



Postgraduate
master's courses in

Energy and Sustainability

Academic year 2024/25 entry

Advanced Chemical Engineering MSc
Advanced Digital Energy Systems MSc
Advanced Mechanical Engineering MSc
Renewable Energy MSc

Cranfield University

We are the UK's only specialist postgraduate university in technology and management, with longstanding relationships with some of the most prestigious global companies. Our close collaboration with industry, and passion for the areas we operate in, will help your career.

Specialist postgraduate

A research-focused professional community

88%

of our research is world-leading or internationally excellent

Research Excellence Framework (REF) 2021

Over £150 million

of investment in new facilities over the past five years

Top 30
in the world

for Engineering – Mechanical, Aeronautical and Manufacturing
QS World University Rankings by subject, 2023

A professional network of **75,000+** alumni, from 177 countries

5,000+ postgraduate students from 100+ countries

Six-time winner
Of the prestigious Queen's Anniversary Prize

As we are postgraduate only, we are not listed in league tables that help compare undergraduate universities, such as *The Times World Rankings* and *The Complete University Guide*.

"I'd say a major part of the Cranfield experience is the peer-to-peer learning. It's very collaborative, you have to work in teams, you learn about communication, you learn about how to be inclusive and tolerable to different working styles. Cranfield means growth, opportunity, learning and tranquillity."

Malvika Urkolil, (Renewable Energy MSc 2022)



Reasons to study **Energy and Sustainability** with us

1 Projects with industry

We work closely with industry to tackle the real-world issues in both developed and developing nations and address global climate challenges around carbon reduction, renewable energy and the transition to sustainable, low carbon and net zero energy. Your individual and group project will give you an opportunity to work with our industry connections and make a difference to the energy landscape of tomorrow.

2 Learning from the best academics

We attract leaders in their area of expertise from around the globe. The diverse mix of backgrounds, cultures, knowledge and experiences creates a rich teaching and research environment to tackle the grand challenges facing the world and deal with climate change head-on.

3 Outstanding facilities

Our extensive and impressive on-site pilot-scale facilities allow us to conduct exciting, transformative and leading science. These facilities include: gas turbines, high-pressure combustion rigs, a flow assurance laboratory, a high-temperature coating test facility, solar simulators, wind tunnels, large-scale mechanical test rigs and a 30m wave tank, amongst others.

4 Networking opportunities

We have a considerable global network of industrial and government contacts, some of whom will provide regular or guest lectures, which gives

you the opportunity to build useful and career-enhancing connections with industry. You will have instant access to our international alumni network and build long-term relationships with the Cranfield academic team to last throughout your career.

5 Research-informed teaching

Our teaching is informed by our world-leading research into all forms of energy and sustainable low/zero carbon business. This includes renewable energy, thermal and carbon capture and storage, energy from waste, energy materials and power plants, energy policy and strategy, the exciting and rapidly-growing area of digital energy systems and so much more. The team at Cranfield incorporate their latest groundbreaking knowledge into each year's MSc courses to ensure that the course content gives you the opportunity to make an immediate impact.

6 Industry-relevant courses

We design our courses with employers and careers in mind. We combine high-calibre teaching with practical, real-world work experience, giving you an unparalleled competitive edge and the ability to start on your journey the moment you leave Cranfield.

7 Flexible learning

All energy and sustainability courses run on a full and part-time basis. For part-time students, the modular structure allows flexibility, making an MSc achievable even if you work full-time.

Courses

Modules form 40% of the course content, with the group and individual projects making up the other 60%.

This brochure shows the modules being offered in the 2023/2024 academic year, to give you an idea of course content. To keep our courses relevant and up-to-date, modules are subject to change so please check the latest information on our website. All courses are available on a full- or part-time basis and are accredited, see page 9 for more information.

Advanced Chemical Engineering

www.cranfield.ac.uk/ace • Accredited – see page 9

MSc, PgDip, PgCert

The MSc in Advanced Chemical Engineering will equip you with the skills to address the global chemical engineering challenges of the 21st century.

Compulsory modules

- Advanced Reaction Kinetics for Energy,
- Applied Thermochemical Pilot Design,
- Biofuels and Biorefining,
- Engineering Project Management,
- Research Methods for Chemical Engineering,
- Separation and Purification Design.

Advanced Digital Energy Systems

www.cranfield.ac.uk/ades

MSc, PgDip, PgCert

Digital technology is set to change the face of energy. This course provides the skills, techniques and know-how to be part of this exciting and fast-growing sector.

Compulsory modules

- Applications of Blockchain Technology,
- Artificial Intelligence for Energy Systems,
- Cybersecurity for Energy Systems,
- Data Analytics for Energy Systems,
- Energy Entrepreneurship,
- Energy Systems Case Studies,
- Renewable Energy Technologies 1,
- Renewable Energy Technologies 2.

“I will definitely say the group project has been the most exciting part, the most challenging as well. I really enjoy working with my colleagues - now I can say they are my friends, on an industry related project, especially for a big industry like the offshore wind industry. Cranfield was a great and unforgettable experience.”

Diego Rodriguez, (Advanced Mechanical Engineering 2021)



Process systems engineering laboratory.

Advanced Mechanical Engineering

www.cranfield.ac.uk/ame • Accredited – see page 9

MSc, PgDip, PgCert

Mechanical engineers are in huge demand across the energy industry. This course provides real-world, industrially-focused teaching to enhance career prospects.

Compulsory modules

- Assessing Risk and Failure,
- Computational Fluid Dynamics for Renewable Energy,
- Engineering Project Management,
- Engineering Stress Analysis: Theory and Simulations,
- Fluid Mechanics and Loading,
- Structural Integrity.

Renewable Energy

www.cranfield.ac.uk/re • Accredited – see page 9

MSc, PgDip, PgCert

The Renewable Energy MSc will equip you with the advanced knowledge and skills to develop a successful career in the rapidly-growing renewable energy sector. Two study routes are available on this course: i) management ii) engineering.

Engineering route compulsory modules

- Energy Entrepreneurship,
- Engineering Stress Analysis: Theory and Simulations,
- Design of Offshore Energy Structures,
- Fluid Mechanics and Loading,
- Renewable Energy Technologies 1,
- Renewable Energy Technologies 2,
- Solar Energy Engineering.

Management route compulsory modules

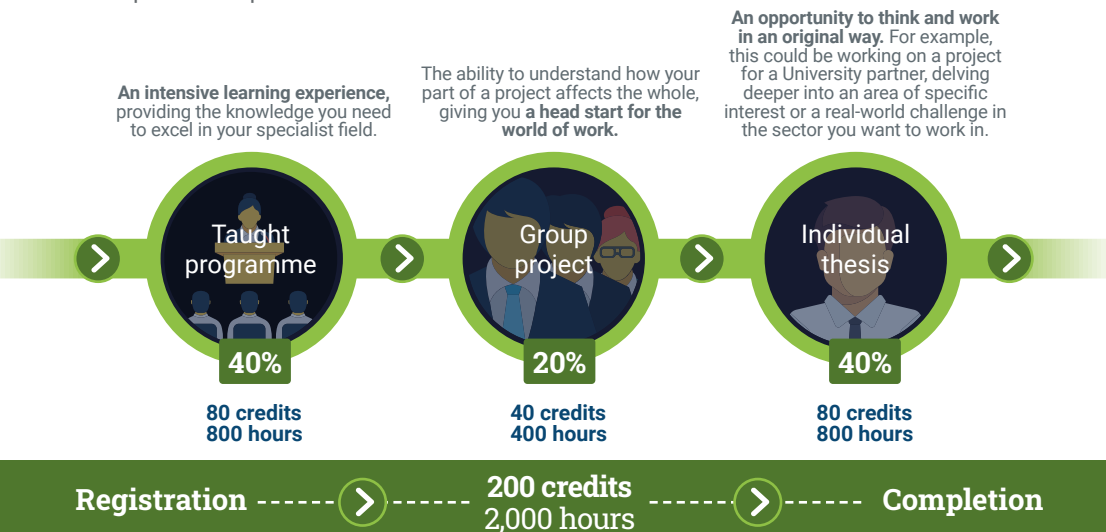
- Energy Entrepreneurship,
- Energy Economics and Policy,
- Engineering Project Management,
- Health, Safety and Environment Risk,
- Renewable Energy Technologies 1,
- Renewable Energy Technologies 2,
- Sustainability and Environmental Assessment.

The Energy and Sustainability MSc course modules are predominantly delivered over two weeks. The first week will typically involve lectures and workshops, with the second week largely dedicated to assignments and tutorial sessions. The modules delivered before the Christmas break are designed to provide you with the essential learning and more theoretical elements of your course. Meanwhile, the modules delivered throughout January and February provide you with the opportunity to apply this knowledge in practical and case study-based modules.

Course structure

Our specialist, sector-facing master's courses are set up and developed in close collaboration with industry partners, ensuring the content of our courses remain industry-relevant and employers remain impressed with our graduates' business-readiness.

This diagram illustrates the course structure of our full-time master's courses. Please check your course structure online for more detailed information, including the weight of each phase and part-time course structure variations.



Careers

An exciting and rewarding career within energy awaits you. Whatever your specialism, there are numerous opportunities to shape your career and begin making a significant change to society.

You could soon join our graduates and alumni around the globe, who are already initiating change within the energy sector in roles and at organisations such as:

Roles:

- Design Engineer,
- Operations Engineer,
- Principal Process Engineer,
- Renewable Energy Analyst,
- Senior Project Engineer,
- Wind Farm Developer.

Organisations:

- EDF,
- GE Renewable Energy,
- Rolls-Royce Marine AS,
- Meggitt,
- Scottish Power,
- Siemens.

Industry links

Cranfield has unrivalled links with industry. You will benefit from our extensive contacts and track record of close collaboration with government and the energy and power sector. These links include industrial advisory panels and project sponsors.

Companies and organisations we work and collaborate with to research and develop sustainable energy and power technologies across the sector include: BP, Cadent, Carbon Trust, Intecsea, MBNL, Saudi Aramco, SEMLEP, UK Power Networks, and many more.

Industrial advisory panel

Our courses are reviewed each year by a panel of industry advisors from leading companies and institutions in the sector. This ensures that the skills you acquire are up-to-date and are what employers want.

Industry-sponsored group projects

Cranfield's group project experience provides you with the opportunity to take responsibility for a consultancy-type project while working under academic supervision. Below are some recent examples:

- Fatigue life assessment of offshore wind turbine bolted connections,
- Peer to peer energy trading with battery electric vehicles,
- CO₂ and H₂ as feedstock for the chemical industry,
- Parametric investigation and optimisation of a novel ocean-going robotic platform,
- Modelling oil spill response under fast current,
- Development of a novel floating solar farm in waves,
- Flexible energy generation from landfill sites,
- Design specification and engineering development of a cold thermal energy system,
- Techno-economic assessment and planning of green hydrogen systems in the UK agriculture sector.

Academic staff

You will be taught by a wide range of subject specialists at Cranfield and from outside the University, who draw on their research and industrial expertise to provide stimulating and relevant input to your learning experience.



Dr Patrick Verdin, Director of the Energy and Sustainability MSc Programme

Patrick is responsible for overseeing and managing the delivery of the MSc courses in Energy and Sustainability. Patrick's research focuses on the transition from oil and gas to renewable energy, with over 20 years of expertise in Computational Fluid Dynamics.

www.cranfield.ac.uk/pverdin



Professor Nazmiye Ozkan, Head of Centre for Energy Systems and Strategy

Nazmiye is an interdisciplinary energy economist with a background in urban and regional planning. She is interested in understanding the interactions between social, economic, environmental and technological systems, from household up to network and city level.

www.cranfield.ac.uk/nozkan



Professor Upul Wijayantha, Head of Centre for Renewable and Low Carbon Energy

Upul has about 30 years of experience working in academia and industry. He is a committee member of International Energy Agency Renewable Hydrogen Implementation Programme. His research interests include, hydrogen and sustainable fuels, energy harvesting and advance energy materials.

www.cranfield.ac.uk/wijayantha



Dr Joy Sumner, Head of Centre for Energy Engineering

With a background at Cambridge and MIT, Joy's work is related to the high temperature degradation of mechanisms of components in energy systems. She is a Fellow of the Institute of Materials, Minerals and Mining, and a Fellow of the Higher Education Academy.

www.cranfield.ac.uk/jsumner

Key facts and statistics

Course information



Full-time
One year



Part-time
Up to three years



Start date
October



MSc/PgDip/PgCert



Fees

Please see the individual course pages on our website for full fee information and full-time or part-time options. Terms and conditions apply.

See www.cranfield.ac.uk/fees

Cohort profile*



Geographic spread
20% UK
80% International



Typical cohort age
20-60 years



Average cohort size
Approximately 39



19% Female
81% Male

*These figures give an indication of the course make-up at registration across Energy and Sustainability for the entry year 2022-2023.

Accreditation

The following courses are accredited by the Institution of Mechanical Engineers: Advanced Mechanical Engineering MSc and Renewable Energy MSc.

The following courses are accredited by the Energy Institute: Advanced Chemical Engineering MSc, Advanced Mechanical Engineering MSc and Renewable Energy MSc.

Institution of
**MECHANICAL
ENGINEERS**

 **energy**
institute
Accredited Course

More than a degree with the Cranfield Enhance programme

Cranfield graduates are valued for their distinctive skills and capabilities. We have developed these programmes to complement and enhance what you learn on your chosen qualification. On the Cranfield Enhance programme, you will be able to earn 'digital badges' in areas such as Employability, Entrepreneurship, Sustainability and Outreach to showcase your new skills to prospective employers.

Read more at www.cranfield.ac.uk/enhance

Financing your studies

If you need advice on funding your course or living costs, we can provide information and a range of online tools to help you put together the funding package you need.

There is more information on our website:
www.cranfield.ac.uk/funding

How to apply

Read more about our entry requirements and how to apply:
www.cranfield.ac.uk/apply



Life at Cranfield

A welcoming, professional campus community.

Located just over an hour from London in the English countryside, Cranfield's campus environment supports close, working relationships between our multinational postgraduate students and academic and industry experts.

www.cranfield.ac.uk/visit



Have a look at some of our facilities in this virtual experience.

virtualexperience.cranfield.ac.uk

Cranfield University works with over

1,500 businesses and governments
based in over 40 countries

These organisations include:



SIEMENS



UK Research
and Innovation

Related programmes:

Agrifood: www.cranfield.ac.uk/agrifood

Design: www.cranfield.ac.uk/designthinking

Environment: www.cranfield.ac.uk/environment

Water: www.cranfield.ac.uk/water

For a full list of Cranfield courses, please see our prospectus and website.

www.cranfield.ac.uk/energy

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blogs.cranfield.ac.uk

Every effort is made to ensure that the information in this brochure is correct at the time it is printed. Please check our website for the latest information.

[SWEE-ES-September 2023](#).