Achieving energy efficiency and reducing environmental pollution are increasingly important aspects of professional engineering. This course equips graduates and practicing engineers with an in-depth understanding of the fundamental issues of energy thrift in the industrial and commercial sectors, enabling a successful career as an environmentally aware energy professional.

The course has continually evolved over the past 40 years from discussions with industrial experts, employers, sponsors and previous students, and remains the most prestigious degree in technical energy management in the UK. The content of the study programme is updated regularly to reflect changes arising from technical advances, economic factors and changes in legislation, regulations and standards.

Who is it for?
The course has been developed to provide up-to-date technical knowledge and skills required for achieving an improved management of energy, designing of energy-efficient systems and processes, utilisation of renewable energy sources and the cost effective reduction and control of pollution. This knowledge can be directly applied to help various sectors of the economy in improving their competitiveness in the face of dwindling resources, probable substantial increases in unit 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
Our world-class reputation for industrial-scale research facilities and pilot-scale demonstration programmes in the energy area and close engagement with the energy sector over the last 40 years has produced long-standing strategic partnerships with the sectors most prominent organisations including Alstom Power, BP, Cummins Power Generation, Doosan Babcock, E.ON, npower, Rolls Royce, Shell, Siemens and Total.

Our strategic links with industry ensure that all of the materials taught on the course are relevant, timely and meet the needs of organisations competing within the energy sector. This industry-led education makes our graduates some of the most desirable in the world for energy companies to recruit.

Future career
There is a considerable demand for environmentally aware energy specialists with in-depth technical knowledge and practical skills. Our industry-led education makes graduates of this program 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. A number of our MSc graduates follow further research studies leading to PhD degrees at Cranfield and in other academic institutions.

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).

Heat Transfer
You will gain an in-depth understanding of the fundamentals of heat transfer and practical tools for solving heat-transfer problems and design of heat-transfer equipment. This will include modes of heat transfer, conduction, convection, thermal radiation and boiling heat transfer.

Heat and Power Generation Systems
This module provides an understanding of the fundamentals of operation, configuration and characteristics of thermal 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
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.

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.

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 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.

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

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.

Elective modules
(a selection of modules from the following 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.

Energy Systems Case Studies
During this module you will gain a deep understanding of the truly multidisciplinary nature of a real industrial project. Using a relevant case study, the scientific and technical concepts learned during the previous modules will be brought together and used to execute the analysis of the case study.

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 the industrial process measurement technology and systems will be highlighted.

Group project
The group project 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.

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 April and August.

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

According to QS World University Rankings 2019, Cranfield is fifth for mechanical, aeronautical and manufacturing engineering education in the UK, and has risen 6 places to #39 in the world.

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