



# Offshore Engineering

## MSc, PgDip, PgCert



**Offshore engineering is a rapidly developing discipline. In addition to its traditional relevance to the oil & gas industry, it is expanding to embrace the novel engineering challenges presented by the offshore renewable energy industry. We have answered this expansion in scope by developing a new state-of-the-art MSc in Offshore Engineering, exploiting our strong track record in offshore renewable energy projects and giving our graduates the competitive edge in their career.**

**When you choose to study this course you can select whether to follow the engineering or management route. This ensures that the course is tailored to your background as well as your planned career path.**

## Who is it for?

This course is suitable for engineering, maths or science graduates who wish to specialise in Offshore Engineering. It develops professional engineers and scientists with the multidisciplinary skills and ability to analyse current and future offshore energy engineering problems.

Our MSc in Offshore Engineering is able to provide the new skills needed across this fast developing sector, together with the fundamental engineering understanding necessary, whatever the application. Exciting new disciplines taught in this MSc include Advanced Maintenance Engineering and Asset Management; Health, Safety, Security and Environment; Risk and Reliability Engineering; and Computational Fluid Dynamics for Industrial Processes.

When applying for this MSc you will be able to choose between two routes: one focusing on detailed engineering aspects, and the other focusing on offshore asset management. Graduates with an MSc in Offshore Engineering will be able to work in a range of different industries including offshore renewables, oil & gas, aquaculture systems and beyond.

## 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 these sectors' most prominent players. Our strategic links with industry ensures that all of the material taught on your 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 from.

## Future career

On successful completion of this course you can expect to develop diverse and rewarding careers in the extremely exciting and challenging fields of offshore oil and gas exploration, underwater engineering, pipeline engineering, risk management in offshore and marine operations, and the emerging offshore renewable energy industry. The international nature of such activities means that career opportunities are not restricted to the domestic market; Cranfield graduates develop careers around the world.

## 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 a relevant science, engineering or related discipline, or the international equivalent of these UK qualifications. Other relevant qualifications, together with significant experience, may be considered.

## Overview of taught modules

### Compulsory modules (both routes)

(all the modules in this list need to be taken as part of this course).

#### 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.

#### Materials in the Offshore Environment

This module enables you to understand the structure and properties of materials, and to apply this knowledge to the use of materials in the offshore environment.

#### 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 their skills to model and analyse complex engineering problems.

#### Corrosion in the Offshore Environment

You will gain a knowledge and understanding of the corrosion processes that occur on a range of materials in the offshore (including oil and gas) environment.

#### 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.

#### 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.

### Engineering route compulsory modules

#### 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.

#### 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.

## Contact details

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For further information please visit  
[www.cranfield.ac.uk/oe](http://www.cranfield.ac.uk/oe)

### Management route compulsory modules

#### Health Safety Security and Environment

Health, safety, security and the environment are all key considerations when working in the offshore and renewable energy sectors. This 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.

#### Advanced Maintenance Engineering and Asset Management

This modules aims to provide you with the knowledge and skills necessary to design advanced maintenance, monitoring and asset management strategies for complex engineering systems through the lifecycle.

## 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.

Recent group projects include:

- Conceptual and preliminary design of a SPAR for a 5 MW VAWT
- Investigation of severe slugging in pipelines.

## 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 can 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

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.



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. March 2019.