ADVANCED CHEMICAL ENGINEERING
MSc/PGDip
Develop your career in a field that is fundamental to modern quality of life

Chemical engineering is dynamic and evolving, and today extends far beyond its roots in oil and gas processing. It provides many solutions to problems facing the pharmaceutical, biotechnological, oil, energy and food and drink sectors. It is also fundamental to many issues affecting our quality of life – such as better processes to reduce the environmental burden, and longer lasting food – all of which depend on the right combination of chemistry, ingredients and processing.

This programme focuses on exploring the aspects of chemical engineering that deal with the design and development of formulated products, such as food and pharmaceuticals. Our graduates are well prepared for a career in a variety of industries and have an opportunity to capitalise on the growing global demand for chemical engineers.

WHY CHOOSE BIRMINGHAM?

- Explore important aspects of modern chemical engineering, addressing the design and development of key formulated products such as fuel cells, food and pharmaceuticals
- Specialise in areas that interest you, from the production of pharmaceuticals and formulation of structured food products, to hydrogen energy and the business surrounding chemical and process engineering
- Benefit from our collaborations with world-class industry partners, and international, leading-edge engineering and science departments
- This programme is accredited by the Institution of Chemical Engineers
- The School has a first-class reputation in learning, teaching and research, and is highly placed in both the Guardian and The Times league tables
Advanced Chemical Engineering
MSc/PGDip

Course content
This course consists of 180 credits: 60 credits from the five core compulsory modules, 60 credits of optional modules and a 60-credit research project carried out with one of the department’s research teams (MSc only). The programme has options in Fuel Cells, Food Processing, Pharmaceutical Technology and Business Studies.

Introductory modules (MSc and PGDip)
- Bioscience for engineers* – 10 credits, or
- Process engineering fundamentals* – 10 credits
*These modules will be timetabled to allow students to attend both if required. However, only one will be formally assessed as agreed with the course director.

Core modules
- Colloid chemistry and rheology – 20 credits
- Molecular delivery – 10 credits
- Measurement techniques – 10 credits
- Frontiers in interdisciplinary bioscience – 10 credits
- Research project – 60 credits

Optional themed modules
Choice of 60 credits (MSc and PGDip).

Hydrogen Energy and Safety Theme
- Introduction to electrochemistry – 10 credits
- Advanced electrochemical applications – 10 credits
- Fuel cell & hydrogen technology – 10 credits
- Techniques for fuel cell characterisation – 10 credits

Food Engineering Theme
- Food structure for performance – 20 credits
- Food plant and process – 20 credits
- Food chain security – 10 credits
- Pest management and cleaning systems – 10 credits
- Chemical contamination of food and water – 10 credits
- Sustainability in the food industry – 10 credits
- Principles of nutrition – 10 credits

Pharmaceutical Theme
- Plant design and manufacturing principles for pharmaceutical production – 10 credits
- From bench to market: the development of pharmaceutical drug products – 10 credits
- Design and development of drug delivery systems – 10 credits

Business Studies Theme
- Effective project management – 10 credits
- Business methods, economics and strategy – 10 credits
- Marketing and total quality management – 10 credits

Core Skills Theme
- Modern minerals engineering – 10 credits
- Systems modelling – 10 credits
- Chemical nanoengineering – 10 credits
- Explosion science, prevention and protection – 10 credits

More about the course
In the autumn and spring semesters, you will study 5 compulsory core modules and 60 credits of optional modules. In the summer semester, each student on the MSc programme will then undertake an individual project in a research area of their choice within one of the School’s internationally recognised research groups.

The multidisciplinary core modules cover the fundamental science and engineering underpinning the design of sophisticated formulated products. Depending upon your academic background, you will begin by studying the fundamental principles of either chemical engineering or the relevant biological science.

A wide range of optional modules enables you to gain specific knowledge relating to fuel cells, food and/or pharmaceutical product development. Safety, regulatory and quality issues applicable across the relevant industries are also considered. Core skill modules are topics that may be applied across all themed areas. You may also choose to study business and management modules, or develop mathematical modelling skills. You will have the freedom to pick and choose modules from each theme (providing timetabling allows for this).
Advanced Chemical Engineering
MSc/PGDip continued

Research expertise
Our research strengths are in the design and characterisation of products, heat and mass transfer, fluid flow, particle technology and materials engineering across chemical, biological and physical systems. We collaborate with world-class industry and leading edge engineering and science departments, both nationally and internationally.

World-class teaching and learning
Postgraduate study at the University of Birmingham is a chance to learn from world leaders in their fields. This guarantees you a first-class learning experience, leading to a qualification that is respected the world over and making you an attractive prospect in a very competitive job market.

The MSc is a 12-month full-time advanced course, comprising lectures, laboratory work, short experimental projects and a research project. The course can also be taken on a part-time basis over two or three years. The Postgraduate Diploma (PGDip) lasts for eight months and does not include the research project. Modules are also available individually to fulfil continuing professional development needs.

Enhance your professional prospects
There is a great demand for chemical engineers in industry worldwide. This course gives you a professional basis for a career in a variety of industries.

Our Careers Network offers a range of events and support services designed to help you maximise your employability: from networking opportunities and career coaching workshops, to our effective-careers-strategy toolkit and one-to-one guidance. We also offer subject-specific careers consultants and advisers for each college and a dedicated careers website for international students.

LEARN MORE
For full module information and an online application form, please visit our dedicated web pages, or contact our programme staff with your questions.
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