Renewable Energy

MSc, PgDip, PgCert

Develop a successful career in renewable energy.

This MSc will equip you with the advanced knowledge and skills to develop a successful career in the rapidly growing renewable energy sector. A choice of study routes enables you to specialise in developing the state-of-the-art technical skills required to design renewable energy systems, or to focus on managing renewable engineering projects and systems. Ranked in the UK top 5 for mechanical engineering, Cranfield offers a unique, postgraduate-only environment, unique engineering-scale facilities for the development of efficient renewable energy technologies with low CO2 emissions and a teaching team with extensive experience of solving real world renewable energy challenges.

Who is it for?

This course is designed for engineering, maths or science graduates who wish to develop a successful and rewarding career in the renewable energy sector. It will equip you with the multidisciplinary skills required to design, optimise and evaluate the technical and economic viability of renewable energy schemes. The engineering route will provide you with the state-of-the-art technical skills required to design renewable energy systems, including finite element analysis (FEA), computational fluid dynamics (CFD), and technology technology lifecycle management (TLM). Alternatively, you can specialise in managing renewable energy projects and systems; focusing on topics such as health and safety and environment; energy entrepreneurship and asset management.

Course structure

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

Informed by industry

The Renewable Energy MSc is closely aligned with industry to ensure that you are fully prepared for your new career:

- Cranfield's long-standing strategic partnerships with prominent players in the energy sector ensures that the course content meets the needs of global employers in the renewable energy sector,
- The teaching team are heavily involved in industrially funded research and development, enabling you to benefit from real-world case studies throughout the course,
- An industrial advisory board for the programme scrutinises course content and ensures its relevance to the needs of global employers.

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 modules 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 four 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 legislation 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 and your fellow students will have the opportunity to take responsibility for a consultancy-type project while working under academic supervision. The group project is highly valued by employers for developing your ability to work within agreed objectives, deadlines and budgets, whilst developing transferable skills such as team work, self-reflection and effective communication.

Recent group projects include:

- Conversion of consumer waste plastic into new plastics,
- Design specification of pilot scale 142 kWth air/rock,
- Conceptual and preliminary design of a SPAR for a 5 MW VAWT.

Individual project

Selected in consultation with the Thesis Co-ordinator and Course Director, the individual project offers the opportunity for you to focus on an area of particular interest and of direct relevance to your career aspirations. It will enable you to develop independent research skills, to think and work in an original way, contribute to knowledge and overcome real-world problems – particularly as many of the projects are supported by external organisations.

Recent individual projects include:

- Modelling, structural analysis, and optimisation of a 10 metre solar concentrating mirror array for industrial process heat applications,
- Pollution modelling and mitigation strategies through renewable energy technologies in Mexico City,
- Floating offshore wind turbines and support foundations in ultra deep waters,
- CFD study of a ducted wind turbine.

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/re

Every effort was made to ensure that the information on this document was correct at the time it was produced. Please check our website for the latest information. April 2020.