MANCHESTER
1824
The University of Manchester

Chemical Engineering and Analytical Science

2020
Undergraduate brochure

Chemical Engineering at Manchester

"There has never been a better time to undertake a career path in chemical engineering. In the 21st century, mankind faces great challenges in providing sustainable supplies of energy, in protecting our environment, supplying clean water and adequate food for all and in developing benign processes for the chemical and pharmaceutical industries."

Professor Christopher Hardacre
Head of Department, Chemical Engineering

Chemical engineering is ranked as the 4th highest paid graduate job (The Times Good University Guide, 2018).

Ranked 4th in the UK for Chemical Engineering and 26th in the world (QS World University Rankings 2019).

Enjoy access to the largest and best-equipped pilot scale area of any UK University.

Manchester is the birthplace of chemical engineering.

Our courses have industry focus and real-world relevance and are all accredited by the IChemE.

What is Chemical Engineering?

Chemical engineering is sometimes also called ‘process’ or ‘manufacturing’ engineering and is concerned with designing processes to carry out molecular transformations at large scale, in order to provide the products and materials we all need. Chemical engineers take raw materials and, through an understanding of the underlying engineering and scientific principles, turn them into useful products via chemical or biological reactions. The main challenge chemical engineers overcome is carrying out a process developed by a chemist in a laboratory at industrial scale.

Without chemical engineers, we wouldn’t have chocolate, painkillers, plastics, antibiotics, paper, ink, detergents, petrol, paint, or toothpaste. Chemical engineers are widely employed by major manufacturing companies and are among the highest paid of the different engineering professions. Working in industry, chemical engineers manufacture essential products and generate profit for companies by adding value to raw materials in a safe and cost-effective way.

Chemical engineering jobs can focus on any part of a process, for example:

- **Designing and selecting equipment**
- **Solving process problems**
- **Designing procedures to ensure safety and minimise environmental impact**
- **Being responsible for daily plant operations**
- **Determining process economics**
- **Developing and researching new products.**

What will I learn?

The technical aspects of chemical engineering revolve around managing the behaviour of materials and chemical reactions.

This means predicting and manipulating compositions, flows, temperatures and pressures of solids, liquids and gases. You will discover how to understand and describe chemical, physical and biological processes using mathematical equations, as well as learning about and getting hands-on experience of using the equipment and techniques applied in industry for large-scale manufacturing. At Manchester, safety and sustainability are also studied in depth. You will develop skills that will be of great use to you in your future career, such as teamworking, problem-solving, communication and the use of information technology.

How does chemical engineering relate to subjects studied at school?

In physics and mathematics courses at school you will have learned basic heat-transfer (eg, conduction, convection and radiation) and calculations of motion and momentum. From chemistry classes you have probably carried out process operations – such as distillation and filtration – on a small scale, and you may have studied the gas laws and factors influencing chemical reaction rates. These are some of the topics that chemical engineers study in depth.

For more information about chemical engineering, see the Institution of Chemical Engineers website:
www.whynotchemeng.com

BEng Chemical Engineering

As part of this degree you'll study a range of core material incorporating the fundamentals of chemical engineering. You'll discover how to understand and describe chemical, physical and biological processes using mathematical equations, as well as learning about and getting hands-on experience of using the equipment and techniques applied in industry for large-scale manufacturing. The third year design project, a key component of all our Chemical Engineering degree courses, gives you the opportunity to work in a team to undertake an open ended project to design a complete production process.

MEng Chemical Engineering

Like the BEng course, our four-year MEng course incorporates the fundamentals of chemical engineering and the design project. In addition, you can then choose a specialist theme in the final year, such as sustainable development and industry or advanced biotechnology, through which you'll gain a deeper understanding of areas of advanced chemical engineering. You'll also carry out a research project and write a dissertation.

MEng Chemical Engineering with Energy and Environment

Sustainability is a key aspect of this course and, as well as the fundamentals of chemical engineering, you'll take specialist units covering aspects of energy and the environment, such as distributed and renewable energy systems and the nuclear fuel cycle. Sustainability is embedded within the design project and your final year research project will investigate an energy and environment-related issue.

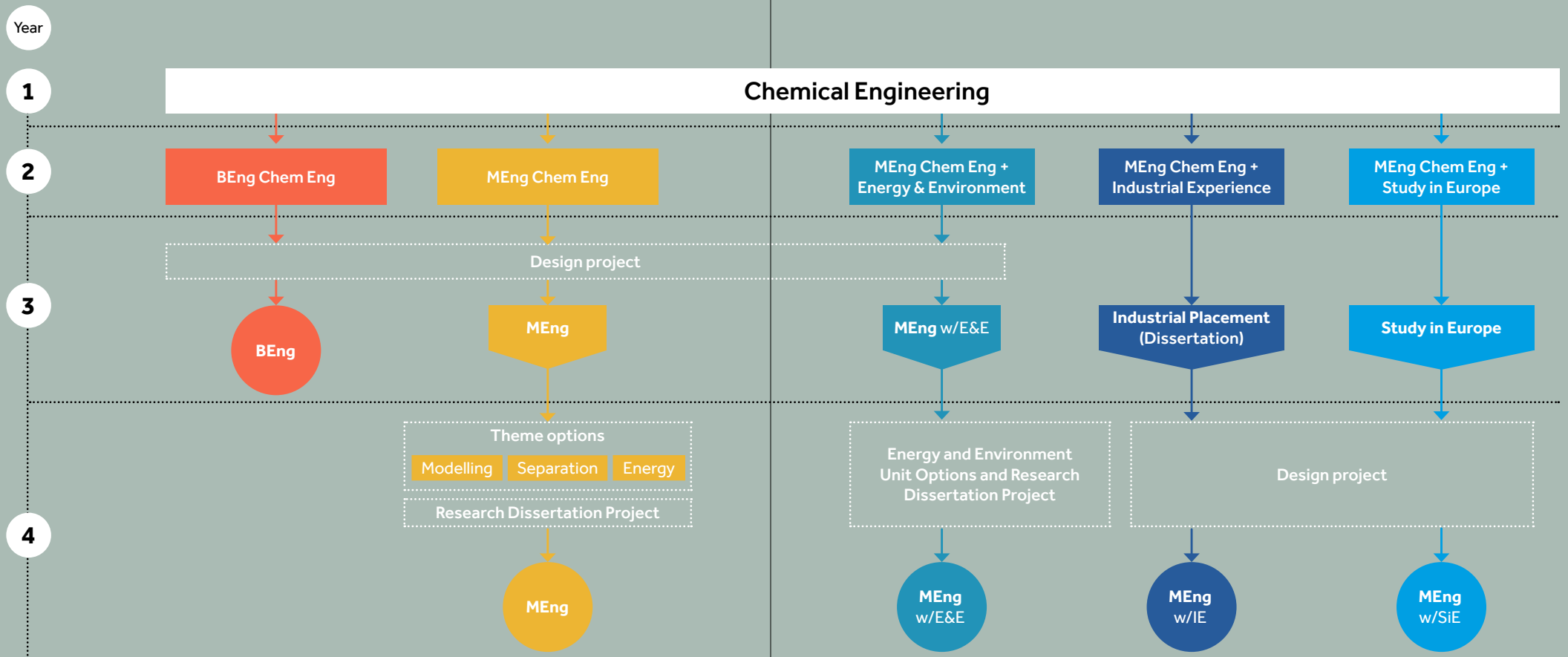
MEng Chemical Engineering with Industrial Experience

In the first two years of this course you'll gain a thorough understanding of the fundamentals of chemical engineering. This will prepare you for a year-long industrial placement, through which you'll gain invaluable experience of working as a Chemical Engineer, at companies such as AkzoNobel, AstraZeneca, BP, JaguarLandRover, Rolls Royce, or one of many others that regularly welcome our students on industrial placement. You'll return to the University in the final year to complete the design project and further specialist units in advanced chemical engineering.

MEng Chemical Engineering with Study in Europe

Alongside learning about the fundamentals of chemical engineering, you can take a foreign language course to prepare you for a year of study in either France, Germany, Italy or Spain. You'll spend the third year at a university in your chosen country where you'll attend lectures and tutorials and take examinations in the local language, as well as preparing a research project report on which you'll be assessed. The design project and further specialist taught units make up the fourth and final year of this course.

Course structure



IChemE accreditation

All our chemical engineering courses are accredited by the IChemE. After gaining appropriate industrial experience, graduates may apply for corporate membership and gain professional recognition as a Chartered Engineer (CEng), with average earnings of £15,000 more per year than their non-chartered colleagues.

Athena SWAN

The Athena SWAN Charter recognises and celebrates commitment to advancing gender equality in academia.

Apply

How to apply

www.manchester.ac.uk/study/undergraduate/applications

Please note that the course units listed in this brochure only represent a sample of the full breadth of available units for each course. Units are reviewed on an annual basis and as such may vary slightly to those advertised.

For up-to-date course information, including unit detail and entry requirements in full, visit our course finder:
www.manchester.ac.uk/undergraduate

Typical offer

BEng/MEng

A-level: A*AA-AAB including Maths at Grade A and either Physics or Chemistry. We would normally require a pass in the Practical Assessment in the newly reformed science A-levels.

IB: 37-35 points overall.
7,6,6 - 6,6,5 in Higher Level subjects including Maths at Higher Level 6 and either Physics or Chemistry.

For full details of our entry requirements:
www.manchester.ac.uk/ugcourses

Our courses

			UCAS code
Chemical Engineering	BEng	3 years	**H800**
	MEng	4 years	**H801**
Chemical Engineering with Energy and Environment	MEng	4 years	**H8F4**
Chemical Engineering with Industrial Experience	MEng	4 years	**H803**
Chemical Engineering with Study in Europe	MEng	4 years	**H810**

Which course?

Choosing your course

Our courses provide broad coverage of principles, techniques and applications and, after the first year, offer considerable choice, enabling you to specialise in areas of particular interest.

Our interdisciplinary and joint courses combine core material from different disciplines, equipping graduates for jobs that require rich skill sets and cross traditional topic boundaries.

Flexible options for changing courses

Undergraduate teaching is modular, with core units shared by the different courses. This means that it is often possible to change between courses up to the end of your first year, and (grades permitting) transfer to the MEng or variant of your course.

Find out more information about our courses at:
www.ceas.manchester.ac.uk/study/undergraduate/courses/2020

Industrial experience

Competition in the graduate job market has risen dramatically over the last ten years, and students are increasingly looking for ways to differentiate themselves.

Our four year MEng Chemical Engineering with Industrial Experience course involves spending a year working in industry as a Chemical Engineer in your third year of study.

As well as the salary that you earn during your placement, you also gain practical experience that can be invaluable, both in your final-year project and when applying for graduate jobs.

Read more about industrial placements at:
www.ceas.manchester.ac.uk/study/undergraduate/industrial-experience

Study abroad

Our Chemical Engineering with Study in Europe course gives you the opportunity to study a modern language alongside Chemical Engineering before spending a year studying at one of our partner universities in the third year - an experience that can boost your prospects in the job market and give you a new perspective on your subject area.

There are also study abroad options for second-year students on other courses, or you can choose an industrial placement in another country if you undertake the MEng with Industrial Experience course.

Read more about studying abroad at:
www.ceas.manchester.ac.uk/study/undergraduate/study-abroad

Facilities & resources

Our facilities are second-to-none and provide students with the very best opportunities:

- **State-of-the-art undergraduate teaching laboratories**
- **A new pilot hall designed for chemical engineering in the 21st century. Benefits of our pilot scale laboratory include:**
  - **Enhanced understanding of chemical engineering theory and a chance to apply theory practically**
  - **Practical experience of safety issues**
  - **Hands-on practical insight into start-up and shutdown principles.**

Visit our virtual open day to see more about our facilities for students:
www.ceas.manchester.ac.uk/virtual-open-day

> "Where's a better place to study chemical engineering than at the birthplace of chemical engineering itself? Laboratory sessions, great lecturers, group problem-based learning sessions and a variety of societies to be part of at the University will mould you into a hardworking engineer. This will give you enough skills and experiences to be utilised to solve real-life problems."

Nilukshan Ananthathavam
MEng Chemical Engineering with Energy and Environment

> "In my opinion, Manchester nurtures you not only to develop the key academic skills that will form the foundations on which to build your professional career, but also to develop the so-called 'soft skills' that will allow you to become the leaders and managers of the future. The impressive thing about the strategy embedded into the teaching at Manchester is that it does not feel overwhelming at all to obtain these skills."

Rameez Mussa
MEng Chemical Engineering

Career opportunities

Chemical Engineering graduates from The University of Manchester :

77%
Employed

14%
Further study

Salaries

UK average	£23,000
UK Chem Eng	£28,603
UoM Chem Eng	£28,644

Further study options

PhD – 37%
MSc – 14%
Most popular qualifications

PhD Chemical Engineering
Most popular course title

MANCHESTER 1824
The University of Manchester
Most popular institution

What our graduates do:

- Chemical engineers
- Data Analytics
- Research and development
- Process engineers
- Business and Finance
- Consultancy
- Banking
- IT

Where our graduates work:

- Shell
- BP
- GlaxoSmithKline
- Saudi Aramco
- Amec Foster
- Wheeler
- ExxonMobil
- Jacobs

Source: HESA, Destinations of Leavers from Higher Education (DLHE)

"Manchester prepared me for a challenging career in nuclear decommissioning. The proactive learning style has benefited me when pursuing opportunities in my career. There is also an international recognition of the standard of Manchester Chemical Engineering graduates that has given me a good base to build on."

Kirsty Donovan
Process Engineer, Sellafield Ltd

"The course is a perfect blend of lectures, coursework, design projects, and exams and enhances one's problem-solving skills. Manchester also gives you the opportunity to work with students from all over the world. This prepared me for my current role where collaboration is key to successfully delivering various projects in a multinational company."

Shobana Simon
Process Engineer, Shell

"The year spent in industry was particularly useful as the challenge of balancing both the academic requirements and the professional workload sets you up well for a career in industry post-graduation. The approach to learning and problem solving that is instilled in students at Manchester is invaluable in adapting to new challenges."

Luke Glynn
Integrated Supply Chain , AkzoNobel

Manchester engineering campus development

A world-leading campus for teaching, learning and research, providing a brand new home for the next generation of engineers and material scientists.

It's a playground for engineers! It's got facilities and spaces - some social, some very technical - to let you work with other people to do some really amazing things.

Its workshops and lab spaces will become amplified centres of creativity, innovation and identity, allowing students to solve problems collaboratively to reflect the way industry works.

Learning will not be confined to the classroom – it will deliver a variety of adaptable and innovative learning spaces, recognising that there is no one right teaching and learning style.

Engineering is about creativity and the first thing you will see when you come into the building is students 'making' and 'doing'.

Our new campus reflects our pride in Manchester's rich academic and civic heritage, while showcasing our ongoing evolution of education and research.

Learning support

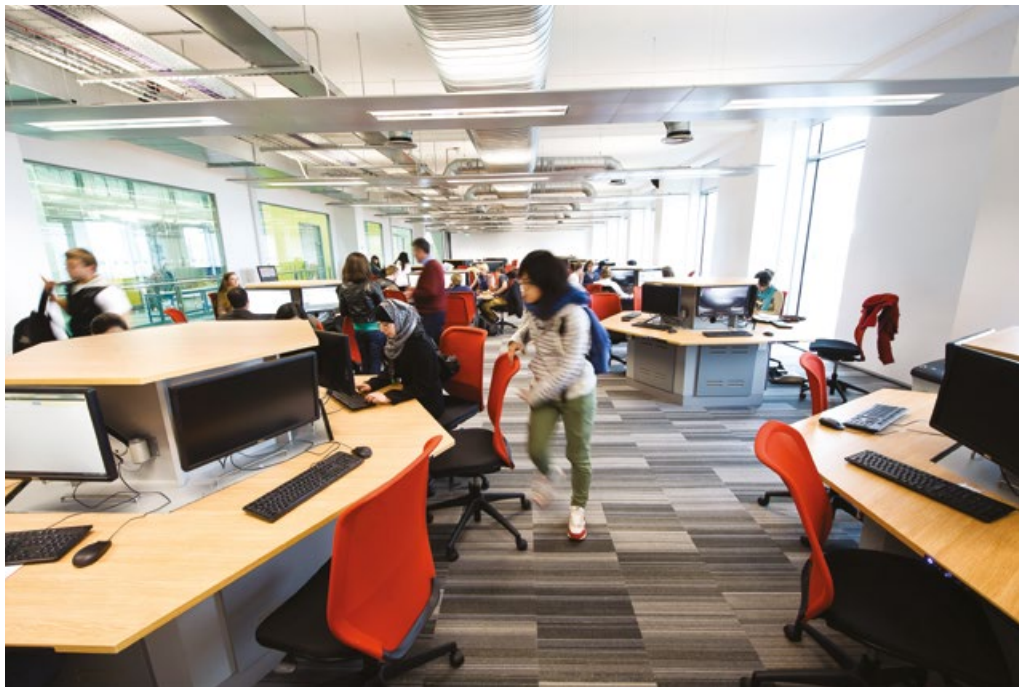
Peer support scheme

Our peer support scheme is one of the largest in Europe. Peer mentors are higher-year students on the same degree programme as you, who will help you find your feet when you arrive here and adjust to student life. As they'll have already been a student at Manchester for at least a year, they should be able to help you with anything you might be worried or unsure about.

PASS *(Peer Assisted Study Sessions)*

Led by volunteer students, PASS sessions will often be based around a specific area of study. You'll have the opportunity to consolidate and build on your existing knowledge through discussion with other students in an informal and supportive environment, where you can compare notes, analyse, ask questions and talk through ideas.

Find out more about the personal and academic support available to you throughout your studies:
www.manchester.ac.uk/study/experience/student-life/university/student-support



Academic advisers

Study with us and you'll be assigned an academic adviser who is there to give advice about any academic issues throughout the duration of your course. Your adviser will be able to help you with the transition from school or college to university – and can help you get to grips with studying and learning more independently. They'll also be able to help you develop your skills in academic writing or research, or any other skills that are specific to your degree programme.

Disability support

If you have additional needs arising from a medical condition, physical or sensory disability, a specific learning disability such as dyslexia, or a mental health difficulty that affects your study, we can provide support. Contact or visit our Disability Advisory and Support Office before you apply, to discuss your needs and the support available.

www.manchester.ac.uk/dass

Women in engineering

The Department of Chemical Engineering and Analytical Science actively works towards generating an inclusive environment for all of our staff and students and has been awarded an Athena SWAN Silver award for its commitment to gender equality in higher education and research.

Read about our Women of Wonder:
www.se.manchester.ac.uk/people/women-of-wonder

Watch the stories of some of the women in our Faculty:
www.mub.eps.manchester.ac.uk/science-engineering/2017/03/06/women-of-wonder

Emily Cooksey

Emily has been a member of The Department of Chemical Engineering and Analytical Science (CEAS) since joining as an undergraduate student in 2010. After completing the MEng programme, she went on to complete PhD studies focusing on creating a microbial fuel cell that uses bacteria to treat wastewater. In 2018, Emily took on a new role of lecturer in Chemical Engineering.

During her time at the University, Emily has been very active in outreach and widening participation work. Here she encourages local school children to consider university as an option and to highlight what chemical engineering has to offer. For this, Emily received both, the Faculty of Science and Engineering, and University of Manchester awards for Outstanding Contribution to Widening Participation.

Her teaching of multiple courses utilises her personal experience of being a student in CEAS, alongside her knowledge of chemical engineering to support students with their studies.

Prof Aline Miller

Professor in Biomolecular Engineering

While in Manchester Aline has gained several awards including the Exxon Mobil Teaching Fellowship in 2004 and in 2008, won The Royal Society of Chemistry MacroGroup UK Young Researchers Medal, and also The Institute of Physics, Polymer Physics Group Young Researchers Lecture Award for her work on self-assembling materials. More recently Aline won the 2014 Philip Leverhulme Prize for Engineering and was shortlisted for the 2014 WISE Research Award. Aline is currently Gender Equality Champion for the University.

"My research interests lie at the life-science interface with emphasis on applying physical principles to mimic, manipulate and improve biomolecular self-assembly. Inspiration for this work comes from nature as it has had many millennia to optimise the production of highly complex and functional structures with 100% efficiency. Excitingly, some of this work is now being commercialised through PeptiGelDesign Ltd, which I co-founded in 2014."

Make your mark with Stellify

"I wanted to try something completely new. Transforming unused and overgrown land into areas where fruit and vegetables can be grown gave my volunteering an environmental focus.

Volunteering is a different experience from study. For me, as a chemical engineering student, it's enabled me to think outside my discipline, which by its nature is very technical.

Here at Manchester, volunteering is embedded in the very heart of the University's culture – there are so many opportunities to try something new, which in turn can have such a positive impact on our communities."

Alessia Xu
MEng Chemical Engineering with Industrial Experience

Read Alessia's story at:
www.manchester.ac.uk/make-your-mark

At Manchester you'll find a whole host of transformational academic and extracurricular activities to help you stand out and make your mark on the world. You could even prove your abilities to potential employers by gaining a prestigious award.

We call this process **Stellify**: to change, or be changed, into a star.

Stellify offers you opportunities to develop and grow at a university leading the way in social responsibility. Here's how.

Learn without boundaries

Enjoy interdisciplinary, international and entrepreneurial study options outside your course.

Understand the issues that matter

Become ethically, socially and politically informed on some of humanity's most pressing global issues.

Make a difference

Contribute to and learn from local and global communities through volunteering.

Step up and lead

Gain confidence and experience by assisting and inspiring your peers.

Create your future

Explore countless opportunities for professional career development.

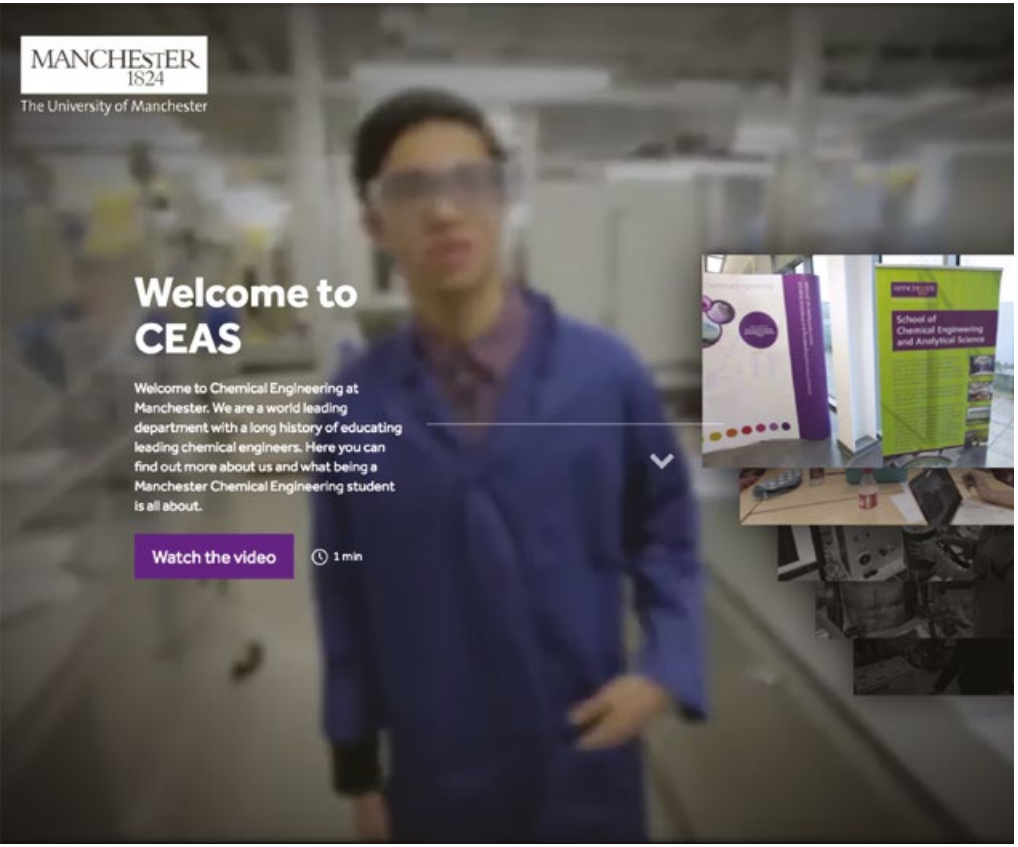
STELLIFY

www.manchester.ac.uk/stellify

Virtual open day

Take a tour of our Department and find out more about student life from the people who know best - our students.

www.ceas.manchester.ac.uk/study/virtual-open-day



"Choosing to study MEng Chemical Engineering at Manchester has got to be one of the best choices I have ever made in my life. During my first year here, I started off vaguely understanding what the course entails and what my future role would be in the University, but now I am crystal clear of what a career in engineering would entail and found that my own interest in engineering strengthened. To sum it up, I am proud to call myself a student of The University of Manchester."

Khor Eugene
MEng Chemical Engineering with Industrial Experience

"The chemical engineering course has provided an amazing opportunity to gain valuable technical skills that I am using during my industrial placement. The logical problem-solving approach to teaching has developed my knowledge and interest in all engineering industries. The course structure provides a good development through team project tasks to independent work, which is invaluable to any career."

Daniel Niblett
MEng Chemical Engineering with Industrial Experience

The University of Manchester

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This brochure was printed in 2019 for the purposes of the 2020 intake. It has therefore been printed 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:

www.manchester.ac.uk/undergraduate/courses

Further information describing the teaching, examination, assessment and other educational services offered by The University of Manchester is available at:

www.manchester.ac.uk/undergraduate