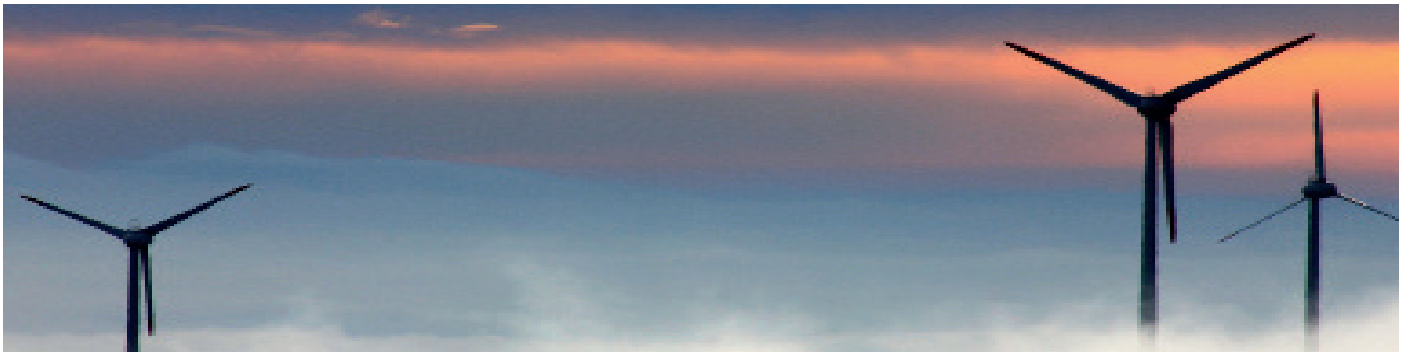




Advanced Mechanical Engineering

MSc, PgDip, PgCert



The Advanced Mechanical Engineering MSc is designed to prepare you for a successful mechanical engineering career leading large, complex projects. You will learn state of the art mechanical engineering methods, apply them to real world problems via industrially focused modules and research projects, whilst gaining the essential management skills to bring your ideas to life. Ranked in the UK top 5 for mechanical engineering, Cranfield offers a unique, postgraduate-only environment, with near-industrial scale engineering facilities and a teaching team with extensive experience of solving real world issues within industry.

Who is it for?

This course is designed for engineering, physics or mathematics graduates who wish to develop a successful mechanical engineering career in industry, government or research. It will equip you with the advanced engineering and management skills demanded by leading global employers, including project management, design, computer-aided engineering, operation and optimisation of machinery, structural mechanics and integrity, and technology leadership.

Course structure

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

Informed by industry

The Advanced Mechanical Engineering MSc is closely aligned with industry to ensure that you are fully prepared for your career:

- The teaching team are heavily involved in industrially funded research and development, enabling you to benefit from real-world case studies throughout the course,
- Engineering modules are state-of-the-art, covering a range of topics including structural mechanics and integrity, design, computer-aided engineering, materials and corrosion, operation and optimisation of machinery, and project management,
- A dedicated 'Management for Technology' module develops the essential management skills demanded by employers,
- Student projects are often linked to the department's industrially-funded research – ensuring relevance to employers,
- The course is accredited by the Institution of Mechanical Engineers.

Future career

The Advanced Mechanical Engineering MSc is designed to provide you with the skills, knowledge and expertise required to develop a successful mechanical engineering career in the sector of your choice, including energy and power, aerospace, automotive and manufacturing. Our focus is on ensuring that you can make an impact from day one in your career. We do this by teaching you the state-of-the-art skills in mechanical engineering, enabling you to apply what you learn through industrially relevant group and individual research projects and equipping you with technology leadership skills.

Graduates of this course have gone on to work in a range of roles, including:

- Mechanical Design Engineer at Siemens,
- Production Line Supervisor & Lean Implementer at GKN Land Systems,
- Staff Engineer at BPP Technical Services Ltd working on offshore oil and gas engineering,
- Engineer at Det Norske Veritas,
- Management Associate at BMW Group UK Limited,
- Project Engineer at BASF Coatings S.A.

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).

Applied Materials and Corrosion

The aim of this module is to provide you with a knowledge and understanding of the corrosion processes that occur on structural materials and the impact on their mechanical performance.

Computational Fluid Dynamics for Renewable Energy

During this module you will learn about Computational Fluid Dynamics (CFD) techniques and tools for modelling, simulating and analysing practical engineering problems related to renewable energy, with hands on experience using commercial software packages used in industry.

Component Design

A specialised module to advance technical skills in industry prototyping design processes. This module will also introduce the facilities/workshops available at Cranfield.

Engineering Stress Analysis: Theory and Simulations

This 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. The examination of Finite Element Analysis (FEA) for various practical applications (e.g. engineering components, composite structures, rotating disks, cracked geometries) in conjunction with relevant case studies will allow you to combine theoretical understanding with practical experience in order to develop your skills to model and analyse complex engineering problems.

Fluid Mechanics and Loading

This module provides you with a theoretical and applied understanding of fluid mechanics and fluid loading on structures. This includes the properties of fluids, flow structures, lifting flows and fluid loading on both horizontal and vertical axis turbines.

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.

Structural Integrity

During this module you will gain an understanding of pertinent issues concerning the use of engineering materials and practical tools for solving structural integrity and structural fitness-for-service problems. Fatigue crack initiation, fracture mechanics, inspection reliability and corrosion engineering are some of the subjects covered in this module.

Group project

The aim of the group project is to provide you with direct experience of applying knowledge to an industrially relevant problem that requires a team-based multidisciplinary solution. You will develop a fundamental range of skills required to work in a team including team member roles and responsibilities, project management, delivering technical presentations and exploiting the variety of expertise of each individual member. Industry involvement is an integral component for the group project, to give you first-hand experience at working within real life challenging situations.

Individual project

The aim of the individual research project is to provide you with direct experience in undertaking a research/development project in a relevant industrial or research area. You will make a formal presentation of your findings to a panel of academics and industry experts and submit a research thesis.

Recent individual research projects include:

- Comparison of a panel method and Reynolds averaged Navier-Stokes (RANS) method to estimate the aerodynamic coefficients of a profile flying in ground effect
- The stress shielding effect of cracks in loaded components
- Review and modelling of heave and roll motion passive damping systems for offshore floating support structures for wind turbines.

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.



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For further information please visit
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