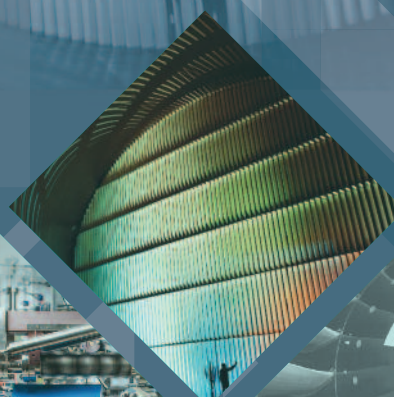




**Trinity College Dublin**  
Coláiste na Tríonóide, Baile Átha Cliath  
The University of Dublin

# MSc in Zero-Carbon Technology

Department of  
Mechanical, Manufacturing and  
Biomedical Engineering



## Programme Overview

Climate change is the greatest global challenge facing the current generation. The need to decarbonise human activities is now urgent and will require radical change in many sectors, particularly energy, transport and heating, which impact almost all aspects of our modern lives. However, this vast challenge brings enormous opportunities in the technology sector for research, innovation and new businesses. The world is looking to a new generation of engineers to bring forward solutions for sustainable energy, mobility and cities that safeguard the earth's natural resources for the future (in accordance with the United Nations Sustainable Development Goals).

This Level 9 MSc course equips students with the required breadth and depth of skills to understand the technology that underpins the existing high-carbon energy/economic system, as well as emerging zero-carbon technologies. The course will present an in-depth explanation of the

fundamental physics of power generation and propulsion technologies, and the latest innovations to optimise their efficiencies. Students will acquire a broad perspective through modules in the field of natural sciences and business, which challenge them to learn and communicate with those outside the engineering field.

The programme provides an opportunity for students to learn directly from leading academics and industry experts in the power and propulsion sectors. The student group on this course is diverse, encompassing local and international participants, as well as a mix of full-time students alongside professionals undertaking part-time learning. Through the research project, it provides networking opportunities to connect with PhD researchers, as well as the Trinity Research Centre for Low Carbon Technology and the Sustainable Aviation Research Centre.

## Programme Content

The MSc course comprises 90 ECTS credits. One third of the course is composed of three new taught modules specifically developed for this MSc programme:

- Low Carbon Power Technology (10 ECTS)
- Low Carbon Transport Technology (10 ECTS)
- Geological Resources and Carbon Impact (10 ECTS)

These three modules are primarily assessed through assignments and design studies. A further 20 ECTS are selected from a wide range of modules related to renewable energy, low carbon technology, energy policy and economics.

The remaining 40 ECTS are devoted to a significant individual research project in conjunction with a taught research methods module. This project provides the opportunities for students to specialise in a chosen topic with a piece of in-depth work carried out in conjunction with an academic expert and a PhD researcher. Example project topics include hydrogen energy, aviation, fuel cells, transport technology, thermal energy systems, battery management, wind and solar energy. Often these projects are linked to national or international industrial collaborators. Students are encouraged to propose their own project and to develop a plan in conjunction with an academic supervisor from across the School of Engineering.

## Programme Delivery

All of the taught modules feature hybrid delivery where in-person lectures are also live streamed and recorded on Trinity's online teaching platform. All course materials and assignment submissions are also online, and some modules feature class forums to encourage additional discussion between the class members. While in-person attendance is encouraged as the most beneficial learning and networking experience for students, the complete access to online teaching provides a high degree of flexibility for part-time learners to study aspects of this course along side their full-time professional job. Project supervision meetings can also be held remotely. (Some physical attendance on the Trinity campus is required, e.g. to deliver seminar presentations or undertake experimental project work).

The structure facilitates highly flexible study options so that even employed professionals can engage. Students can choose part-time or full-time study and can undertake smaller elements of the programme to attain a Postgraduate Certificate (30 ECTS) or a Postgraduate Diploma (60 ECTS). Subsequently, students can choose to continue their study to upgrade the Certificate to the Diploma, or upgrade the Diploma to the MSc. It is also possible to study some modules in isolation for Continuing Professional Development.

This MSc degree is fully accredited by Engineers Ireland to produce professional engineers capable of working in the international environment of zero carbon technology.

## Programme Requirements

This Postgraduate Certificate/Diploma/MSc is open to those with:

- Level 8 honours degree (180 ECTS) in a STEM, or cognate discipline
- A demonstrated aspiration to pursue a role in technology aimed at reducing carbon dependency
- 2-page Curriculum Vitae (CV)
- 1-page letter of motivation
- Two references

The programme aims to attract talented students and mobilise sustainability leaders to action within both the private and public sector, in Ireland and abroad, to deliver a low-carbon and resource-efficient society.

## Application Details

<https://www.tcd.ie/mecheng/postgraduate/>

## Contact Details

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QS subject rankings, 2023

