

Department of Chemical Engineering



NSS 2017
2ND FOR OVERALL SATISFACTION
IN CHEMICAL ENGINEERING



HESA UG STUDENT RECORD 2016/17: ENGINEERING & TECHNOLOGY
WE SEND 15% MORE STUDENTS ON ENGINEERING PLACEMENTS
THAN ANY OTHER UK UNIVERSITY



DHLE, 2017 GRADUATES¹
£30,000 AVERAGE STARTING SALARY





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WHATUNI? STUDENT
CHOICE AWARDS 2018
UNIVERSITY
OF THE YEAR



THE GUARDIAN
UNIVERSITY GUIDE 2019
RANKED 4TH
IN THE UK OVERALL

Why choose Chemical Engineering?

Chemical Engineers are at the forefront of scientific and technological developments. They design, construct and operate processes to create products we all depend on and are often tackling some of the world's most urgent problems.

Chemical Engineering is a global profession and studying this area of engineering opens up worldwide opportunities to a well-paid and rewarding career. Most items used by people everyday require Chemical Engineers to produce them. Their skills are applied to a wide range of industries including: oil refining; pharmaceuticals; food and drink manufacture; paper; plastics; water purification; electricity generation; metals; textiles; semi-conductors and cosmetics.

Chemical Engineers develop and create products that improve people's lives around the world. They also help to sustain our modern society by managing natural resources, recycling materials and protecting the environment.



Why choose Loughborough?

We are regarded as one of the UK's leading chemical engineering departments, being consistently ranked highly in UK university league table rankings. Our courses are taught by experts supported by world-class facilities. Close links with industry and an established placement scheme provide opportunities to gain vital paid work experience in a professional environment. We have an outstanding reputation for producing highly trained, well-educated and professional Chemical Engineers.

Chemical Engineering

MEng/BEng

MEng (Hons) DIS/DIntS* 5 years full-time sandwich
UCAS code: H802

MEng (Hons) 4 years full-time
UCAS code: H803

BEng (Hons) DIS/DIntS* 4 years full-time sandwich
UCAS code: H806

BEng (Hons) 3 years full-time
UCAS code: H805

Typical offers

A level: (MEng) A*AA / (BEng) AAA including Mathematics and at least one from Chemistry or Physics.

IB: (MEng) 38 (7,6,6 HL) / (BEng) 37 (6,6,6 HL) including Mathematics and at least one from Physics or Chemistry at HL.

BTEC Level 3 National Diploma: D*D (MEng) / DD (BEng) in a relevant subject plus A-Level Mathematics Grade A.

Typical offers correct at the time of print. Please check our website for the latest version and other qualifications.



*DIS/DIntS: Diploma in Industrial Studies/Diploma in International Studies



—
“There are so many career options open to a Chemical Engineering graduate, so if you enjoy challenges, science and teamwork, why not study it?”
 —

Emma
 Chemical Engineering

Chemical Engineering is concerned with the processing of raw materials into chemical products on a commercial scale. It can also be described as process engineering. We are ranked 2nd for overall satisfaction amongst UK Chemical Engineering in the 2017 National Student Survey, meaning that we are one of the very best places to study this exciting subject area.

During this course you can take the option of a paid industry placement. Completing a placement not only gives you real world experience but you will also gain an additional qualification of a Diploma in Industrial Studies. This is an experience that will really help you stand out when applying for your first engineering job.

Alongside core engineering and scientific knowledge you'll develop important professional skills such as team-working, presentation skills, project management and report writing. These will enable you to pursue a career as a professional chemical engineer or choose from a wide range of other career options.

About the course

The course covers the main principles underpinning the manufacture of 'chemical products' on a commercial scale such as petrol, pharmaceuticals, food, drinking water, paints, cosmetics and clothing.

These principles include mass and energy balances, thermodynamics, fluid flow and heat transfer, chemical reactor theory, mixing and separation processes, process control, plant safety and process economics. The main supporting subjects are mathematics and the physical sciences, backed up by computing, together with some chemistry.

Principles and theories are essential for understanding real processes but students also need to develop professional competence. We develop our students' capabilities from the outset through experimental work, design and research projects and computer simulations. Engineers working in industry participate in some of our design exercises and help keep them realistic.

This course is offered as a three year BEng or four year MEng, each with an additional, optional industrial placement year. Whilst the broad philosophy of the MEng and BEng is the same, MEng students are required to study a wider range of technical subjects with additional depth, as well as undertaking a Professional Development Project (PDP). Find out more about the PDP on page 10.

The MEng and BEng are accredited as being in complete and partial fulfilment respectively of all educational requirements for Chartered Engineer status by the Institution of Chemical Engineers (IChemE).

Professionally accredited course

This course has been independently tested so you can be sure it offers you a top level education. Accredited courses provide a fast-track to full Chartered Engineer status and are looked upon favourably by employers and can therefore improve your career prospects.



Outstanding facilities

Our purpose built facilities allow you to put theory into practice on industrial scale equipment.

Our courses have a very practical focus and include a considerable amount of time gaining hands on experience within our world-class laboratories. We have invested significantly in the quality of our equipment and laboratory spaces to offer our students an enhanced learning experience, through practical hands-on teaching and the opportunity to gain essential skills for future careers in industry.

Our undergraduate teaching laboratories are equipped with over fifty experimental rigs, including:

- a double effect evaporator;
- a pressurised steam canning retort;
- a suite of fully instrumented and computerised control rigs;
- concentric cylinder viscometer;
- distillation column;
- gas fluidised beds;
- hydrocyclone;
- liquid fluidised beds and particle mixers;
- membrane emulsification rig;
- plate heat exchanger;
- shell-and-tube heat exchanger;
- spray dryer;
- three phase separator;
- ultrafiltration and vacuum filtration units.

New materials manufacturing facilities

We have invested £4 million into the facilities in our S-Building, home to our Chemical Engineering Department. New laboratory space and equipment are now available including:

- A new 87 seater IT laboratory for taught sessions – but also available for project work and private study.
- A new interactive learning facility – the 'Igloo' – that uses state-of-the-art software to create simulations of real-life engineering scenarios, e.g. working in hazardous areas of industrial plants. This allows small groups of students to engage with realistic situations in a safe and accessible environment.
- State-of-the-art pilot engineering facilities, with the addition of new mezzanine floors, housing new equipment and providing flexible student space for computational and modelling work.

STEMLab

STEMLab is a £17 million investment in new state-of-the-art laboratory facilities and part of a wider £25 million investment in our campus which includes an adjacent student learning and teaching hub.

STEMLab allows us to offer new ways to learn and collaborate, for example a 'drop-in' engineering workshop, alongside teaching laboratories, workshops, computer-aided design facilities, a design studio and informal learning spaces. Our chemistry and biochemistry related laboratory classes are conducted in these facilities.

Take an interactive tour of STEMLab www.lboro.ac.uk/stemlab

West Park Teaching Hub

Newly refurbished with superb modern facilities for teaching small to large student groups (and a student Café included), the West Park Teaching Hub forms another part of the fantastic student learning experience we offer.



STEMLab



Igloo



What you will study

As Chemical Engineering is not a subject that you will have studied at school or college, it can sometimes be difficult to envisage what you will be learning as an undergraduate student. The following information aims to give you an idea of the topics covered.

The Chemical Engineering degree programme is general in that it is designed to provide students with the chemical engineering skills and knowledge to undertake careers across the whole spectrum of industries and roles that await them.

Year one

The first year modules focus on the fundamentals needed to analyse chemical processes. The content and learning outcomes of the modules are summarised below.

Fluid Mechanics I, Heat Transfer, and Thermodynamics I explore the physics of chemical engineering processes, focussing respectively on the pumping and piping of liquids and gases, the heating and cooling of streams, and systems that use or produce heat and power.

Chemical and Biochemical Processes revises and reinforces A level Chemistry (also a crash course for those that did not take A level Chemistry) and introduces elements of Biochemistry (proteins, polysaccharides, lipids, nucleic acids, enzymes) and Microbiology (microorganisms and viruses).

Process Balances introduces the powerful concepts of mass and energy balances for analysing chemical processes.

Stagewise Processes focuses on processes such as liquid-liquid extraction and plate columns which can be regarded as a sequence of stages.

Mathematics (an extremely important tool for all engineers) is covered throughout the first year as a stand-alone module, taught using chemical engineering examples to illustrate and demonstrate relevance.

A laboratory module runs throughout the year where students spend an afternoon per week either performing chemical engineering experiments (mainly in heat transfer and fluid mechanics), science experiments (in STEMLab), igloo activities, computer labs or working on a group design project.

Optional modules:

Languages – useful for students considering taking the MEng Part C project abroad.

Chemical Engineering and Society – explores the impact of Chemical Engineering processes on society at large.



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UNIVERSITY GUIDE 2019
TOP 10 FOR CHEMICAL
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Year two

The second year modules build on first year material to give students sufficient knowledge and skills to be able to fulfil what would be required on an industrial placement.

Chemical Engineering Science Topics:

Thermodynamics II covers chemical and vapour-liquid equilibria.

Particle Technology provides an introduction to solids processing.

Fluid Mechanics II builds on the material learnt in Year One and includes flows of complex fluids and computational fluid dynamics simulations.

Studies of Unit Operations:

Reaction Engineering I extends A level Physical Chemistry to model continuous reactors.

Mass Transfer and Separations studies distillation and gas absorption systems.

Process Design and Safety, Instrumentation and Control, Plant Engineering and Process Systems Engineering are all covered by separate modules, and feed into the second year Design Project, testing and developing chemical engineering skills and knowledge. (Plant Engineering refers to the structural engineering design aspects of a chemical plant, and Process Systems Engineering teaches students to use and understand simulation software).

Mass Transfer and Separations, Control, Particle Technology and Food Engineering all include practical lab sessions. Students are required to give oral presentations and produce written reports on their work.

Optional modules:

Languages or Food Engineering

Year three

The first semester is mainly lecture based with more advanced modules on Reaction Engineering, Control, and Transfer Processes (which covers processes involving the transfer of molecules, heat and/or momentum between different phases).

The second semester is project based. BEng students undertake a Research Project in pairs with the supervision of an academic. They also complete their final year Design Project – the culmination of their degree where chemical engineering skills, knowledge and understanding are put to the test. MEng students take their PDP - see page 10 for more information.

Year four (MEng final year)

The first semester is lecture based, featuring advanced chemical engineering topics. The grand finale of the course is the semester long final year design project. We challenge students to come up with innovative designs for processes, often featuring novel applications or technologies.

Graduate destinations

Companies with whom our students have found employment include 3M, AstraZeneca, BP, Croda, Exxon Mobil, Foster Wheeler, GlaxoSmithKline, Johnson Matthey, Huntsman, INEOS, Invista, Mars, Merck, Nestlé, Pepsico, Pfizer, Procter and Gamble, Shell, Schlumberger, Tate and Lyle, Total, and United Biscuits.

You may also be interested in...

We have launched a new innovative and technology-driven Bioengineering course focusing on using engineering techniques to develop devices, techniques and interventions for human health. Built upon significant specialism at Loughborough University and utilising new purpose built facilities, studying Bioengineering equips you with the knowledge to work in this rapidly developing and growing sector. Visit our online prospectus to find out more.

Year in industry option

If you're looking to gain hands-on experience at some of the world's top companies we are the place for you.

We send 15% more students on engineering year-long placements than any other UK university*. The placement year is optional but is highly encouraged because of the many benefits it can provide. Students undertake their placement after their second year, however MEng students can choose to take their placement year after their third year of studies if preferred.

Key benefits of an industrial placement

- **Improved job prospects.** A placement gives you real world experience that will help you stand out when applying for your first engineering job. Some placement students are offered a permanent job with their host company when they graduate.
- **Salary** typically £15,000 - £20,000.
- **Professional status.** A year of industrial work experience can contribute towards achieving professional status.
- **Develop professional skills.** Time management, team working, presentation skills and project management are all developed on placement.
- **Professional practice.** Put your knowledge gained during your degree into practice within a working environment alongside professional engineers.
- **Improved academic performance.** Placement students often demonstrate an improved academic performance on return from a placement due to the additional experience and maturity they have gained.
- **Additional qualification.** Upon completion of the Chemical Engineering course, students who have successfully completed a placement year will also be awarded the Diploma in Industrial Studies (DIS).
- **Professional contacts.** The placement year is an ideal opportunity to start making industrial contacts at your host company and amongst their customers and suppliers.

Finding a placement

Our students are keenly sought after by high profile companies who know from past experience that Loughborough students are enthusiastic and equipped with the knowledge and skills needed to make a positive contribution to their organisation.

Our Industrial Training Coordinator gathers and supplies information about placement opportunities and advises students on what to expect from the placement experience. The placement process is overseen by the Department's Industrial Placement Tutor and we make every effort to help our students secure placements which match their interests and ambitions.

—
"A placement is one of the best things that you'll have on your CV when you come out of university. It is an invaluable experience and the set of skills that you acquire will really help you when you're applying for your first job."

—
Lorenzo
MEng Chemical Engineering,
on placement at GSK



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£17,000 AVERAGE
PLACEMENT
SALARY



DEDICATED
UNIVERSITY STAFF
TO HELP YOU FIND
A PLACEMENT

*HESA UG Student Record 2016/17: Engineering & Technology.



Companies providing recent placements include:



"I would 100% advise other students to take a placement year."

Nicole
MEng Chemical Engineering,
whilst on placement at GSK

 www.lboro.ac.uk/engineering/gsk



Professional Development Project

All our MEng students undertake a Professional Development Project (PDP) in the second semester of their third taught year. This gives our students a unique experience with many choosing to study overseas at one of our partner universities.

The PDP can be done in one of three ways:

1. as a technical project at a company. This differs from the placement year in that students will work on a single project and write a report which is assessed as part of their degree. Placement students, on the other hand, often undertake several projects;
2. as an individual research project carried out at Loughborough under the supervision of an academic; or
3. as an individual research project carried out at a partner university overseas. Many of our MEng students take this option.

Overseas Professional Development Project

We have particularly close links with Universities in Europe including France, Italy, Spain, Portugal, Sweden, Finland, Germany and Belgium, and also further afield in Australia, New Zealand, Canada and the United States.

Example student projects

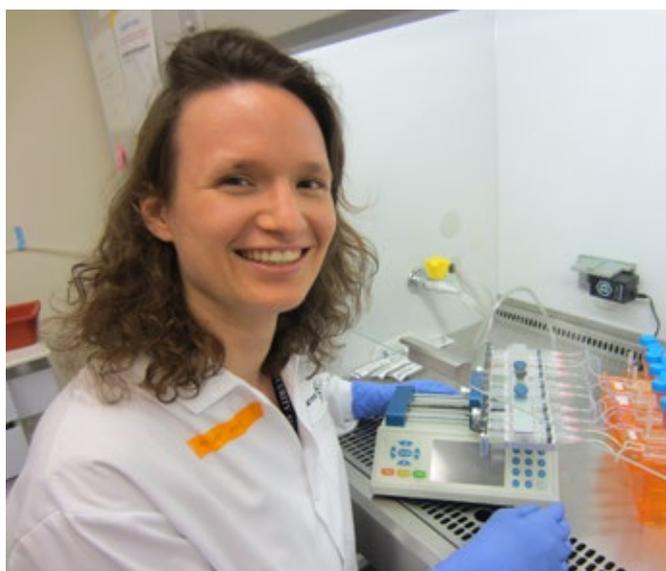
- A Process to Manufacture the Cardiovascular Drug Propranolol
- Fabrication of Microparticles to Enhance Contrast in Medical Ultrasound Applications
- Membrane Methods for the Removal of Arsenic from Water
- Microneedles for Blood Sugar Monitoring
- Optimisation of Control Systems of a Solar Powered Desalination Plant
- Production of a Monoclonal Antibody Drug for the Treatment of Lung Cancer
- Production of Bioethanol from Sugar Beet
- Removal of Heavy Metals from Pond Water
- Separation of Americium Oxide from Nuclear Fuel for use in Smoke Detectors



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THE TIMES AND SUNDAY TIMES
GOOD UNIVERSITY GUIDE 2018
THE BEST STUDENT EXPERIENCE
IN CHEMICAL ENGINEERING



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“The PDP was the best part of my four years of chemical engineering. I loved my research project, I got to meet many incredible people and I enjoyed living in a new city.”
—

Arianna
MEng Chemical Engineering
whilst taking her PDP at Harvard University



Inspiring graduates

After graduating I started work as a Process Engineer for AstraZeneca, working in Research and Development. My role involved providing a practical and technical input to facilitate the development of processes and technologies for the bulk manufacture of drugs and secondary activities. One project I was involved with resulted in saving the company over \$4 million per year. For me that's what's great about engineering, the opportunity to see the projects through to the end and have a tangible output.

I then moved to my current role as an Advanced Process Engineer for 3M. I lead the 'Lean Six Sigma Green Belt Projects' which aims to improve current manufacturing processes and implement new manufacturing solutions. On a day-to-day basis my role is to ensure yields are as high as possible but to also balance this with the need to fully optimise product quality. I really enjoy having the opportunity to see the improvements I make have an impact on the company on a daily basis.

Siobhan

*MEng Chemical Engineering,
Advanced Process Engineer, 3M*



After graduating I joined the Kraft Foods Research and Development team, working in Banbury on their instant coffee brands such as Kenco and Maxwell House. I spent my industrial placement year working for Kraft Foods which led to me getting the job there after I finished my studies.

My proudest moment was cracking a problem with Kenco Cappio. It's an instant cappuccino product that delivers a foam layer when you add hot water. We wanted to improve the foam quality and thickness and to make it even closer to an authentic 'café' experience. After a lot of investigation and head scratching in the pilot plant, I developed a process that gave the desired effect and the new product is on sale across the world!

Thanks to the huge variety of categories and countries Kraft Foods has a presence in I now work in the Gum and Candy Centre of Excellence in Switzerland. It's a great move for my career and an amazing opportunity to get experience in a totally different area. The skills and opportunities I gained whilst at university were a fundamental part of my success so far and in recent years I've even been involved in supervising students from Loughborough who come to spend their placement year at Kraft Foods just like I did.

Tom

*MEng Chemical Engineering, Process
Development Manager, Kraft Foods*



—
*"The skills and opportunities I gained
 whilst at university were a fundamental
 part of my success so far."*
 —



TIMES HIGHER EDUCATION
STUDENT EXPERIENCE
SURVEY 2017-2018
1ST PLACE



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