Climate change, growing populations and limited fossil fuel resources mean that demand for renewable energy continues at an ever-increasing rate. Use of renewable resources and application of renewable energy technologies will play a major role in future energy supply. As a result, renewable energy is now at the heart of every informed discussion concerning energy sustainability, security and affordability.

To reflect the industry demands, this MSc offers two routes;

On the engineering route, you will have the opportunity to learn state-of-the-art technical skills required to design renewable energy systems including Finite Element Analysis (FEA).

The management route allows you to focus on aspects such as health and safety, environmental aspects and asset management.

Who is it for?

This course is suitable for engineering, maths or science graduates who wish to specialise in renewable energy. It develops professional engineers and scientists with the multidisciplinary skills and ability to analyse current and future energy problems. This course will equip you with the advanced interdisciplinary skills required to design, optimise and evaluate the technical and economic viability of renewable energy schemes.

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 20 years has produced long-standing strategic partnerships with the sectors most prominent players. The strategic links with industry ensure that all of the material taught on the course is relevant, timely and meets 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

With the current worldwide focus on addressing low carbon energy production and renewable energy technologies, graduates of this course can expect to be highly sought after by employers. On successful completion of the course you will have the skills and knowledge to be able to analyse current and future energy needs, and design and implement appropriate solutions, taking into account the social, environmental, technical, regulatory and commercial issues. You can expect to go on to a wide range of careers as professional scientists or engineers in energy production, distribution and demand management across the full breadth of industrial and public sector organisations.

Past graduates have gone on to roles in companies such as, E.On, Vestas, Siemens Gamesa Renewable Energy, ABB and EDF.

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 a related science or 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 (both routes)
(all the modules in this list need to be taken as part of this course).

Energy Entrepreneurship
The aim of the module is to provide you with knowledge and skills relevant for starting and managing new ventures across the entrepreneurial life cycle. Moreover, it will prepare you for how to prepare a business pitch to an investor.

Energy Systems Case Studies
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.

Renewable Energy Technologies 1
The purpose of this module is to introduce the basis for assessment of the performances of wind, wave and tidal, hydro-electricity, biomass and waste technologies, and geothermal technologies.

Renewable Energy Technologies 2
This module provides detailed knowledge of renewable energy power generation using solar PV and Concentrating Solar Power (CSP) technologies, energy storage and distribution after generation of renewable energy. This module also provides you with knowledge in designing and analysing post-generation infrastructure.

Risk and Reliability Engineering
Risk and Reliability Engineering introduces the principles of risk and reliability engineering and associated tools and methods to solve relevant engineering problems in industry.

Engineering route compulsory modules

Engineering Stress Analysis: Theory and Simulations
This comprehensive module brings together theoretical and computational stress analysis through Finite Element simulations, allowing you to appreciate how the two disciplines interact in practice and what their strengths and limitations are.

Fluid Mechanics and Loading
This module provides a theoretical and applied understanding of fluid mechanics and fluid loading on structures.

Renewable Energy Structures
Renewable Energy Structures introduces the principle structural components of renewable energy devices operating in challenging environments, like offshore wind turbines. You will also develop an appreciation of the environmental loads acting on these structural components and of the contemporary methodologies and engineering design tools used for the prediction of these loads.

Management route compulsory modules

Advanced Maintenance Engineering and Asset Management
This module will provide the knowledge and skills necessary to design advanced maintenance, monitoring and asset management strategies for complex engineering systems through the lifecycle.

Energy Economics and Policy
This module covers a variety of theoretical and empirical topics related to energy demand, energy supply, energy prices, renewable vs depletable resources and environmental consequences of energy consumption and production, all from an economic perspective. It will demonstrate how key economic principles are used in various energy-environment models to inform energy and climate policy.

Health, Safety, Security and the Environment
Within the scope of a single module, it is not possible to cover all 4 aspects in depth. The module is designed to provide you with the competencies to assess and evaluate the relevant international standards as well as the legislative and regulatory requirements. There is a strong focus on the use of case studies to provide examples of how standards and legislation are implemented in practice.

Group project
The group project is an applied, multidisciplinary, team-based activity. Often solving real-world, industry-based problems, you will be provided with the opportunity to take responsibility for a consultancy-type project while working under academic supervision. Success is dependent on the integration of various activities and working within agreed objectives, deadlines and budgets. Transferable skills such as team work, self-reflection and clear communication are also developed.

Individual project
The individual project is the chance for you to focus on an area of particular interest to you and your future career. You will select the individual project in consultation with the Thesis Co-ordinator and your Course Director. These projects provide you with the opportunity to demonstrate your ability to carry out independent research, think and work in an original way, contribute to knowledge, and overcome genuine problems in the offshore industry. Many of the projects are supported by external organisations.

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

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