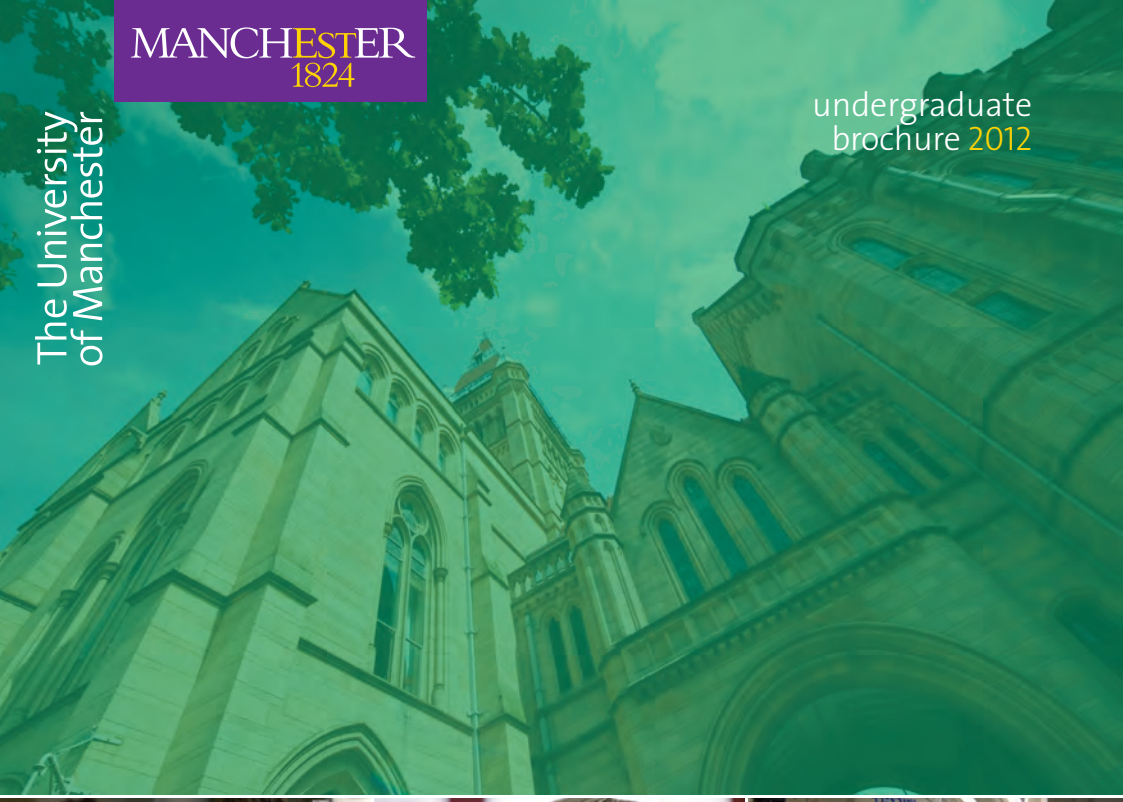
MANCHESTER 1824

The University of Manchester

undergraduate brochure 2012



chemical engineering

engineering and physical sciences

www.manchester.ac.uk/ceas

the facts

contents

- Manchester was the birthplace of chemical engineering
- Largest chemical engineering school in the UK
- Purpose-built building with fantastic teaching and research facilities
- Close industry links give Chem Eng graduates excellent job prospects and earning potential
- Flexible courses with a common first year, allowing you to switch between specialisms
- 4 million books in one of the UK's best university libraries
- Best careers service in the UK
- Guaranteed accommodation for all first-years
- The UK's largest students' union

'Manchester is a place for individuals, brilliant kids who like to do their own thing… and if you are ready it will release you to do the same…'

The Virgin Guide to British Universities

With a distinguished history of academic achievement and an ambitious agenda for the future, The University of Manchester offers you a highly reputable learning experience, rooted in a rich educational heritage and boosted by cutting-edge research and innovation – all at the heart of one of the world's most vibrant cities.

the university

Part of the prestigious Russell Group of universities, Manchester has much to offer you. As well as the outstanding facilities, resources and opportunities found within an institution of this calibre, the University is highly respected amongst academic and business communities alike – a respect that is conferred upon its graduates.

Innovative

Our tradition of success in learning and research stretches back over 180 years, encompassing the birth of the modern computer, the splitting of the atom and the founding principles of present-day economics. All these and many more world-changing innovations have their roots here, at The University of Manchester.

Rated third in the UK in terms of 'research power' in the last Research Assessment Exercise, today we enjoy a global reputation for our pioneering research, which informs our problem-based approach to undergraduate learning.

Internationally renowned

Since 2005, the University has risen in the influential Academic Ranking of World Universities Survey conducted by Shanghai Jiao-Tong University, from 53rd to 44th in the world, and ninth in Europe – confirming us as a progressive and world-class teaching and research institution.

Our campus is home to more than 37,000 students from around 150 countries, creating a diverse and inclusive multicultural community.

Ambitious

Our mission is to become one of the top 25 universities in the world by 2015 and the preferred destination for the best teachers, researchers and students.

It's a goal that we're well on the way to achieving, backed by a multimillion-pound investment programme in facilities, staff and buildings. This includes a virtual learning environment that offers you flexible access to study resources 24/7, and the Alan Gilbert Learning Commons, a new £30 million resource centre for students opening in 2012.

Distinguished

More than 5,600 academic and research staff – many leaders in their fields, with international reputations – provide stimulating learning environments and excellent standards of teaching.

As a Manchester graduate, you will join a prestigious hall of fame, including 25 Nobel Prize winners among our current and former staff and students. We have more Nobel Prize winners on our current staff than any other UK university.

Sought after by employers

Employers actively target University of Manchester graduates, giving you excellent job prospects.

Our worldwide community of 240,000 graduates can be found in top positions in every imaginable field, including Sir Terry Leahy, chief executive of Tesco; former Secretary General of Amnesty International Irene Khan; writer/performer Meera Syal and author Louis de Bernieres.

Full of opportunity

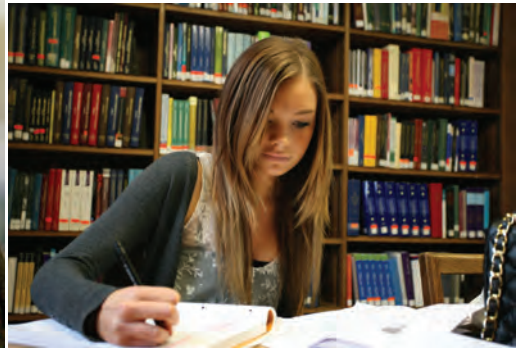
You can take advantage of countless exciting personal development opportunities at Manchester, including career development programmes run by a university careers service that has consistently been voted the best in the UK by graduate recruiters.

Choose The University of Manchester and you will join one of Britain's most forward-thinking universities, which builds on its success year on year – and invites you to do the same.

Find out more…

www.manchester.ac.uk/aboutus

chemical engineering at manchester



A chemical engineering degree from The University of Manchester will give you great choice in your future career and a head start when you come to look for a job. We have a long tradition of innovation and excellence, being the birthplace of the discipline of chemical engineering. Here, George E Davis delivered the first series of lectures on the subject in 1887 and published the first-ever chemical engineering book.

Our students consistently tell us that we are a very friendly School. We have around 550 undergraduate students, plus a thriving postgraduate community, all of whom benefit from our distinguished reputation and our high standards of teaching and research.

In the most recent teaching quality assessment by the Higher Education Funding Council for England, we achieved an excellent 22 out of 24 – one of the highest scores awarded in the country. In the 2008 Research Assessment Exercise, 85% of our research was described as "world-leading" or "internationally excellent", which puts Chemical Engineering at the forefront of research quality.

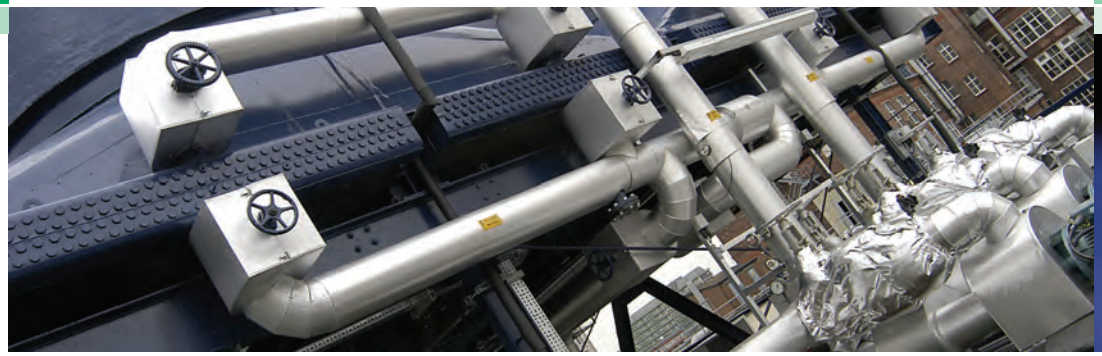
We have close links with industry and our distinguished reputation means that our former students are very well thought of. Our graduates are the most sought-after by employers in industry and business. The most recent National Signposts to Employability Survey (Performance Indicator Project) found that employers prefer to recruit our former students over any other engineering graduates in the UK.

Abigail Ee student
BEng Chemical Engineering

"I am from Singapore and came to Manchester because it has an excellent reputation. I am enjoying the course and the way lectures are conducted. I particularly like the way that the whole teaching environment is much more informal than at home. All the lecturers have been very helpful and friendly."

Manchester offers you…

- A distinguished history in Chemical Engineering at the birthplace of the subject as an academic discipline
- A reputation as a world leader in industrially relevant research and teaching in chemical engineering and related subjects
- A range of prestigious scholarships (open to all nationalities) that reflects the popularity of our graduates with industry
- A step towards a career in chemical engineering – rated as the third highest paid graduate job in a poll by The Times newspaper



Study resources and facilities

Laboratories

Our School has excellent laboratories, including the unique pilot-industrial scale Morton Laboratory, which contains equipment as used in a real chemical manufacturing plant. It is the only one of its type and size in a UK university and is used for undergraduate students to work with large-scale laboratory equipment. This is very different to working in a normal-sized laboratory and will help you to understand the practical problems of controlling processes on an industrial scale.

The benefits of the pilot-industrial scale laboratory include: in-house industrial experience as part of the course; an enhanced understanding of theory; practical experience of safety issues; practical insight into start-up and shutdown principles; and experience of writing technical reports.

There are also several smaller-scale laboratories, where you learn how to plan and undertake experiments, evaluate and operate laboratory equipment, appreciate the safety requirements, and analyse experimental data using graphical and statistical methods.

IT

You will have access to computer clusters across the campus and in halls of residence, as well as more than 100 computers in the School dedicated to chemical engineering students.

New building

In January 2012, the School will move to a brand new, £12 million teaching building. This building will house state-of-the-art computer clusters, an undergraduate teaching laboratory, a bespoke enquiry-based-learning suite and a new pilot hall designed for chemical engineering in the 21st century.

For further information on the new building, see the school website:
www.manchester.ac.uk/ceas/aboutus/newbuilding

Library

You will use the John Rylands University Library, one of the largest academic libraries in Britain, with more than four million books and journals. This includes general and specialist materials, as well as a variety of electronic resources.

Scholarships and bursaries

A range of scholarships and bursaries are available for students who choose to study chemical engineering at The University of Manchester.

Several industrial scholarships are available once you have started the course, with companies such as Shell, BP, Cargill, Air Products and Proctor & Gamble. Further details are available on request from our admissions team.

For international students, the School of Chemical Engineering and Analytical Sciences will award up to ten Morton Scholarships for International Excellence, worth up to £4,000 (£1,000 per year of the course), for those international students who demonstrate overall academic excellence. The University's Faculty of Engineering and Physical Sciences also offers scholarships of £2,000 per year for well-qualified international undergraduate students. For details of eligibility, see:
www.manchester.ac.uk/eps/intschol

Daniel Lipin student
MEng Chemical Engineering with Industrial Experience

"I am from Seattle, USA. I decided to study chemical engineering as I liked chemistry at school, but it was too small a subject – I wanted to apply it to a wider context. I was looking for a place that didn't just teach theory – I liked the look of the pilot-scale laboratory and wanted to get in there. Also, the lecturers on the course are people at the forefront of research."

course details

Chemical Engineering BEng 3yrs
UCAS Code H800

Chemical Engineering MEng 4yrs
UCAS Code H801

Chemical Engineering with Biotechnology MEng 4yrs
UCAS Code H8C5

Chemical Engineering with Industrial Experience MEng 4yrs
UCAS Code H803

Chemical Engineering with Environmental Technology MEng 4yrs
UCAS Code H8F8

Chemical Engineering (Business Management) MEng 4yrs
UCAS Code HN82

Entry requirements

GCSE or equivalent
C English Language

GCE A-level / unit grades
AAA including Maths and a science subject

GCE AS-level acceptability
Acceptable only in combination with A-levels or Advanced Highers

GCE A-level double award
The double award is welcomed; applicants should contact the University for further information

GCE AS-level double award acceptability
Acceptable only in combination with A-levels or Advanced Highers

BTEC National Diploma
DDD any technical subject, providing Maths and Science modules at Level III are included

Welsh Baccalaureate (inc A-levels)
Pass and AA including Maths and a science subject

Scottish Advanced Highers
AAA including Maths and a science subject

Scottish Highers
Acceptable only in combination with A-levels or Advanced Highers

Irish Leaving Certificate
AAAAB including Maths and a science subject

International Baccalaureate
37 points with at least 18 points at Higher Level including grade 6 or above in HL Maths and a science subject

English language requirement
IELTS 6, TOEFL 540, internet-based TOEFL 80 (minimum of 20 in each component), computer-based TOEFL 207

Other subjects
General Studies and Key Skills welcomed, but will NOT form part of the standard offer

Chemical Engineering with Chemistry MEng 4yrs
UCAS Code H8F1

Entry requirements

GCSE or equivalent
C English Language

GCE A-level / unit grades
AAA Including Maths and Chemistry

GCE AS-level acceptability
Acceptable only in combination with A-levels or Advanced Highers

GCE A-level double award
The double award is welcomed; applicants should contact the University for further information

GCE AS-level double award acceptability
Acceptable only in combination with A-levels or Advanced Highers

BTEC National Diploma
DDD any technical subject, providing Maths and Science modules at Level III are included

Welsh Baccalaureate (inc A-levels)
Pass and AA including Maths and Chemistry

Scottish Advanced Highers
AAA including Maths and Chemistry

Scottish Highers
Acceptable only in combination with A-levels or Advanced Highers

Irish Leaving Certificate
AAAAB including Maths and Chemistry

International Baccalaureate
37 points with at least 18 points at Higher Level, including grade 6 or above in HL Maths and Chemistry

English language requirement
IELTS 6, TOEFL 540, internet-based TOEFL 80 (minimum of 20 in each component), computer-based TOEFL 207

Other subjects
General Studies and Key Skills welcomed, but will NOT form part of the standard offer

Chemical Engineering with Study in Europe MEng 4yrs
UCAS Code H810

Entry requirements

GCSE or equivalent
C English Language

GCE A-level / unit grades
AAA. This should include Maths, a science subject and the language to be studied (German, French, or Spanish)

GCE AS-level acceptability
Acceptable only in combination with A-levels or Advanced Highers

GCE A-level double award
The double award is welcomed; applicants should contact the University for further information

GCE AS-level double award acceptability
Acceptable only in combination with A-levels or Advanced Highers

BTEC National Diploma (A-Level grade B equivalent in German, French, Spanish)
DDD any technical subject, providing Maths and Science modules at Level III are included

Welsh Baccalaureate (inc A-levels) (A-Level grade B equivalent in German, French, Spanish)
Pass and AA including Maths and a science subject

Scottish Advanced Highers
AAA including Maths, a science subject and the language to be studied (German, French, or Spanish)

Scottish Highers
Acceptable only in combination with A-levels or Advanced Highers

Irish Leaving Certificate
AAAAB including Maths, a science subject and the language to be studied (German, French or Spanish)

International Baccalaureate
37 points with at least 18 points at Higher Level, including grade 6 or above in HL Maths, a science subject and the language to be studied abroad (German, French, or Spanish)

English language requirement
IELTS 6, TOEFL 540, internet-based TOEFL 80 (minimum of 20 in each component), computer-based TOEFL 207

Other subjects
General Studies and Key Skills welcomed, but will NOT form part of the standard offer

course details

Introduction to chemical engineering

What is chemical engineering?

Chemical engineering is sometimes called 'process' or 'manufacturing' engineering. It concerns the science, technology and management involved in making the materials and products society need. These include substances such as oils, acids and solvents, used to create everyday essentials like plastics, drugs, fuels and foodstuffs. Without chemical engineers, we wouldn't have chocolate, beer, painkillers, antibiotics, paper, ink, detergents, petrol, paint, toothpaste, or plastic bags.

Chemical engineers are widely employed by major manufacturing companies and are amongst the highest paid of the engineering fields. They generally work in industry, generating profit for companies by adding value to raw materials in a safe and cost-effective way.

Their job can focus on any part of the process. Examples include:

- Designing and selecting equipment
- Solving process problems
- Carrying out financial calculations
- Designing procedures to ensure safety and minimise environmental impact
- Managing a team of operators
- Researching new products

Engineering operations include everything from extracting raw materials, to generating energy; from manufacturing intermediate materials and producing finished goods, to the disposal of waste.

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 chemical, physical and biological processes using mathematical equations, as well as, on the more practical side, learning about the equipment and techniques used by industry for large-scale manufacturing.

Business, safety and environmental issues are also studied in some depth. You learn skills that will be of great use to you in your future career, such as team-working, problem-solving, communication and the use of information technology.

How does chemical engineering compare to chemistry?

Chemists design chemical reaction routes to produce desirable products or processes, working on a molecular level. Chemical engineers then find ways to put these into practice in a cost-effective and safe way on an industrial scale, using real equipment to move, mix, react, heat up, cool down, and separate materials.

How does this relate to subjects studied at school?

In physics and maths 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 issues that chemical engineers study in depth.

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

Ei Sheen Lau graduate
BEng (Hons) Chemical Engineering

"Studying the BEng Chemical Engineering course at The University of Manchester has been most enriching and enjoyable. The skills and experience gained from the course have formed a solid foundation to my future career. I really enjoyed the problem-based learning aspect of the course, as it provided me with many opportunities to solve complex engineering problems individually and as a team. I also benefited from the PASS (Peer Assisted Study Sessions) programme, both as a participant and as a leader. The teaching and supporting staff were always very supportive, approachable and willing to help.

"Well known and internationally recognised, the School of Chemical Engineering and Analytical Science has excellent links with industry. I was privileged to have an internship with Foster Wheeler during my second-year summer holidays. The practical experience and exposure has proved to be invaluable.

"Manchester is no doubt an excellent city to live in, having all the buzz and jazz of a city, yet it enchants with its warmth and charm. With its vibrant and diverse student population, there are huge opportunities to network and to forge friendships with students from different cultures and backgrounds. I have made many friends from all over the world!

"I graduated in July 2009 and I am now studying an MSc in Petroleum Engineering. Looking back over the past years at Manchester, I would recommend any student to study Chemical Engineering at The University of Manchester. The doors of opportunities as a professional engineer are wide; so come, learn and enjoy!"

Career opportunities

Chemical engineering graduates are in great demand for all kinds of jobs – and not just in the chemical engineering sector. This is because we encourage you to develop skills during your degree course that are valued by employers from a diverse range of industries; these include verbal and written communication skills, problem-solving ability, numeracy, business awareness and group-working.

Jobs in the chemical engineering sector

Chemical engineering jobs exist in all kinds of industries: food and drink; pharmaceuticals; energy; oil and gas; water; chemicals; materials such as plastics, metals and ceramics; and products such as toiletries, fertilisers and detergents. They are also involved in assessing health, safety and environmental issues. So you could do anything from working out how to manufacture life-saving vaccines, to creating a revolutionary new type of ice-cream, to managing a project for the treatment of wastewater.

Information technology is also very important. You could be using sophisticated computer-aided design (CAD) and virtual reality software to simulate what will happen, for example, when you design a process to manufacture a product such as toothpaste.

The types of jobs within these sectors are varied and include: design of products; research and development; construction and installation of industrial plant; manufacturing and production; project management; sales and marketing; finance; policy-making; and management. Many chemical engineering graduates reach senior managerial positions and it is not unusual to find them on the boards of large multinational companies.

course details

Jobs outside the chemical engineering sector

Chemical engineering graduates have easily transferable skills and the ability to take an overview of a situation. For this reason, they are in demand in the areas of management, finance, accountancy, marketing, banking, information technology, computing and consultancy.

Employment worldwide

There are many opportunities for chemical engineers around the world. You could be located in Africa, working on providing basic facilities for communities; or in the USA, contributing to the design and manufacture of advanced materials for spacecraft. Wherever you are based, there will be opportunities for travel as part of the job.

How much will I earn?

Chemical engineering is one of the best paying professions in the UK.

The 2008 IChemE Salary Survey cited the average starting salary for a chemical engineer as £26,000 (for those in the oil and gas sector this is £30,000), reaching £33,700 between the ages of 25 and 29 and rising to an average of £47,500 in your 30s and £60,500 in your 40s. Similar salaries were reported for chemical engineers in other business sectors. Top earners in the finance sector were earning £130,000 per year.

Robert Swales graduate
BEng (Hons) Chemical Engineering

"The environment plays a crucial role in the day-to-day lives of everyone across the globe – and humankind continues to adversely affect all aspects of it. This ranges from water pollution all the way to climate change. As chemical engineers, we have a real opportunity to make a difference across industries and work towards overcoming these environmental challenges. I chose to study chemical engineering with environmental technology to gain the knowledge and insight so I could do just this.

"The course consisted of various course units that explored many different aspects of environmental technologies, such as green solvents, law and regulations, aerial emissions and aqueous systems. The units explored the history, philosophy and application of each technology, which provided me with excellent background knowledge. I also learnt new skills, such as dispersion modelling and life cycle assessments, and had the opportunity to really engage with specialists during group discussions.

"One of the most amazing aspects of the course is how incredibly relevant I still find it. Thanks to the knowledge I acquired and the skills I developed, I was successful in applying for a job with an environmental engineering consultancy. I now find that barely a day goes by without me using not only core chemical engineering skills, like mass and energy balances, but also some of the things I learnt in environmental technologies. I often have to advise clients of different technologies and understand the laws and regulation surrounding them. Even just knowing basic background details is a real boost and it helps me to navigate around my projects much more easily.

"I think it is fair to say that without studying chemical engineering with environmental technology, I wouldn't have the job that I enjoy so much today."

All our Chemical Engineering courses

We offer eight undergraduate courses. In our flexible system, you have until the start of your second year to decide in which area you would like to specialise. This means that you don't need to choose your specialist area until you have had a chance to find out more. All degree courses have professional recognition and are accredited by the Institution of Chemical Engineers. For all courses, you will study a range of core topics, incorporating:

- Fundamentals of chemical engineering
- Supporting maths and science
- Process design, including a design project in each year
- Laboratory work throughout the course, including some in the pilot-scale laboratory
- Information technology (IT), including the use of computers both as office tools and for computer-aided design (CAD)

IChemE accreditation

All our chemical engineering degree courses have professional recognition and are accredited by the Institution of Chemical Engineers (IChemE). This means that after gaining appropriate industrial experience, graduates may apply for corporate membership and gain professional recognition as a Chartered Engineer (CEng).

Chartered status is a benchmark of professionalism that many chemical, biochemical and process engineers aspire to. Engineers with chartered status earn, on average, £15,000 more per year than their non-chartered colleagues. Achieving chartered status typically requires four years' experience employed in a relevant post, which can include time worked on industrial placements undertaken whilst at university.

How can I gain chartered engineer status?

MEng courses take one year longer than the BEng to complete, which gives you the opportunity to study a specialist subject in more depth. An MEng qualification from Manchester will also help you to gain CEng status.

If you gain an accredited BEng (Hons) rather than MEng (Hons) degree, you will have to provide evidence of further learning after graduation before you can achieve IChemE chartered status. This further study could be achieved during your career through work-based learning, a masters qualification (MSc), or a chemical engineering PhD.

course details

Core chemical engineering topics

Year 1

Course units cover topics including physical and organic chemistry, engineering maths, thermodynamics, heat transfer, fluid mechanics and information technology. Case studies, project work and laboratories develop additional material on process design and economics, reaction engineering and environmental issues.

Year 2

Course units cover topics including design of separation processes, reaction engineering, materials science, biochemistry, engineering maths, environmental science and technology. Case studies, project work and laboratories develop additional material on process modelling, multiphase processing, process control and biochemical engineering.

Year 3

Course units cover topics including polymers, biotechnology, fine chemicals, risk analysis, advanced reaction engineering, process dynamics and control. Case studies, project work and laboratories develop additional material, including process synthesis, design and economics, process safety and sustainable development.

Specialist subjects

On the MEng courses, you can choose to study a specialist subject in greater depth. Specialist themes are: advanced chemical engineering science, business management, environmental technology, biotechnology, chemistry, or a language (French, German, or Spanish), including studying at a university in Europe (explained in more detail later in this brochure).

There is also the option of gaining experience in industry for one year.

Alex Matten graduate
MEng (Hons) Chemical Engineering

"I recently graduated from The University of Manchester with a First Class MEng in Chemical Engineering. The experience and skills I gained during the four years allowed me to achieve great results and obtain an excellent graduate job.

"Following the straight MEng course allowed me to focus on academic work during the university year and manufacturing internships in the summer holidays. This way I obtained relevant industrial experience without sacrificing the extra technical detail (and fun!) obtained from four years of full-time study. It also allowed me to undertake an individual research project in my fourth year, rather than write a dissertation based on an industrial placement. This project provided me with the skills to conduct independent research and manage my time effectively.

"I currently work as a Supply Leader at Procter & Gamble (the world's largest consumer goods company, which owns brands such as Pringles, Pantene, Bold, Duracell and Gillette). Although I do not regularly use the extensive technical knowledge I gained during my degree as other graduate process engineers might do, I apply many other skills that I developed whilst studying the straight MEng course.

"For example, the ability to understand a problem, locate the root cause and develop a solution is integral to every graduate job and is developed and reinforced throughout the four-year degree. The ability to lead and work in a team of people with different styles of thinking, from very different backgrounds, is very important in multinational corporations. The second- and third-year design and laboratory projects and fourth-year group work undertaken on the straight MEng course helped me to develop this ability and apply it successfully to the workplace.

"I would thoroughly recommend the four-year straight MEng degree. The wide range of experiences allows each student to determine what they enjoy, are good at and want to pursue as a career. "

Kevin Eade graduate
MEng (Hons) Chemical Engineering with study in Europe

"During the first two years of my course, I studied French alongside the core Chemical Engineering course; this led on to me studying my third year abroad in Toulouse, where I studied Process Engineering.

"Whilst in Toulouse, I took lectures and tutorials in French, as well as laboratory projects. At the end of the year I was also given the opportunity to spend six weeks working with some of the postgraduates at the school, helping with their research projects.

"Doing the study in Europe course enabled me to continue to study a language that I had enjoyed doing at A-level and to improve my ability to a point where I would be confident in being able to use what I have learnt in a professional setting. The year abroad also gave me an idea of how a different education system works; it meant that I got to know and work with people from France and all around the world. I found living abroad, at times, challenging, but this has now given me more confidence.

"I hope that in the future I will be able to travel further. I hope to be able to find a job that allows me to work around Europe, or even further afield. Often foreign languages are asked for in job advertisements, so I hope this will help to find employment.

"Finally, and possibly most importantly, the year abroad was a great opportunity to enjoy spending a year meeting loads of people from around the world and to enjoy the sunshine of southern France!"

BEng Chemical Engineering (3 yrs)

If you want the option of completing your degree in just three years, then this course, leading to the award of BEng (Hons), may be for you. It includes all the core course units, as well as developing skills such as problem-solving, communication and working in teams. All the chemical engineering subjects that employers will be looking for are covered.

MEng Chemical Engineering (4 yrs)

This Honours course enables you to gain deeper understanding of advanced chemical engineering science. This is for you if you want to become an expert in pure chemical engineering and learn about the subject in more detail.

You study the specialist course units in the third and fourth years, alongside the core chemical engineering subjects. You undertake a detailed research project in your fourth year.

Specialist subject areas:

Interface and colloid science, biochemical engineering, adsorption and ion exchange, advanced mathematical methods and computer aided process design.

course details

MEng Chemical Engineering with Business Management (4 yrs)

Chemical engineers can play many roles in industry and, if you want to be in a position to make things happen, you may move into management. A high proportion of our graduates have successful management careers. Many senior managers were initially trained as chemical engineers.

This is the first degree course of its kind in the UK and will improve the career prospects of graduates within the chemical engineering sector. It can also enhance your opportunities to follow other career paths in areas such as finance, consulting, marketing and accountancy.

You can decide to make business management your specialist subject by choosing to study the introductory course unit in your second year. You then study the specialist units in the third and fourth years, alongside core chemical engineering. You undertake a detailed research project in your fourth year.

Specialist subject areas:

Tools and technics for enterprise, managing projects, marketing, advanced technology enterprise and managing business operations.

MEng Chemical Engineering with Environmental Technology (4 yrs)

Four-year MEng (Hons) chemical engineers can make a real difference to the environment by reducing pollution, minimising waste, creating more efficient manufacturing processes and using clean technology. The preservation and improvement of our environment is becoming increasingly important. Chemical engineers solve pollution problems and develop industrial processes that are less harmful to the environment. Specialists in environmental technology can find employment in industry, in the regulatory authorities and, increasingly, as consultants.

You can decide to make environmental technology your specialist subject by choosing to study the introductory course unit in your second year. You then study the specialist units in the third and fourth years alongside core chemical engineering. You undertake a detailed research project in your fourth year.

Specialist subject areas:

Sustainable industry and development, waste water treatment, distributed and renewable energy systems, greenhouse gas and combustion emissions and energy generation systems.

MEng Chemical Engineering with Biotechnology (4 yrs)

Biochemical engineering is the subject through which the science of living organisms and systems is translated into economic and safe products and processes. Its applications are in the fields of healthcare, nutrition and the environment. Some examples are the manufacture of medicines, the use of genetic engineering to treat illnesses, food processing, treating industrial and human waste and finding ways of using renewable resources.

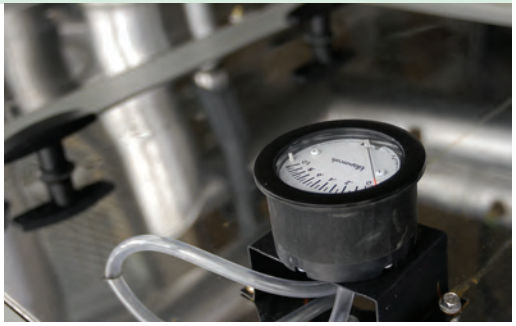
You can decide to make biotechnology your specialist subject by choosing to study the introductory course unit in your second year. You then study the specialist units in the third and fourth years, alongside the core chemical engineering subjects. You undertake a detailed research project in your fourth year.

Specialist subject areas:

Introduction to biotechnology, fundamentals of life sciences, biochemical engineering, biorefinery engineering, and bioprocessing.

Adam Cowling student
MEng Chemical Engineering

"I enjoyed physics, chemistry and maths at school and decided that I wanted to do something with the applications of these subjects, rather than just the theory. The course is a good balance between theoretical and hands-on experience. I enjoy the laboratories and design projects and my fourth-year research project will also be laboratory-based."



MEng Chemical Engineering with Chemistry (4 yrs)

This course will give you an insight into understanding processes from the molecular level up to industrial scale and enable you to learn the chemistry behind the manufacturing processes. The skills of the chemical engineer and the chemist are brought together in order to design and manufacture products as far-ranging as petrochemicals, pharmaceutical tablets, inkjet printing modules, deodorant sticks, hair products and chocolate.

The chemistry course units are introduced in your first year with an introductory course unit. The second, third and fourth years of the course introduce specialist chemistry subjects, which are studied alongside core chemical engineering. You undertake a detailed research project in your fourth year.

Specialist subject areas:

Organic chemistry, molecular simulation, spectral analysis, greenhouse gas and combustion emissions and polymer chemistry.

Liane Turner student
MEng Chemical Engineering

"I like the laboratories and practical work, which show how chemical engineering is used in practice."

course details

MEng Chemical Engineering with Industrial Experience (4 yrs)

Would you like to spend the third year of your degree course learning skills and gaining experience in industry – and be paid a salary at the same time? For the third year of this degree course, a company will employ you on single or multiple projects in areas such as process and plant evaluation, design, construction and operation. During the year, you keep a logbook/career development diary, produce a dissertation in the form of a book and give a poster presentation about your experience.

While working in industry, you can expect to experience the following:

- Enhanced, in-depth and leading-edge chemical engineering
- Extended, broadening study of chemical engineering and other science, technology and non-engineering subjects, such as business, or language
- Enhanced and extended skills, such as project work, design work, or industrial applications

It is expected that during the placement you will have the opportunity to participate in the company staff development scheme and learn about the following:

- Safety, health and environment issues in industry
- Achieving targets and objectives
- Efficiency and cost-effectiveness
- Company organisation and structure
- Legal constraints within industrial practice
- Personal effectiveness

Where could I work?

The school has excellent contacts with industry and maintains a database of potential companies for placements. Although it is your responsibility to find a placement, we will do our best to help you.

Companies involved include: Acordis, Akzonobel, AstraZeneca, Axion Recycling, BNFL, BP, British Sugar, Cabot Carbon, Cadbury, Cargill, Chevron Texaco, Conoco, Dupont, Eli Lilly, Emerys, E-on, Exxon Mobil, Glaxo Smithcline, ICI Paint, Kraft Foods, Kroda, Imerys, Johnson Matthey, Lubrizol, Lucite International, Marathon Oil, Pfizar, Proctar and Gamble, Sabic, Sanofiaventis, Schlumberger, Sellafield, Shell, Solvay, Syngenta, Unilever.

You take an introductory course unit in your second year and a course unit by distance learning during the year out in industry. In order to qualify for an industrial placement, you need to have achieved an average mark of over 60% at the end of your first and second years.

During the year, you will be a registered student and will be liable for fees (at a reduced rate). You will also be an employee of the company hosting your placement and will therefore receive a salary.

International students do not need to obtain a work permit.

Thomas Davison student
MEng (Hons) Chemical Engineering with Industrial Experience

"I have just graduated from the Chemical Engineering with Industrial Experience degree. I felt the structure of this course was beneficial to me as it enabled me to gain practical experience while still doing my degree. My year in industry with BP reinforced what I had learnt in my first two years, standing me in good stead for the final year. In addition, the placement year enabled me to accrue skills and knowledge in a very practical way. While on my placement with BP, I had the opportunity of working with other engineering disciplines and getting to go out on site visits.

"One big advantage is the money factor – Manchester has an IChemE-accredited, four-year Industrial Experience course (at most other universities it takes five years). This means you pay less tuition fees (only half in your placement year) and you are earning a wage. I was able to afford to go travelling in the summer after my placement, while most of my fellow students had to work through the holidays.

"In terms of finding a job after your degree, the Industrial Experience course is ideal because experience in the field helps you to differentiate yourself from other applicants. In particular, the company you work for in your year out views the placement as a kind of year-long interview and is much more likely to give you a place on its graduate scheme than an external applicant.

"Whatever you want to do after university, a year in industry looks great on your CV and gives you the opportunity to perform well in the field and get a good reference."

MEng Chemical Engineering with Study in Europe (4 yrs)

Would you like the exciting opportunity to live and work in another culture for a year? This course enables you to spend your third year in France, Germany, or Spain, becoming familiar with a different social and technical culture, greatly improving your language skills and enhancing your career prospects. Chemical engineers with sufficient knowledge of another language have career opportunities all around the world.

You will have intensive language tuition in the second year of the degree course. This includes spoken language, grammar and some technical vocabulary.

During the year abroad in the third year, you will:

- Extend your chemical engineering knowledge by studying further subjects and undertaking additional projects
- Attend lectures and tutorials conducted in the local language
- Participate in group work in laboratories and on projects
- Write reports and take examinations in the local language
- Make a presentation in the local language about your project

A student from the country may be assigned to act as your mentor, and staff from The University of Manchester will visit you at least once a year. The European university will arrange your accommodation in student residences.

During the year, you will be a registered student and will be liable for fees (at a reduced rate).

course details

Where might I study?

The European universities where you can choose to spend your year out are:

- **France**: Nancy (www.ensic.u-nancy.fr) and Toulouse (www.ensiacet.fr)
- **Germany**: Stuttgart (www.uni-stuttgart.de/en) and Furtwangen (www.fh-furtwangen.de)
- **Spain**: Oviedo (www.uniovi.es) and Cadiz (www.uca.es)

Practical and project work

The degree course is structured so that about one-third is practical and project work, with the remainder made up of lectures and problem-solving classes. The benefit of this is that you have the opportunity to relate theory to practice, so enhancing your understanding.

Year 1

- Projects focused on equipment and process design
- Laboratory experiments introducing safety and good laboratory practice
- Use of information technology to assist with writing reports, calculations, design, programming and library research

Year 2

- Industrial-sized experiments in the pilot-scale laboratory
- Small-scale experiments in the laboratories
- Project on computer flow sheet design

Year 3

(This is the fourth year for Chemical Engineering with Study in Europe, or with Industrial Experience)

- Design project where, as part of a group of students, you design a complete process plant; this involves equipment design, costing and profitability, control, start-up and shutdown of the plant and assessment of hazards. The project is set up jointly with an industrial company, which means that it will relate to real life.
- Detailed large experiments in the pilot-scale laboratory

Year 4

- Research project, which you can choose, to examine a scientific or technical problem relating to your specialist area; you report the work and its outcomes in a dissertation in the form of a book, in a short academic research paper and as a poster presentation

Studying abroad

Would you like to spend some time in another country as part of your studies? The school has several links with universities abroad and encourages you to gain wider experience in an international context.

We are able to offer great opportunities for students on the MEng courses to undertake their final-year research project in Singapore, France, Germany, Spain, or the USA.

Matthew Cook graduate
Chemical Engineer, Foster Wheeler

"I enjoyed the course, which is not all about technical ability; it also teaches you how to tackle problems and, in the design project especially, how to work effectively as a member of a team. "On graduation, I was offered a position with Foster Wheeler. My work is very varied and I may be working on a small pharmaceutical project one month and looking at the ways in which IT can help the design process become more efficient the next. In years to come, I expect to be involved in refinery production in the Middle East, pharmaceuticals in Singapore, or an oil platform in the Arabian Gulf."

Career prospects

Ten reasons why Manchester chemical engineering graduates are snapped up by employers:

1 Our sterling reputation throughout the world means that employers know our graduates make excellent employees. A prestigious qualification from The University of Manchester is a passport to a great future.

2 Courses have a practical focus and use design projects, laboratory experiments and problem-based learning to enhance theoretical work. You gain the analytical and problem-solving skills that are so valuable to employers.

3 Highly qualified staff are experts in their field, ensuring that you learn up-to-date, relevant and cutting-edge chemical engineering.

4 You learn valuable skills, like team-working, communication, presentation skills and use of information technology, including specialist design and modelling packages.

5 Close links with industry ensure your degree will be well known and highly respected when you come to apply for a job.

6 A chemical engineering degree is widely applicable to industrial and business sectors, giving you choice and flexibility. Careers in the chemical engineering sector are wide and varied, and our graduates also forge excellent careers in non-chemical-engineering jobs, such as accountancy, marketing and management.

7 All courses have professional recognition and have been accredited by the Institution of Chemical Engineers. This means that, after gaining appropriate industrial experience, graduates may apply for corporate membership and become a Chartered Chemical Engineer.

8 Industrial-scale experiments in the pilot-scale Morton Laboratory (the only one of its type in the UK) give you practical experience of operating principles and safety issues, as well as a deeper understanding of theory.

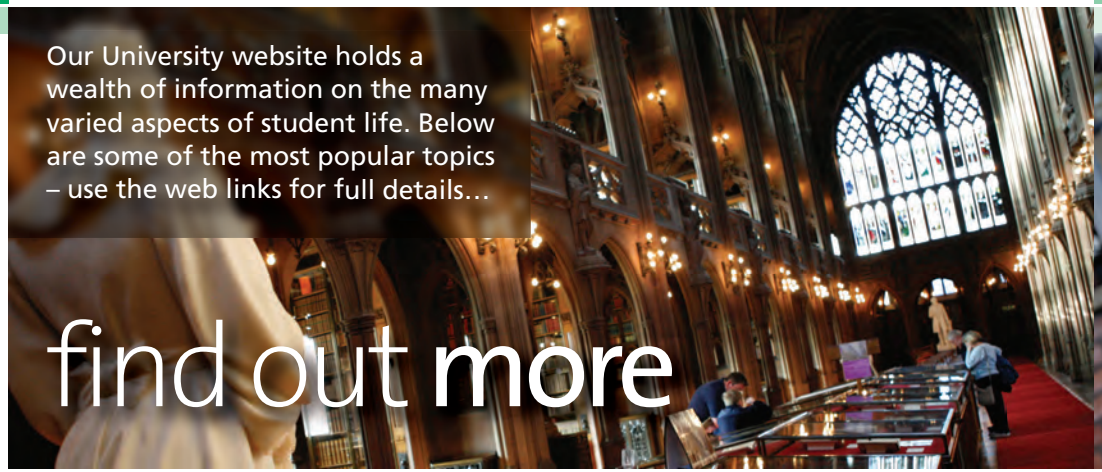
9 The MEng Chemical Engineering with Business Management course is unique and provides additional specialist skills and knowledge for a high-level management career.

10 The MEng Chemical Engineering with Industrial Experience course is the only one of its kind to have been accredited at MEng level by IChemE. The course extends and broadens knowledge and provides you with experience you can only gain in the workplace.

The Manchester Leadership Programme

The Manchester Leadership Programme (MLP) is an exciting and high profile initiative that encourages University of Manchester students to engage with the local community while boosting your personal and professional development. It combines a credit-rated Leadership in Action unit with 60 hours voluntary work.

You can develop invaluable skills and knowledge for your CV, from project management, to commercial awareness, and will interact with and give something back to the local community.



Our University website holds a wealth of information on the many varied aspects of student life. Below are some of the most popular topics – use the web links for full details…

find out more

Accommodation

As long as you apply by our deadline, all first-year students holding an unconditional offer are guaranteed an offer of a place in university accommodation. For international students, this promise is extended to the full duration of your studies. We are proud to offer more spaces in university-managed accommodation than practically any other UK university.

Discover our diverse range of university accommodation, bustling student areas, halls of residence visits, private accommodation options and more:

www.manchester.ac.uk/accommodation
www.manchesterstudenthomes.com

Admissions and applications

We welcome applications from people of all backgrounds, and are fully committed to equality of opportunity. All applications for full-time undergraduate courses in higher education are coordinated by the Universities and Colleges Admissions Service (UCAS).You must apply online at www.ucas.com. If you are unable to access the internet, contact the UCAS Customer Service Unit on +44 (0)871 468 0468.

Find out more about the application process, policies, procedures and support:

www.manchester.ac.uk/ug/howtoapply

Careers Service

Our award-winning Careers Service will work in partnership with you throughout your degree to improve your employability and prepare for the competitive jobs market. It will help you find part-time jobs, volunteering and work experience opportunities.

Since Manchester is one of the most targeted universities by graduate recruiters, you will meet many employers on campus. You might also take part in the unique Manchester Leadership Programme, to help you develop skills and boost your CV.

Find out more about careers events, mentoring programmes, accredited course units and a whole range of other services:

www.manchester.ac.uk/careers
www.manchester.ac.uk/mlp

Childcare

There are two centres associated with the University for children between six months and five years of age: Dryden Street Nursery and Echoes Nursery. Find out more about funding options, private nurseries, playgroups and schools:

www.manchester.ac.uk/studentnet/crucial-guide/personal-life/student-parents/student-parents

City of Manchester

One of the great benefits of being a student at Manchester is that all the joys of Britain's number one student city are right on your doorstep. You'll be spoilt for choice for food, drink, culture, music, history, nightlife, festivals, shopping, sport and much more – with the quiet countryside of two beautiful national parks also within easy reach when you want to get away from it all. Find out what one of our current students has to say about the capital of the North West:

www.manchester.ac.uk/ug/studentlife/sociallife/manchester

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 DSO to discuss your needs, any arrangements that may be necessary and the extent to which appropriate support is available:

www.manchester.ac.uk/dso

Information is also available from the Students' Union Welfare Officer:

www.umsu.manchester.ac.uk

Funding and finance

In 2010, Parliament approved certain changes to university tuition fees. From autumn 2012, universities will be able to charge up to £9,000 a year for their courses; however, they will need to meet strict criteria to ensure students from all income groups can access those courses. Eligible students will not have to pay up-front for their tuition; the cost will be paid by a loan, which students will only start to repay once they have left their course and are earning more than £21,000 per annum.

At the time of going to press, we have not yet set our course fees and support levels for new entrants in 2012. Once we have done so, we will update our website. Please therefore consult our web pages for student finance before submitting your UCAS application:

www.manchester.ac.uk/studentfinance

You can also keep up to date with the latest developments via the Government's website:

www.direct.gov.uk/studentfinance

International students

The University is a multicultural environment and home to more than 9,500 international students from around 160 countries. A range of services is available for international students, to help you both before and during your studies. This includes an airport collection service, orientation courses and specialist student advisers.

Find out more, including information specific to students from your country, such as entry requirements and useful contacts:

www.manchester.ac.uk/international

IT services

As a student at Manchester, you will have access to a huge range of up-to-date IT services, including: online and mobile learning, PC clusters with a wide range of software, extensive WiFi networks, halls of residence internet service, email and technical help and support.

www.manchester.ac.uk/its

Library

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, with diverse special collections and electronic resources unrivalled within UK universities. In 2009, the Main Library underwent a large-scale refurbishment to the ground floor, improving access

both to the building and to the collections and also introducing new social and learning spaces to cater for a range of learning styles.

Find out more about the information services and resources available to you:

www.manchester.ac.uk/library

Maps

Get to grips with your future home and take a closer look at our campus, the city and University accommodation by viewing our maps:

www.manchester.ac.uk/visitors/travel/maps

Prospectus

Our 2012 undergraduate prospectus offers a comprehensive overview of The University of Manchester. You can view a copy online:

www.manchester.ac.uk/ug/courses/prospectus

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. There are prayer facilities on campus for Muslim students and student societies for many religions.

Sport

We have an exciting sport and fitness scene with something for everyone at every level, from complete beginner to high performance athlete. Discover more than 40 sports clubs; a vibrant 'Campus Sport' programme, allowing you to play in friendly, recreational leagues; a huge variety of health and fitness classes; plus sport volunteering and scholarship opportunities.

Find out more about our superb sport facilities and opportunities to get active in Manchester:

www.manchester.ac.uk/sport

Student support

Whatever the issue – financial, academic, personal, or administrative – we have experienced and sympathetic people, support groups and advice centres to help you. Find out about counselling, academic advice and various other student support services:

www.manchester.ac.uk/studentnet/crucial-guide

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, as well as support and welfare services, student media, shops and bars and the famous Manchester Academy.

Have a look at the SU website:

www.umsu.manchester.ac.uk

Video library

Watch and listen to our students and staff introducing various aspects of student life and The University of Manchester with our selection of online videos:

www.manchester.ac.uk/aboutus/video

contact details

For further information about the courses, or about qualifications, please contact:

admissions tutor
Dr Stuart Holmes

address
School of Chemical Engineering and Analytical Science
The University of Manchester
Oxford Road
Manchester
M13 9PL
United Kingdom

tel +44 (0)161 306 9331
email ug-chem-eng@manchester.ac.uk

For the most up-to-date course information, please visit our website:
www.manchester.ac.uk/ceas

Disclaimer

This brochure is prepared well in advance of the academic year to which it relates. Consequently, details of courses may vary with staff changes. The University therefore reserves the right to make such alterations to courses as are found to be necessary. If the University makes an offer of a place, it is essential that you are aware of the current terms on which the offer is based. If you are in any doubt, please feel free to ask for confirmation of the precise position for the year in question, before you accept the offer.

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