Advanced Process Engineering
MSc, PgDip, PgCert

Process engineers are among the most demanded engineers across multiple sectors, due to the flexibility of their skillset. They can design, optimise and operate industrial processes, as well as lead engineering projects. MSc in Advanced Process Engineering integrates applied learning experience with internationally-recognised research, professional development, career mentoring and teamwork to transform you into the engineering leader who will solve global challenges.

You will develop relevant employability skills to become a successful process engineer in any sector that utilises process engineering, including energy and power, nuclear, chemical, petrochemical, water, food and drink, and pharmaceutical industries. You will also become a member of Cranfield Process Engineering team and will work with us to solve global challenges through real-life assignments and projects.

Ranked in the UK top 5 for mechanical engineering, Cranfield offers a unique, postgraduate-only environment, near-industrial scale engineering facilities, industrially focused modules and real-world case studies. You will take a practical approach to develop solutions to challenges, such as achieving net-zero in power and industrial sectors and solving climate emergency.

Who is it for?
The Advanced Process Engineering MSc is ideal for candidates with engineering or applied science backgrounds who want to dedicate their career to solving global challenges via process engineering.

This course will equip you with an advanced process engineering knowledge, as well as applied analytical, problem-solving and communication skills that are crucial to your successful career as a process engineer or project engineer.

You will become proficient in the use of state-of-the-art approaches applied throughout process development to deal with the major operational and design challenges. You will receive up-to-date technical knowledge and develop skills required for achieving the best management, design, control and operation of efficient process systems.

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

Informed by industry
The Advanced Process Engineering MSc is closely aligned with industry to ensure that you are fully prepared for your career:
- Cranfield's long-standing strategic partnerships with prominent players in the process sectors - including Alstom Power, BP, Chevron, Conoco Philips, Emerson Process Management, npower and Siemens – ensures that the course content meets the needs of global employers.
- The teaching team are heavily involved in industrially funded research and development, enabling you to benefit from real-world case studies throughout the course.

Future career
The Advanced Process Engineering MSc is designed to provide you with the skills, knowledge and expertise required to develop a successful career in any sector, including energy and power, nuclear, chemical, petrochemical, water, food and drink, and pharmaceutical industries. We aim to influence your career development from day one. This course will enable you to apply your learning through applied modules and real-life assignments, industrially-relevant group and individual research projects; while equipping you with the engineering and management skills you need to make an immediate impact in your career.

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 (or equivalent) in an engineering or applied science discipline. Other recognised professional qualifications or several years relevant industrial experience may be accepted as equivalent; subject to approval by the Course Directors.
Overview of taught modules

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

Advanced Control Systems
The aim of this module is to introduce fundamental concepts, principles, methodologies, and application for the design of advanced control systems for industrial applications.

Computational Fluid Dynamics for Industrial Processes
This module introduces the 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.

Process Design and Simulation
This module aims to introduce you to the modern techniques and computer aided engineering tools for the design, simulation and optimisation of process systems. Via a large share of process simulation and optimisation case studies, the module will enable you to gather the hands-on experience of using the commercial software.

Process Measurement Systems
You will learn how to apply a systematic approach to the design of measurement systems for industrial process applications. The fundamental concepts, key requirements, typical principles and key applications of industrial process measurement technology and systems will be highlighted.

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

Risk and Reliability Engineering
You will learn about the principles of risk and reliability engineering and associated tools and methods to solve relevant engineering problems in industry. This includes the risk management process and reliability analysis techniques.

Thermal Systems Operation and Design
Design of optimum thermal and energy storage systems is one of the key prerequisites to enhance the performance and efficiency of conventional and future energy systems. This module aims to enable you to combine and apply the principles of heat transfer, thermodynamics and fluid mechanics in the design and optimisation of commercial thermal systems. In addition, the module introduces you to a wide range of challenges and opportunities in waste heat recovery and energy storage, and provides you with practical approaches and solutions to enhance the system efficiency.

Group project
The group project 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. The group project is usually sponsored by industrial partners who provide particular problems linked to their plant operations. Projects generally require the group to provide a solution to the operational problem. Potential future employers value this experience.

During the project you will develop a range of skills including learning how to establish team member roles and responsibilities, project management, and delivering technical presentations. At the end of the project, all groups submit a written report and deliver a presentation to the industrial partner.

Individual project
The individual research project allows you to delve deeper into a specific area of interest. As our academic research is so closely related to industry, it is common for our industrial partners to put forward real practical problems or areas of development as potential research topics. The individual research project component takes place between April and August.

For part-time students, it is common that their research project is undertaken in collaboration with their place of work.

Research projects will involve designs, computer simulations, techno-economic feasibility assessments, reviews, practical evaluations and experimental investigations.

Accreditation and Rankings
This MSc degree is accredited by the Institution of Mechanical Engineers (IMechE).

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/ape