically highlights the Department as developing 'a free, award-winning carbon footprint tool that can be tailored to different industrial sectors. The tool offers a quick and easy method for identifying carbon hot spots and opportunities for reducing emissions and enables organisations to accurately assess and manage their carbon emissions'

The MSc additionally offers a module entitled 'Sustainable Energy Systems' within the degree course.

COURSES IN RELATED SUBJECT AREAS:

MSc Renewable Energy and Clean Technology
MSc Geoscience for Sustainable Energy
MSc Petroleum Geoscience (Exploration and Reservoir Development)

ENTRY REQUIREMENTS AND PREREQUISITES:

A 2.1 (upper second-class honours) first degree in Chemical Engineering or a closely related engineering discipline, or equivalent qualifications/experience. Applicants with a 2.2 will be considered and are welcome to apply.

IELTS: at least 6.5 overall with no sub-test below 6.0

This course is accredited by the Institution of Chemical Engineers (IChemE).

MSC SUBSURFACE ENERGY ENGINEERING

Read more about this course

This course is jointly developed with the Department of Earth and Environmental Sciences

It is expected that two-thirds of the global energy to be covered by renewable sources by 2050. However, the transition away from fossil fuels requires an integrated approach, utilising existing energy sources and developing new technologies that both decarbonise and provide new sources of energy. Geosystems play a critical role in this process, offering sources of both fossil fuels (oil and gas) and renewable energy (e.g. geothermal energy) alongside capacity for decarbonisation through geological CO2 sequestration.

Our MSc Subsurface Energy Engineering will give a unique opportunity to students - with a prior qualification in engineering - to learn engineering and modelling skills required to understand these systems.

Focus on the modelling and simulation of subsurface properties, processes in industrial applications to assist with the transition to a cleaner energy system; carbon capture and storage; geothermal energy; groundwater resources and ground mechanics and stability.

THIS COURSE COULD LEAD YOU TO A CAREER IN ONE OF THE FOLLOWING CATEGORIES:

A ENERGY CAREERS **B BUILDING SUSTAINABLE FUTURES CAREERS**
D INNOVATING TECHNOLOGY CAREERS **E RESEARCH FOR NEW HORIZONS**

WHERE DO OUR GRADUATES WORK?

- Shell
- BP
- TOTAL
- Jacobs
- Aspen Tech

"Petroleum engineering and Dr Vahid ignited my interest in reservoir engineering, it is a fascinating field where one is constantly catching up to nature. I took on the Ph.D. under his supervision, my life's best decision. Petroleum engineering and a Ph.D. in Multiphase flow in porous media has given me a solid understanding of the fundamental principles in reservoir engineering."

Rimsha Aziz
BEng Petroleum Engineering graduate and
PhD in multiphase flow in porous media
Now working as a Production Optimisation Reservoir Engineer

COURSES IN RELATED SUBJECT AREAS:

MSc Renewable Energy and Clean Technology
MSc Geoscience for Sustainable Energy
MSc Petroleum Geoscience (Exploration and Reservoir Development)

WHAT DO OUR GRADUATES DO?

Students will acquire a deep and systematic conceptual understanding and practical engineering skills needed for diverse industrial applications such as reservoir engineering, geothermal engineering, and carbon sequestration. Additionally, the course offers unique opportunities to talented students to work with the industry during their MSc research project.

UNITED NATIONS SUSTAINABILITY DEVELOPMENT GOALS:

Chemical Engineering contributed to The University of Manchester's no.1 Times Higher Education Impact Ranking. Our 2021/22 SDG report specifically highlights the Department as developing 'a free, award-winning carbon footprint tool that can be tailored to different industrial sectors. The tool offers a quick and easy method for identifying carbon hot spots and opportunities for reducing emissions and enables organisations to accurately assess and manage their carbon emissions.'

The MSc additionally offers a Subsurface Physical Chemical Process taught unit and research projects related to industrial applications required for future sustainable energy (e.g., geological carbon storage, hydrogen storage, geothermal energy).

ENTRY REQUIREMENTS AND PREREQUISITES:

Upper second (2.1) class honours degree (or overseas equivalent) in engineering subjects (chemical, civil, mechanical, petroleum engineering), or in geological sciences (geology, geophysics, petroleum geology, petrophysics, hydrogeology) with an evident background in engineering mathematics. Relevant industrial experience may also be considered alongside a previous degree.

IELTS: at least 6.5 overall with no sub-test below 6.0.

ACADEMICS AND THEIR RESEARCH

VAHID NIASAR, PROFESSOR OF SUBSURFACE ENGINEERING AND POROUS MEDIA PHYSICS, DEPARTMENT OF CHEMICAL ENGINEERING, DIRECTOR OF SUBSURFACE ENERGY ENGINEERING MSC COURSE.

Vahid Niasar's research delivers engineering solutions to diverse porous media topics from subsurface hydrology and petroleum engineering to renewable energy, fuel cells and batteries. In his research team, IMPRES they develop computational and experimental techniques to investigate multiphase flow, reactive transport, solid-fluid and fluid-fluid interfaces, and non-classical theories of porous materials to address fundamental problems and propose engineering solutions for different applications.

Vahid aims to address issues related to energy transition, Net Zero and environment including industrial problems such as geological CO2 and hydrogen storage, electrochemical energy engineering such as fuel cells and flow batteries, groundwater and environment.

DR. MARIA PEREZ-PAGE, LECTURER IN CHEMICAL ENGINEERING

Maria is Lecturer in Chemical Engineering and teaches Multicomponent Engineering Separation and Advanced Separation process in the BEng and MEng Chemical Engineering degree.

Her research interest is focused on membrane technology for separation process and electrochemical energy devices.

She investigates new materials to develop thin films, which can act as molecular sieves, more specifically on the synthesis and characterization of layered materials such as graphene and other 2D-materials and their applications as membrane material in separation process such as

gas separation, pervaporation or membrane distillation. In this field, she is looking for a good trade-off between high fluxes and high selectivity.

Her research is also focused on the design and development of high selective membrane for the application on different electrochemical energy devices such as fuel cells, redox flow batteries and electrolysers. She is working on different polymer materials to synthesized 2D-based materials-composite membranes to less prone the crossover of key species, but at the same time allowing ion conductivity. Additionally, she develops catalyst to enhance the performance of the reactions involved in fuel cells and electrolysers using 2D materials. Her ultimate aim is to develop strong and versatile understanding than can be applied for the development of ion-exchange membranes and catalyst for a wide range of electrochemical applications.

Maria's research is currently supported by a Programme EPRSC grant "SynHiSel" linking membranes researches at six different Universities within UK and an EPRSC grant "Design, Program, Evolve: Engineering efficient electrochemical devices for a net-zero word" linking experts on electrochemistry at three different Universities in UK.

JAMES WINTERBURN, SENIOR LECTURER IN CHEMICAL ENGINEERING

James leads a research group focused on industrial biotechnology with well-established research interests in the development of efficient manufacturing methods for bio-based products and chemicals, via a bioprocessing and biochemical engineering route. This covers the whole process from feedstock processing and pre-treatment to fermentation process development, downstream separation and application testing. This work is key to the transition to a circular, low carbon economy and contributes to several UN sustainable development goals including "12 - Responsible Consumption and Production" and "13 – Climate Action".

James' research into the efficient and sustainable production of biosurfactants, green alternatives to crude oil derived surfactants used as ingredients in many applications including personal and household care, has been successfully commercialised through the spin out company Holiferm, of which he is a Co-Founder and Technical Director. These efforts were recognised by the BBSRC Innovator of the Year Early Career Award 2018. Holiferm is supported by more than $9M in venture capital investment from ICOS Capital, Rhapsody Venture Partners and the Clean Growth Fund and works with companies including BASF and Sasol. Holiferm won the Innovation Award at the Chemicals Northwest Awards 2022 for the patented gravity separation fermentation technology invented in the Department of Chemical Engineering.

PRACTICALITIES

PRACTICALITIES - FEES, FUNDING, AND SCHOLARSHIPS

Your master's fees will cover the cost of your study at the University as well as charges for registration, tuition, supervision, examinations, and graduation. Tuition fees also entitle you to membership of our libraries, the Students' Union, and the Athletic Union.

If you require funding for your master's course, it is advised that you begin looking as soon as possible. A range of funding options may be available to you, which will differ depending on whether you are a student from the UK or an international student (including the EU).

Check the tuition fees for your chosen course, your fee status, and funding opportunities by visiting our master's fees and funding webpage.

ACCOMMODATION

For most of you, Manchester won't just be your next stage of education; it'll be your new home for a year or more. From the moment you arrive, you'll be able to access support to help you make the most of your time in university accommodation. You'll find a range of accommodation options for postgraduate students, from contemporary and traditional halls of residence to a specialist advice service for those interested in private letting.

An offer of residence in university accommodation is guaranteed to all overseas postgraduate students for the duration of their studies, provided they meet conditions related to offer holder status and study mode. If your application falls outside the conditions of the guarantee, you are still welcome to apply for university accommodation.

Find out more on the accommodation website or explore our interactive map

This brochure was created in 2022/2023. It has therefore been created in advance of course starting dates and for this reason, course information may be amended prior to you applying for a place. There are a number of reasons why changes to course information and/or published term dates may need to be made prior to you applying for a place – more details can be found on our website. Prospective students are therefore reminded that they are responsible for ensuring, prior to applying to study, that they review up-to-date course information by searching for the relevant course at: manchester.ac.uk/study/masters/courses/

Further information describing the teaching, examination, assessment, and other educational services offered by The University of Manchester is available at: manchester.ac.uk/study/masters/

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