Suitable for all engineering and applied science graduates, the MSc in Advanced Chemical Engineering will equip you with the skills to address the global chemical engineering challenges of the 21st century. You will develop an advanced understanding of the sustainable supply of clean energy, food and water, through the production of chemicals, functionalised products and fuels. Using our campus pilot plant facilities and benefitting from Cranfield’s strong industry links, you will gain the essential skills and experience to develop a successful global career in a thriving discipline with its high demand for postgraduate level engineers.

The course is unique in offering two study routes:

• A general chemical engineering route,
• A biorefining route (Cranfield is the only UK university to offer an MSc in Advanced Chemical Engineering with biorefining as a dedicated option).

Who is it for?

A distinguishing feature of this course is that it is not exclusively designed for chemical engineering graduates. Suitable for all engineering and applied science graduates, this MSc will provide you with the skill sets that employers actively seek in highly desirable engineering graduates, enabling you to embark on a successful career as chemical engineering professional in industry, government or research.

You will learn state of the art chemical engineering methods, apply them to real world problems via industrially focused modules and research projects, whilst gaining the essential management skills to bring your ideas to life.

The general chemical engineering route equips you with diversified skills in advanced engineering, which includes theoretical and practical elements in operation, design, and control of a wide range of chemical processes.

The biorefining route equips you with fundamental understanding of chemical engineering and solid skills to address the challenges of the rapidly growing and dynamic bioenergy sector. This option covers the sustainable production of heat, power and fuels from biomass within the biorefining framework.

Course structure

• Eight taught modules (40%),
• Group project or dissertation: (20%),
• Individual research project (40%).

Informed by industry

This MSc is particularly industry focused, with the course team being heavily involved in various industry funded and oriented research and development projects. These close links mean that students are exposed to the latest industry developments as they are learning from academics who are making a real difference in the sector.

Future career

Industry driven research makes our graduates some of the most desirable in the world for recruitment by companies competing in a range of industries, including chemicals, petrochemicals, biochemicals, conventional energy and bioenergy, food, materials, consultancy and management.

Those wishing to continue their education via PhD or MBA studies in the chemical or energy sectors will be greatly facilitated by the interdisciplinary, project-oriented profile that they will have acquired through this course.

Key information

Duration:
MSc: one year full-time, two to three years part-time.
PgDip, PgCert: one year full-time, two years part-time.

Start date:
Full-time: October.
Part-time: October.

Qualification:
MSc, PgDip, PgCert.

Location:
Cranfield campus.

Entry requirements
A first or second class UK Honours degree in a relevant science, engineering or related discipline, or the international equivalent of these UK qualifications. Other relevant qualifications, together with significant experience, may be considered.
Overview of taught modules

Compulsory modules (both routes)  
(all the modules in this list need to be taken as part of this course).

Advanced Reaction Kinetics  
The module provides an understanding of the principles of chemical reaction kinetics, thermodynamics, and heat and mass transfer phenomena governing chemical reactions.

Computational Fluid Dynamics for Industrial Processes  
CFD techniques and tools for modelling, simulating and analysing practical engineering problems with hands-on experience using commercial software packages used in industry.

Management for Technology  
This module covers the importance of technology leadership in driving the technical aspects of an organisation's products, innovation, programmes, operations and strategy, especially in today's turbulent commercial environment with its unprecedented pace of technological development.

Pilot Plant Operations  
This practical-focused module provides students with a critical understanding of the key differences and challenges in pilot-scale working.

Process Design and Simulation  
Process design, simulation and modelling are industrially-relevant tools to assess the techno-economic feasibility of complex engineering processes.

Biorefining route compulsory modules

Biofuels and Biorefining Processes  
This module focuses on liquid biofuels as a current opportunity to decrease greenhouse gasses emissions when used to replace fossil fuels in motor engines, and as a route to fulfil the European goals on the use of renewable energy.

Energy from Biomass and Waste: Thermochemical Processes  
You will learn about the opportunities and potential for biomass and waste to contribute to the production of renewable heat and electricity.

Evaluating Environmental Sustainability  
This module looks at the impact that goods and services impose on the environment and how we quantify these to compare production or consumption methods and the demands placed on the earth’s environment.

General route compulsory modules

Advanced Control Systems  
An introduction of the fundamental concepts, principles, methodologies, and application for the design of advanced control systems for industrial applications.

Process Plant Operations  
Providing an overview of the fundamental principles of typical unit operations in process plants.

Thermal Systems Operation and Design  
This module aims to enable students to combine and apply the principles of heat transfer, thermodynamics and fluid mechanics in the design and optimisation of commercial thermal systems.

Group project

The group project, undertaken between February and May, enables you to put the skills and knowledge developed during the course modules into practice in an applied context, while gaining transferable skills in project management, teamwork and independent research. Projects are often supported by industry and potential future employers value this experience. The group project is normally multidisciplinary and shared across the Energy MSc programme, giving the added benefit of working with students with other academic backgrounds.

Individual project

The individual research project allows students to investigate deeper into an area of specific interest. It is very common for industrial partners to put forward real-world problems or areas of development as potential research project topics. The individual research project component takes place between May and September.

Rankings

Cranfield ranks 5th in the UK for mechanical, aeronautical and manufacturing engineering in the QS World University Rankings 2019.

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For further information please visit  
www.cranfield.ac.uk/ace