Rational and economic use of energy, with the least damage to the environment, is vital for the future of our planet. Established in 1972, The Energy Systems and Thermal Processes MSc remains the most prestigious degree in technical energy management in the UK. Accredited by the Institution of Mechanical Engineers, it will equip you with the state-of-the-art technical knowledge and skills required to help achieve energy efficiency and reduce environmental pollution.

Who is it for?
Closely aligned with industry, with real world case studies and research projects at its core, this course will enable engineering graduates or practicing engineers to develop a successful and rewarding career as an environmentally aware energy professional.

The course will equip you with knowledge that can be directly applied to help various sectors improve competitiveness in the face of dwindling resources, probable substantial increases in energy costs and the urgent requirement to comply with the increasingly restrictive pollution control standards.

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

Informed by industry
Close engagement with the energy sector over the last 20 years has produced long standing strategic partnerships with a wide range of prominent organisations including Alstom Power, BP Cummins Power Generation, Doosan Babcock, E.ON, npower, Rolls Royce, Shell, Siemens and Total.

Knowledge gained working with our industrial clients is continually fed back into the teaching programme to ensure that you benefit from the very latest knowledge and techniques affecting industry.

We have a world-class reputation for industrial-scale research facilities and pilot-scale demonstration programmes in the energy area. Our strategic links with industry ensure everything taught on the course is relevant, timely and meets the needs of organisations competing within the energy sector, making our graduates some of the most desirable in the world.

The course is accredited by the Institution of Mechanical Engineers, ensuring professional recognition and relevance to employers.

Future career
There is a considerable demand for environmentally aware energy specialists with in-depth technical knowledge combined with practical and management skills. At Cranfield, our focus is on an industry-led education, which makes our graduates some of the most desirable in the world for recruitment by companies and organisations competing in the energy sector.

Graduates of the course have been successful in gaining employment in energy, environmental and engineering consultancies and design practices, research organisations and government departments or go on to further research studies.

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 mathematics, physics or an engineering discipline. Other recognised professional qualifications or several years relevant industrial experience may be accepted as equivalent; subject to approval by the Course Director.
Overview of taught modules

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

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

Applied Thermal Energy Systems
This module provides an in-depth applied knowledge for different thermal energy systems to help spur the next industrial revolution for improving efficiency, reducing water consumption and efficient way of utilising waste heat streams. You will also learn how to develop these integrated schemes and play an important role in thermodynamic modelling, data collection, analysis, and prediction of the performance and control of these advanced/applied thermal systems.

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

Heat Transfer
An in-depth understanding of the fundamentals of heat transfer and practical tools for solving heat-transfer problems and design of heat-transfer equipment.

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.

Thermal Energy Systems
This module provides an understanding of the fundamentals of operation, configuration and characteristics of thermal energy systems. You will also learn how to apply these for design of energy-efficient furnaces and boilers and key implementation issues of various types of power plant.

Thermal Systems Operation and Design
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, undertaken between February and April, enables you to put the skills and knowledge developed during the taught 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.

Each group is given an industrially relevant problem to solve. 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 poster presentation to industry partners. This presentation provides the opportunity to develop presentation skills and effectively handle questions about complex issues in a professional manner.

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 May and August.

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.