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SCHOOL OF ENGINEERING

MEngSc Sustainable Energy

UCC

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Why an MEngSc in Sustainable Energy?

If you want to help the world address the energy 'grand challenge' of the 21st century, then Ireland's first Masters in Engineering Science degree programme in Sustainable Energy is for you.

Our modern world depends on a secure, reliable, and affordable energy supply. Sustainable Energy is crucial to addressing some of the most challenging issues facing the world today, namely how to:

- reduce human impact on the climate (energy accounts for 80% of EU greenhouse gas emissions) through innovative low-carbon energy supply systems.

- provide a better standard of living for the world's growing population through access to sustainable and secure energy supplies.

Sustainable Energy graduates will be required to source, design, convert, transmit and supply useful energy to meet our present and long-term needs for electricity, mobility and heating and cooling.

What do Sustainable Energy Engineers do?

Many of our graduates progress directly to the Energy Engineering profession, taking up positions with companies in renewable energy engineering, e.g. Airtricity, Eirgrid, Bord Gais, ESB and ESBI.

Other graduates work as electrical power engineers or building energy systems engineers and opportunities are also available in the significant growth area of efficient energy management for large energy users, e.g. the food and pharmaceutical industries.

Other MEngSc Sustainable Energy graduates use their valuable acquired skills to embark on careers outside of engineering, in areas including software design and development, management consulting, accountancy and industrial management.

Various research opportunities are available to our MEngSc Sustainable Energy graduates in UCC. We offer PhD research degrees in areas such as bioenergy, sustainable energy technology and policy, industrial energy efficiency, wind energy and solar energy. These are linked with the world-leading SFI MaREI Research Centre for Energy, Climate and Marine. **www.marei.ie**

Entry Requirements

Candidates must have a BE (Hons) or BEng (Hons) Degree or equivalent engineering qualification, with a minimum grade 2H2. However, candidates with equivalent academic qualifications and suitable experience may be accepted subject to the approval of College of Science, Engineering and Food Science. In all cases, the course of study for each candidate must be approved by the Programme Coordinator.

Candidates, for whom English is not their primary language, should possess an IELTS of 6.5 (or TOEFL equivalent) with no less than 6.0 in each individual category.

Candidates from Grandes Écoles Colleges are also eligible to apply if they are studying a cognate discipline in an ENSEA or EFREI Graduate School and are eligible to enter the final year (M2) of their programme.

Applicants that are non-native speakers of the English language must meet the university approved English language requirements. More infromation available at: **www.ucc.ie/en/study/comparison/english/postgraduate/**

The EU fee for this course is **€6,500**
The Non-EU fee for this course is **€22,000**

What some of our graduates say

Calvin Campopiano
Electrical Engineer,
General Dynamics Electric Boat

I work for General Dynamics Electric Boat in Groton, CT USA. Day-to-day activities in my role as an Electrical Engineer include power system analysis, component development, system modelling and data management.

As a significant part of my job is modelling and analysis, the Energy Systems Modelling module and the modelling assignments contained within the Solar and Geothermal Energy, Energy in Buildings, and Wind Energy modules provided experience and skills in system analysis and optimisation that I was able to utilise immediately in my current role. Additionally, the MEngSc thesis project assisted in developing not only my ability as a technical speaker and presenter, but how to manage a complex project with multiple stages over a significant period of time in such a way that the project is accomplished successfully.

In general, I enjoyed the variety contained within the program, both from the perspective of the subjects contained within the course as well as the mixture of classwork and practical experience provided in the labs and at site visits. Personally, the milestones I accomplished during the progression of my thesis project were the highlights of my time in the program, specifically being able to take what was taught in the classroom during the programme and apply it so as to analyse the workings of a solar cell using both a photovoltaic cell and analytical program that I had constructed myself. The opportunity to so directly apply what one is learning during the programme to one's research project brought the whole programme together for me.

Nigel Hayes (2007-2009)
Managing Director,
Nordex (UK and Ireland)

I owe an awful lot to the MEngSc in Sustainable Energy course. I went from working in wind farm development for several years after the MEngSc to now Managing Director of Nordex in UK and Ireland.

I graduated from the MEngSc programme in Sustainable Energy in 2010 and have been working in the wind energy industry since this time. Indeed, before I graduated, and while I was undertaking my thesis in collaboration with a wind energy developer, I was offered my first role in the industry, working as a Project Manager developing onshore wind projects.

Since this time I have held various roles within the sector on both the development side and more recently on the turbine supplier side. I currently work for Nordex, a German based turbine equipment manufacturer. I joined Nordex in 2015 as a business development manager and have since progressed to the position of Managing Director of Nordex UK and Ireland. Nordex employs circa 75 people in Ireland and 170 people in UK, with offices in Manchester, Dublin and Cork, along with multiple service centres across these islands. We operate and maintain over 2GW of installed wind assets across UK and Ireland and in 2018 will surpass 1GW installed on the island of Ireland.

The MEngSc in Sustainable Energy was a strong launch pad for my career in the renewables energy sector. Not only did the course content provide me with the knowledge and tools necessary to enter the sector but I also benefited from the close ties the programme has to industry. I still draw on my learnings from the Wind Energy module in particular. I am delighted I chose this programme to further my career. It provided me with immediate and exciting career opportunities in a sector I am proud to work in.

Catherine O'Brien (2007-2008)
Manager, Management
Consulting Division for Utility
Sector Clients, Accenture

On completion of the MEngSc programme, I secured a graduate position with ESB International as a Project Engineer for wind farm development and construction projects in Ireland and the UK. I later moved within ESB to Electric Ireland where I worked as an Energy Trader, securing high value power contracts and trading within the Single Electricity Market. Thereafter, I moved to ESB Innovation where I completed a number of strategic, and innovative new clean tech business projects for ESB including energy services and solar energy.

Having the MEngSc was a major benefit to me initially in my interview to get into ESB, and thereafter in excelling in each of my roles. The MEngSc modules included Wind Energy, Electricity Market Modelling, Solar Energy and Energy Systems Studies. Little did I think I would end up working in all four areas in my professional career!

I recently departed ESB and I now work for Accenture, a leading global professional services company which has offices in Grand Canal Square along with an exciting new global Innovation headquarters at Hanover Quay in Dublin. I work as a Manager in the Management Consulting division for Utility Sector Clients. Again, the MEngSc continues to benefit me as I help clients solve problems and align their businesses with the changing utility landscape, which is increasingly positioning sustainability at the core.

One of the main highlights of the MEngSc for me was the variety of the course and the opportunity to gain insight into so many parts of the energy sector, each offering different career opportunities. A highlight of my time was getting to work on my masters thesis with doctoral and post doctoral students and academics at the Environmental Research Institute (ERI) in Cork. I was thrilled to see my work published with my research colleagues at the ERI and I look back fondly on both my time in UCC and the ERI.

Conor Cooney (2007-2008)
Technology Manager,
Technology Innovation Unit (TIU),
ESB Innovation

I am currently the Technology Manager in the Technology Innovation Unit in ESB Innovation based in Dublin. I manage a small team that assesses emerging technologies for ESB group. We facilitate R&D activities by co-ordinating pilot projects and we also enable strategic roadmaps for ESB group. The technologies we have assessed include ocean energy technologies, battery storage, anaerobic digestion and more recently blockchain.

I have had two other roles in ESB, previously I managed the roll-out of electric vehicle charging infrastructure and before that I was a civil project manager for wind farms in ESB International. The MEngSc programme has provided me with skills that were essential in furthering my career.

The wind energy module and masters thesis work enabled me obtain my initial role in ESB International. Modules in electrical engineering related subjects such as control and power systems provided me with sufficient electrical knowledge to adapt to a new role managing the roll-out of electric vehicle charging infrastructure.

Overall the masters provided me with an understanding of the electricity ecosystem in Ireland as a whole. This has enabled me to participate in various levels of strategic thinking for ESB group over longer term time horizons.

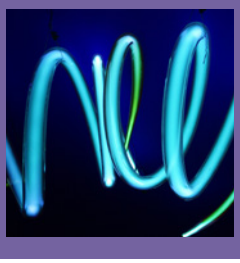
I am extremely happy that I completed the masters programme as it provided me with the skills and competencies to broaden my career beyond which would have not been possible with my civil engineering degree alone.

Programme Structure

This 12 month MEngSc programme in Sustainable Energy is open to Engineering graduates of all disciplines with an 8 month programme option leading to a Postgraduate Diploma in Sustainable Energy.

In Part I (September – May) students take 10 taught modules to the value of 50 credits and a Preliminary Research Report in Sustainable Energy (NE6008) to the value of 10 credits. Part II (June – September) consists of a Dissertation in Sustainable Energy (NE6009) to the value of 30 credits which is completed over the summer months.






Students take **90** credits as follows:

PART I

Students take 50 credits as follows:

- **NE4008** Photovoltaic Systems (5 credits)
- **NE6003** Wind Energy (5 credits)
- **NE6004** Biomass Energy (5 credits)
- **NE6005** Ocean Energy (5 credits)
- **NE6006** Solar and Geothermal Energy (5 credits)
- **NE6007** Energy Systems Modelling (5 credits)
- **NE6012** Energy in Buildings (5 credits)
- **NE6013** Sustainable Energy (5 credits)
- **NE6016** Energy Systems in Buildings (5 credits)
- **EE6048** Smart Grids (5 credits)

Depending on the background of the student, the Programme Coordinator may decide to replace some of the above taught modules up to a maximum of 20 credits.

- **CE4020** Environmental Hydrodynamics (5 credits)
- **CE6042** Transportation and Energy (5 credits)
- **EE3012** Electric Vehicle Energy Systems (5 credits)
- **EE6035** Electrical Power Systems (5 credits)
- **NE6010** Offshore Wind Energy (5 credits)
- **NE6011** Advanced Energy Systems Modelling (5 credits)
- **NE6014** Energy Innovation (5 credits)
- **NE6015** Data Analytics for Engineering (5 credits)

In addition, all students must take 10 credits as follows:

- **NE6008** Preliminary Research Report in Sustainable Energy (10 credits)

Students who pass but fail to achieve the requisite grade of 50% across the taught modules and the Preliminary Research Report will be eligible for the award of a Postgraduate Diploma in Sustainable Energy. Candidates passing Part I of the programme who do not wish to proceed to Part II may opt to be conferred with a Postgraduate Diploma in Sustainable Energy.

PART II

- **NE6009** Dissertation in Sustainable Energy (30 credits)

The Dissertation comprises a significant research project in a sustainable energy topic – examples of previous projects include:

- Quantifying the potential for PV and battery storage systems to charge Electric Vehicles at a domestic level.
- Investigating the trade-offs between delivering universal access to energy and achieving climate change targets.
- Investigation of Different Anaerobic Digestion Systems for the Valorisation of Waste Streams.
- Control of Wind Turbine Tower Vibrations using a Liquid Column Damper.
- Design and implementation of a renewable power source for a remote monitoring station.
- Potential for Energy-Related CO2 Emissions Reduction in Dairy Sector on Dingle Peninsula.
- Testing of a wave energy device and modelling the power take-off.




MEngSc Sustainable Energy, UCC

www.ucc.ie/en/energyeng/postgradenergy/

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