



Water and Wastewater Engineering

MSc, PgDip, PgCert



Water is under increasing pressure from demographic and climatic changes. Water engineering and treatment processes play a key role in delivering safe, reliable supplies of water to households, industry and agriculture, and in safeguarding the quality of water. This course equips graduates with the skills to solve practical problems, communicate effectively and work successfully making them highly sought after by industry and government.

The Water and Wastewater Engineering course aims to develop:

- **Water and wastewater treatment scientists, technologists and engineers with the skills to solve practical problems, communicate effectively and work successfully both in teams and individually.**
- **High quality graduates trained and qualified to work in all areas of water and wastewater treatment and management enabling them to provide a valuable contribution to the UK and global water sectors.**
- **Understanding of water and wastewater systems through innovative teaching, achieved by blending theory, application and practice.**

Who is it for?

The Water and Wastewater Engineering course is ideal for individuals who want to make a real difference to delivering reliable water supplies, or to maintaining and enhancing river and ground water quality.

Well-educated, skilled and experienced graduates are required to operate and manage vital water and wastewater treatment services. The demand for such graduates is already high and will only increase over coming years as environmental standards for water quality increase, and pressures on our water supplies continue to grow.

Course structure

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

Informed by industry

This MSc benefits from input from an industry advisory panel with representatives from consultant, government, industry and charitable sectors, who help to ensure the course maintains its real-world relevance to the marketplace and industry focus.

This involvement and direct contact with industry makes successful students highly sought after in the employment market.

Future career

The Cranfield Water Science Institute links to industry, underpinned by the reputation of its courses, to enable successful students to secure positions and develop their careers in UK water companies, utilities across Europe, the major international engineering consultancies, major engineering and service contractors, and government agencies.

The Centre is recognised internationally as a centre of excellence for postgraduate courses. It is the UK's largest academic group specialising in process technologies, engineering and policy for water quality improvement, and is a member of British Water.

Demand for Cranfield graduates has grown steadily as the education provided has become recognised as excellent, producing graduates able to step into a range of positions and make an immediate and real contribution to the effectiveness of water sector businesses and organisations. Graduates from these programmes are highly sought after by industry and government.

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

Example modules

Modules form only part of the course content with the projects and theses making up the balance. Please see the course structure for details.

The list below shows the modules offered in the 2019-2020 academic year, to give you an idea of course content. To keep our courses relevant and up-to-date, modules are subject to change – please see the webpage for the latest information.

Compulsory modules

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

Biological Processes

This module provides you with an understanding of the design principles, practice and operation of conventional and advanced biological treatment processes. Areas covered include the key principles of biological processes, the role of microorganisms in aerobic and anaerobic processes, activated sludge principles, and principles of heat transfer.

Chemical Processes

This module enables you to gain an understanding of the design principles, practice and operational experience of conventional and advanced chemical treatment processes. Areas covered in the module include the key principles of chemical processes, the role of solubility in chemical processes, absorption of organics by activated carbon, ion exchange resins, and coagulation science and application in water and wastewater treatment.

Hydraulics and Pumping Systems

This module provides you with a foundation in hydraulics and an understanding of pumping systems with reference to water and wastewater treatment flow sheets. The module will include principles of channel flows, weirs and flumes, hydraulic profiling, flow distribution, divisions and combination, as well as different aspects of pump usage.

Physical Processes

Through this module you will learn how to understand and implement the design principles, practice and operational experience of conventional and novel physical separation processes used in water and wastewater treatment processes. This will include an introduction to physical process principles relevant to understanding the design, operation and fault diagnostic of the range of physical processes, modern screening designs, clarification processes, and filtration design and practice.

Process Science and Engineering

By completing tutorials, you will be able to demonstrate a knowledge of the basic principles of water chemistry, physics, microbiology and chemical engineering as applied to the treatment of water and wastewater. The module includes basic algebra and units, aqueous chemistry, fundamentals of flow, reactors, kinetics, mass balance and transfer, and economics.

Water and Wastewater Assets: Lifecycles, Risks and Futures

This module builds on previously acquired knowledge of technological solutions used in water and wastewater

treatment by introducing a holistic approach with the aim to tackle future challenges faced by the water sector. It will cover a range of topics encompassing everything from the initial asset plans, understanding the risk to the assets and how are these risks changing and how do we address and manage these futures. The module is designed around the AMP cycle and includes topics broadly covering asset and risk management as well as future trends in the water sector.

Water and Wastewater Treatment Principles

The aim of this module is to provide you with a general knowledge of the conventional unit operations employed in water and wastewater treatment, including the scientific engineering principles on which they are based.

Group project

The group project is an applied multidisciplinary team-based activity. It provides you with the opportunity, whilst working in teams under academic supervision, to apply principles taught during modules whilst taking responsibility for project tasks. Success is dependent on the integration of various activities, working within agreed objectives, deadlines and budgets. You will submit project reports and present their findings to representatives from industry. This develops professional practice in communication skills for technical and business areas of process development. Part-time students complete a single design project individually in a field of their choice.

Examples of recent group projects include:

- The Islanders
- Sustainable Living
- Surface water management strategy.

Individual project

You select your individual project in consultation with the thesis project coordinators. This provides you with the opportunity to demonstrate independent research ability working within agreed objectives, deadlines and budgets. The project is sponsored by industry and usually includes a four month placement with the sponsoring company. Placements have been offered by all ten of the UK water utilities, the leading two French utilities, as well as multinational companies and SMEs operating in the water sector. Part-time students usually undertake their individual project with their employer.

Accreditation and Rankings

The MSc of this course is accredited by the Chartered Institution of Water and Environmental Management (CIWEM). As a graduate of the MSc course, you are eligible for graduate membership in this leading professional body.

CIWEM Chartered Institution of
Water and Environmental
Management

Accredited Course

In the QS World Rankings 2018, we were ranked 5th in the UK for Mechanical, Aeronautical and Manufacturing Engineering.



Contact details

T: +44 (0)1234 758082

E: studywater@cranfield.ac.uk

For further information please visit
www.cranfield.ac.uk/www

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. September 2019.