College of Science,
Engineering & Food Science
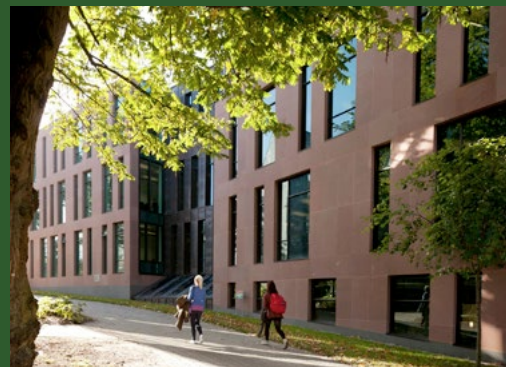
STEM POSTGRADUATE PROSPECTUS 2023

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

WELCOME

to the College of Science, Engineering and Food Science

In the College of Science, Engineering and Food Science, we are very proud of our excellent STEM teaching and research credentials, recognised internationally as being world class.

STEM has always been hugely important in society and will play a pivotal role in the world's COVID-19 recovery, providing significant career opportunities for those who opt to study at postgraduate level in a STEM discipline.

The College of SEFS provides a thriving, dynamic and diverse environment in which to carry out cutting-edge research. When completing a postgraduate course in STEM at UCC, you will discover an exciting environment which provides a vigorous and challenging academic atmosphere for all our students.

With internationally renowned academics, research institutions and centres, we provide students with the opportunity to carry out postgraduate research, towards either a Masters or PhD, or to undertake a taught Postgraduate Programme. There is a wide range of research courses on offer including include PhDs, Thematic PhDs, Practitioner Doctorates and Research Masters.

The College has strong links with industry and commerce through pioneering strategies for technology transfer and commercialisation

of research. We enjoy close links with UCC's world class research centres such as the APC Microbiome Ireland, the Analytical and Biological Chemistry Research Facility, the BioSciences Institute, the Boole Centre for Research in Informatics, the Cork Constraint Computation Centre, the Environmental Research Institute and the Tyndall National Institute.

Postgraduate research is supported by a range of national and international funding bodies. Students should contact the relevant School, Department and/or Research Institute and the Principal Investigators or Course Co-ordinators to discuss postgraduate opportunities.

It has never been such an exciting time to study STEM. We know you will find your postgraduate education in UCC fulfilling, you will be equipped for careers in either academia, commerce or industry and that you will be proud to be a UCC postgraduate alumnus.

Sarah Culloty

Professor Sarah Culloty
Head of College

www.ucc.ie/stem

Why choose UCC?

24 STEM Research Institutes and Centres

1,200 STEM-enabled graduates annually

600 distinguished academic and research staff; 5,000+ students

Ranked 21st in the world and first in Ireland in the inaugural Times Higher Education Impact rankings for sustainable social and economic impact

Ranked in Europe's top 50 for teaching excellence

Ireland's leading university for the generation of research income

First Irish university to establish a business incubation centre for recent graduates

World's first Green Flag campus

UCC was named leading Irish University for Industry engagement and Research Income

Tyndall National Institute is a leading European research centre in integrated ICT (Information and Communications Technology) hardware and systems. Specialising in both electronics and photonics – materials, devices, circuits and systems

Located at the centre of Europe's Biotechnology and ICT industries

Ranked in top 2% of Research led Universities globally

High graduate employment, 1 & 2 year stay-back visa, prepared for postgraduate opportunities in Ireland and abroad

180,000 Alumni Worldwide

Programmes

PhD

PhD applicants need an honours level degree (NFQ level 8) with a minimum of a 2H1 (second class honours grade 1) to apply. Although students generally choose a topic for their research from their degree discipline you are not restricted to your primary degree subjects.

Once you know which area or topic you wish to research, you then need to find a supervisor. You can contact UCC Department/Schools relevant to that area of research and check the availability of appropriate supervisors.

You must choose a supervisor and discuss your prospective research with them before applying. Your supervisor will let you know if you need to prepare a research proposal and will need to approve your proposal before you submit it. You may need to submit this proposal directly to the School/Department and/or submit it with your online application.

To be eligible for consideration for entry to a programme of study and research for the Degree of PhD, you must have obtained a standard of at least Second Class Honours, Grade I, in an approved primary degree, or other such other evidence under the University's policy for Recognition of Prior Learning for Admission to Research Degrees.

All applications for admission to a PhD programme shall be considered and approved by the Head of School/Department/local Graduate Studies Committee in which the programme is to be pursued.

In circumstances where applicants do not meet standard entry requirements, applications recommended for approval by the School/Department will be subject to final approval by the relevant College Graduate Studies Committee and will be reported to the Academic Council Graduate Studies Committee.

On approval, you will be required to register as a PhD candidate for the years prescribed, as a minimum. You will complete a minimum of 3 years, full-time, or 6 years, part-time, unless a shorter period of registration is approved at application stage by the School/Department on the basis of advanced academic standing. In the case of students submitting a thesis in a language discipline, or in the case of students undertaking a joint

Check our qualification comparison website **HERE** for equivalencies. Check our English language requirements **HERE**.

Research fields available:

- **School of Biochemistry and Cell Biology**

- **School of Biological, Earth and Environmental Sciences**

- **School of Chemistry**

- **School of Computer Science**

- **School of Engineering**

- **School of Food and Nutritional Sciences**

- **School of Mathematical Sciences**

- **School of Microbiology**

- **Department of Physics**

PhD Engineering Science
(PhD Engineering Science) and PG Certificate in Innovation, Commercialisation and Entrepreneurship (PG Cert. ICE)

Teaching Mode:	Full-time
Qualifications:	PhD
*Fees:	(Years 1,2,3,4) (EU) €5,770; (Non-EU) €15,000
Duration:	Stream 1: 3/4-yrs full-time; Stream 2: 4-yrs full-time
Web link:	**www.ucc.ie/admin/registrar/calendar/ postgraduate/Doctor/page019.html**
Contact:	Dr Fatima Gunning; +353 21 234 6859 **postgrad-admin@tyndall.ie**
	www.tyndall.ie/application-information

PhD Engineering Science is a novel multi-disciplinary thematic structured PhD programme based in UCC's Tyndall National Institute. Tyndall is a leading European Research Centre in integrated Information and Communications Technology (ICT) hardware and systems, with research themes spanning "from atoms to systems". Our PhD Engineering Science students are supervised by world experts and work on leading edge research projects; often supported by national and European funding agencies as well as from industry.

Career Opportunities

The PhD Engineering Science programme is designed to ensure students gain a wide range of technical and transferable skills facilitating careers in diverse and rapidly changing scientific and engineering work environments, including industry and academia. The joint-PG certificate in Innovation, Commercialisation and Entrepreneurship (ICE), offered by College of Business and Law, provides students with an integrated professional practice skill set enabling them to maximise commercialisation opportunities presented by new technologies with established organisations as well as high-tech start-ups. Our graduates are highly sought after by industry and academia, with many hired nationally and internationally by Rockley Photonics, Dell/EMC, Analog Devices, Intel, Seagate, Infinera, as well as academic institutes worldwide.

Entry and Eligibility

Candidates must have obtained a standard of at least Second Class Honours, Grade I, with an approved primary or Masters degree, in a relevant Science or Engineering discipline, to gain entry to the programme. Candidates should contact potential supervisors prior to application. Candidates for whom English is not their primary language, should hold a valid English test certification according to UCC's College of SEFS standards.

Programme Structure

The PhD (Engineering Science) is a thematic structured PhD programme. Alongside novel, original research, students are required to successfully complete taught modules by the end of Year 3, by following:

- PhD Stream 1 (duration: 36 or 48 months): Research plus taught modules (30 ECTS); or
- PhD Stream 2 with PG Cert. in Innovation, Commercialisation and Entrepreneurship (ICE) (duration: 48 months): Research, plus ICE modules (30 ECTS) and technical/transferrable skills modules (25 ECTS).

Tyndall National Institute also offers training to all students on: Networking Skills, Negotiation and Influencing Skills, Quality Management and ISO, Time Management and Personal Effectiveness, Unconscious Bias, Ethics and Responsible Research amongst others in liaison with TEC-NET and UCC.

What you will study: Novel, original research is the core component of PhD Engineering Science, Students may also complete taught modules in advanced technical skills, transferable skills and ICE. Examples of taught modules include: IS6306 Technology Business Planning; MG6705 Marketing for Technology Entrepreneurs and LW6104 Intellectual Property Law for High-Tech Entrepreneurs. Advanced technical training from Tyndall includes: SE6001 Compound Semiconductor Device Fabrication; SE6014 Semiconductor Growth and Fabrication Technology; and SE6020 Photonics Integrated Circuits Assembly and Packaging.

FACTS: The PhD Engineering Science programme was introduced in 2011, and has been successful in attracting candidates that seek a multi-disciplinary structured research training programme. Tyndall hosts the only full Silicon CMOS, Micro-Electro Mechanical Systems (MEMS) and III-V Semiconductor Wafer fabrication facilities and services in Ireland.

MSc Science

Master by Research applicants need an honours level degree (NFQ level 8) with a minimum of a 2H2 (second class honours, grade 2) to apply.

Entry Requirements

To be eligible for consideration to undertake a programme of study for a Master's Degree by Research, a candidate must have obtained a standard of at least Second Class Honours in an approved primary degree or equivalent.

Application Procedure

Prospective students must contact their proposed supervisor to discuss and approve any application in advance. All applications are then made through **www.ucc.ie/apply**

For more information on the Academic Departments in University College Cork and particular research interests, please browse the UCC academic web pages at: **www.ucc.ie/en/schoolsdepartments/**

Application Dates

Applications for research programmes are accepted throughout the year. Prospective students are advised to complete their applications at least two months in advance of their desired start date as all applications go through two different stages of approval - Department and Faculty/College. The four start dates during the year are January, April, July, and October.

Duration

A candidate who wishes to obtain a Master's degree by research must pursue a programme of supervised research for at least the equivalent of one year full-time from the date of first registration for the programme.

Master of Science Research fields available:

www.ucc.ie/en/biochemistry/research/

www.ucc.ie/en/bees/research/

www.ucc.ie/en/physics/research/

www.ucc.ie/en/chemistry/research/

www.ucc.ie/en/fns/#staff-research-profiles

www.ucc.ie/en/compsci/research/

www.ucc.ie/en/microbiology/research/

www.ucc.ie/en/matsci/research/

Masters in Engineering Science

The School of Engineering in UCC awards research degrees in Engineering at Master's (MEngSc) level. Prospective students must contact their proposed supervisor to discuss and approve any application in advance. All applications are then made through **www.ucc.ie/apply**

Entry Requirements

The MEngSc usually takes a minimum of 12 months full-time or 24 months part-time. The minimum entry requirement for a MEngSc is an approved primary degree with a minimum grade of Second-Class Honours, Grade II (2H2).

Application Procedure

Prospective students must contact their proposed supervisor to discuss and approve any application in advance. All applications are then made through **www.ucc.ie/apply**

For a list of potential engineering academic supervisors in the School of Engineering, please consult the list of **Academic Staff**.

Application Dates

Applications for research programmes are accepted throughout the year. Prospective students are advised to complete their applications at least two months in advance of their desired start date as all applications go through two different stages of approval - Department and Faculty/College. The four start dates during the year are January, April, July, and October.

Duration

A candidate who wishes to obtain a Master's degree by research must pursue a programme of supervised research for at least the equivalent of one year full-time from the date of first registration for the programme.

Master of Engineering Research fields available:

Process and Chemical Engineering
www.ucc.ie/en/processeng/research/

Mechanical Engineering
www.ucc.ie/en/mechanical/researchpg/

Energy Engineering
www.ucc.ie/en/energyeng/research/

Electrical and Electronic Engineering
www.ucc.ie/en/eleceng/research/

Civil, Structural and Environmental Engineering
www.ucc.ie/en/civileng/research/

MRes (Master of Research) in Biochemistry and Biosciences

Teaching Mode:	Full-time/Part-time
Qualifications:	MSc
*Fees:	(EU) €5,770 and €5,000 Bench fee
	(Non-EU) €15,000 and €5,000 Bench fee
Duration:	1 Year full-time; 2 Years part-time
Web link:	**www.ucc.ie/en/biochemistry/courses/ postgraduate/mres/**
Contact:	Dr Susan Joyce; +353 21 490 1343
	s.joyce@ucc.ie and **mresbiochem@ucc.ie**

The MRes in Biochemistry and Biosciences is a focused, research-intensive course aimed to recruit highly motivated, enthusiastic students with an interest in conducting a substantial, independent research project. With internationally recognised researchers in the School of Biochemistry and Cell Biology, the MRes combines immersion to your selected major research project with a minor taught component to enhance each students individual skill set over either a 12 months (full time) or 24 months (part time, available to industry) period.

Career Opportunities

The MRes in Biochemistry and Biosciences is designed to give students a research-intensive experience but at a degree level lower than a PhD. Taught modules are focused on generic and transferable research skills, rather than discipline-specific knowledge. There is an emphasis on data analysis, interpretation, problem-solving and time- and project-management. Students develop skills in presenting and writing science, posing a research question and development of a research proposal. Students completing the MRes in Biochemistry and Biosciences are competitive to secure funding, obtain a PhD position or enter directly into employment within the biotechnology or pharmaceutical sectors.

Entry and Eligibility

There are two entry points in the academic year: October and January. Candidates must have obtained at least a Second-Class Honours Grade I degree or equivalent in the biological sciences, medicine or pharmaceutical sciences. Candidates must be approved by the MRes Director and the Head of the School of Biochemistry and Cell Biology. The number of places is limited and decisions on entry to the programme will be made on the basis of the candidate's performance in their primary degree and interview according to the following criteria: academic qualifications, research experience and focus, scientific understanding, personal statement and strong recommendations from two academic referees. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The MRes in Biochemistry and Biosciences is comprised of an orientation and induction week, elective modules (20 credits in total), attendance at school seminars and their major research project and dissertation (70 credits).

What you will study

Research project: The largest component of the MRes degree is the research project. Students will select or design a project, together with a supervisor based in the School of Biochemistry and Cell Biology. Students begin their selected project within the first month of the programme. Work on your project is compiled into an MSc research dissertation.

Elective modules can include but are not limited to: **ML6003** Scientific Communication of Current Topics in Molecular Cell Biology, **BC6004** Scientific Research Planning and Proposals, **PG6001** Scientific Training for Enhanced Postgraduate Studies, **ML6005** Molecular Techniques, Information Literacy Skills, **PG6014** Scientific Outreach and Communication, **PG6015** Introduction to Research Ethics or **ST6013** Statistics and Data Analysis.

FACTS: By completing the MRes in Biochemistry and Biosciences, students will gain invaluable experience in all aspects of research – from hands-on, practical skills to experimental design, planning and project-management. Students work independently, but also collaboratively within a selected research group within the School of Biochemistry and Cell Biology. As part of the MRes, students attend research seminars in the School of Biochemistry and Cell Biology Seminar Series. Presented by both external and internal speakers, you will hear about the latest research developments from experts in their fields. The MRes is designed to give you the best start for your scientific research career.

On completion, you will have reached your goals as a professional scientist, expanded your scientific network and knowledge in an excellent environment among world experts.

MRes (Master of Research) in Plant Biology

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €5,770 and €3,000 Bench fee
	(Non-EU) €15,000 and €3,000 Bench fee
Duration:	1 Year
Web link:	**www.ucc.ie/en/bees/courses/postgrad/mresplant/**
Contact:	Dr Rossana Henriques; +353 21 490 4561
	rossana.henriques@ucc.ie

The MRes in Plant Biology is a full-time programme running over 12 months from the date of first registration for the programme. Applications will be accepted for a start date in October or January. The programme consists of (a) a major research thesis and (b)taught/classroom-based modules on generic and transferable skills, with an emphasis on scientific writing, oral presentations, and general research skills.

Career Opportunities

The MRes (Master of Research) is designed to give you a strong start in your scientific career. Students will gain invaluable experience in many key transferrable skills required by employers or in preparation for a PhD, including: project design and planning, experimental design, data management and statistical analysis, scientific writing, presentation skills, proposal writing, laboratory and field research techniques, safety, research ethics and integrity, information literacy and science communication. The MRes (Master of Research) will therefore provide an excellent background when applying for PhD positions, or when seeking employment in the private or public sectors.

Entry and Eligibility

Candidates must have obtained at least a Second-Class Honours Grade I degree or equivalent in an area related to Plant Science. Candidates must contact the proposed MRes supervisor to discuss and agree a research proposal prior to application and must be approved by the MRes coordinator and programme team, including the Head of Discipline of Plant Science. The number of places is limited and decisions on entry to the programme will be made on the basis of the candidate's performance in their primary degree and interview according to the following criteria: academic qualifications, research experience and focus, scientific understanding, personal statement and strong recommendations from two academic referees. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

Students undertake a total workload equivalent to 90 credits over the 12-month programme, the principal element of which is the completion of a major research thesis of approximately 10,000 words. In parallel, students must take and pass taught/classroom based modules to the value of 20 credits.

What you will study

Students take 20 credits from the following available modules:

BL6019 Ecological Applications of Geographical Information Systems, **BL6024** Quantitative Skills for Biologists using R, **BL4004** Frontiers in Biology, **BL4005** Research Skills in Biology, **BL4006** Sustainable Food Production, **PS6001** Plant Genetic Engineering, **PS4021** Sustainable Plant Pest and Disease Management. **Research project:** The largest component of the MRes degree is the research project. Students will select or design a project, together with your supervisor. Work on your project will be compiled into an MRes dissertation.

FACTS: The MRes in Plant Biology provides students will hands-on experience. Most of their time will be spent working on their research project, in a laboratory, field or glasshouse environment. Students will be able to select from a wide range projects focusing on plant ecology, physiology, biotechnology, molecular biology and genetics. Supervision by leading researchers in plant biology and access to equipment and resources will ensure the successful development of MRes projects and increase student employability skills.

MRes (Master of Research) in Geological Sciences
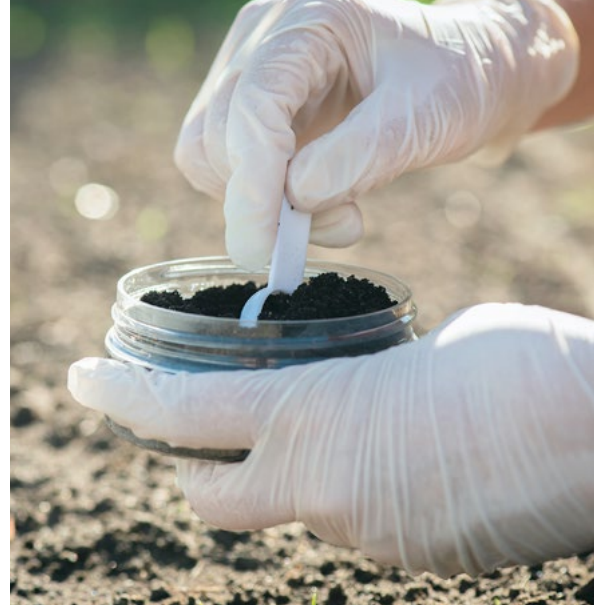
Teaching Mode:	Full-time/Part-time
Qualifications:	MSc
*Fees:	(EU) €5,770 and €3,000 Bench fee
	(Non-EU) €15,000 and €3,000 Bench fee
Duration:	1 Year full-time; 2 Years part-time
Web link:	www.ucc.ie/en/bees/courses/postgrad/mresgeo/
Contact:	Dr Pat Meere; +353 21 490 4576
	p.meere@ucc.ie

The MRes (Master of Research) in Geological Science is a new research-intensive, 12-month programme launched in 2016. It aims to recruit highly motivated, enthusiastic students with a strong interest in research.

The extended project is the focus of the MRes and will be expected to represent cutting-edge, original research conducted under the close supervision of internationally recognised staff at the School of BEES. Projects will focus on the geological sciences including igneous and metamorphic petrology, structural geology, sedimentology, palaeontology, marine geology, palynology and applicants are in general encouraged to suggest projects that foster collaborative research with external agencies.

Career Opportunities

The MRes is designed to give you a strong start in your scientific research career. Students will gain invaluable experience in many key skills required by employers or in preparation for a PhD, including project design and planning, experimental design, data management and statistical analysis, scientific writing, presentation skills, proposal writing, laboratory research techniques, information literacy and science communication. The MRes will therefore help you compete if applying for PhD positions or when seeking employment in the private or public sectors (e.g. in environmental consultancy, mineral and hydrocarbon exploration industries).

Entry and Eligibility

Candidates must have obtained at least a Second-Class Honours Grade I degree or equivalent in an area related to the Geological Sciences. Candidates are advised to contact the proposed MRes supervisor to discuss and agree a research proposal prior to application. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The programme combines a research project (70 credits) with taught modules (20 credits) chosen to enhance each student's individual skill set.

What you will study

Students take 20 credits from the following available modules:

GL6020 Hydrogeology, Contaminated Land and Assessment, **GL6021** Engineering Geology, **GL6022** Environmental Planning and Regulation, **GL6023** Offshore Environmental Geology, **GL6024** Applied Geophysics, **GL6025** Geoinformatics for Environmental Geology, **GL6026** Field Geology Techniques, **GL6027** Industry Case Studies, **GL4002** Petroleum Geology and Basin Analysis, **GL4003** Applied Geophysics, **GL4004** Advanced Igneous Processes, **GL4011** Economic Geology, **GL4024** Exceptional Glimpses of Ancient Life, **GL4027** Geochemistry. **Research project:** The largest component of the MRes degree is the research project. Students will select or design a project, together with your supervisor. Work on your project will be compiled into an MSc dissertation.

FACTS: The Geological Sciences MRes will provide students with an excellent introduction to a career in geoscience research. Studying at UCC will allow you to gain access to cutting edge analytical laboratories in a top class research environment.

MRes (Master of Research) in Environmental Science

Teaching Mode:	Full-time/Part-time
Qualifications:	MSc
*Fees:	(EU) €5,770 and €3,000 Bench fee (Non-EU) €15,000and €3,000 Bench fee
Duration:	1 Year full-time; 2 Years part-time
Web link:	www.ucc.ie/en/bees/courses/postgrad/mresenv/
Contact:	Professor Marcel Jansen; +353 21 490 4558 **m.jansen@ucc.ie**

The MRes in Environmental Science is a new research-intensive, 12-month programme launched in 2017. It aims to recruit motivated students with a strong interest in research. The programme combines a research project with taught modules chosen to enhance each student's individual skill set. The extended project is the focus of the MRes and will be expected to represent cutting-edge, original research conducted under the close supervision of internationally recognised staff within the School of BEES. Projects can be selected from a broad range of environmental science topics, with a focus on inter-disciplinary research. Projects may be conducted in collaboration with external organisations, such as the Environmental Protection Agency, Industry and Local Authorities. Applicants are encouraged to suggest projects that foster collaborative research with external agencies.

Career Opportunities

The MRes is designed to give you a strong start in your scientific career. Students will gain invaluable experience in many key transferrable skills required by employers or in preparation for a PhD, including project design and planning, experimental design, data management and statistical analysis, scientific writing, presentation skills, proposal writing, laboratory and field research techniques, safety, research ethics and integrity, information literacy and science communication. The MRes will therefore provide an excellent background when applying for PhD positions, or when seeking employment in the private or public sectors (e.g. in environmental consultancy, environmental management, local or national agencies or other research positions).

Entry and Eligibility

Candidates must have obtained at least a Second-Class Honours Grade I degree or equivalent in an area related to Environmental Science. Candidates are advised to contact the proposed MRes supervisor to discuss and agree a research proposal prior to application. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The programme combines a research project (70 credits) with taught modules (20 credits) chosen to enhance each student's individual skill set.

What you will study

Students take 20 credits from the following available modules:

EV4002 Principles of Environmental Monitoring and Assessment, **EV4012** Environmental Impact Assessments, **EV4013** Environmental Risk Assessment and Auditing, **BL6010** Characteristics of the Marine Environment, **BL6019** Ecological Applications of Geographical Information Systems, **G 6501** Introduction to Geographical Information systems, **GG6502** Introduction to Remote Sensing, **GG6516** Coastal and Marine Processes. **Research project:** The largest component of the MRes degree is the research project. Students will select or design a project, together with your supervisor. Work on your project will be compiled into an MSc dissertation.

FACTS: Research topics should fall within the following broad areas: water and air pollution, human health and the environment, biomimetic and sustainable materials research, climate change and ocean acidification, water and waste water treatment, marine and freshwater resources management, sustainable water use, environmental risk assessment of emerging pollutants, nanomaterials and the environment.

MRes (Master of Research) in Animal Behaviour and Welfare

Teaching Mode:	Full-time/Part-time
Qualifications:	MSc
*Fees:	(EU) €5,770 and €3,000 Bench fee (Non-EU) €15,000 and €3,000 Bench fee
Duration:	1 Year full-time; 2 Years part-time
Web link:	**www.ucc.ie/en/bees/courses/postgrad/mresanimal/**
Contact:	Dr Fidelma Butler; +353 21 429 8401 **f.butler@ucc.ie**

The science of animal behaviour is a rapidly evolving discipline with much practical application. Welfare issues are a key concern for animal production, zoos and wildlife centres, the pet trade and veterinary sector, and are the subject of much regulation. Understanding animal behaviour underpins our approach to the welfare of wild, domestic and captive animals. This Masters programme will teach you key practical skills in the study of animal behaviour in order to meet a demand for personnel skilled in rigorous methods of behavioural assessment. This programme focuses on sampling procedures and skills, and the analysis, interpretation and reporting of behavioural data.

Career Opportunities

Future prospects for MRes graduates include jobs relating to the production and regulation aspects of the agricultural sector, the pet sector, zoos and wildlife parks; veterinary practices and further research (e.g. PhD).

Entry and Eligibility

Candidates must have obtained at least a Second-Class Honours Grade II degree or equivalent in an area related to Biological Sciences area **or** an equivalent or related degree **or** have reached an equivalent standard through completion of a relevant postgraduate qualification. Candidates are advised to contact the proposed MRes supervisor to discuss and agree a research proposal prior to application. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The programme combines a research project (70 credits) with taught modules (20 credits) chosen to enhance each student's individual skill set.

What you will study

Students take 20 credits from the following available modules:

BL6019 Ecological Applications of Geographical Information Systems, **BL6024** Quantitative Skills for Biologists using R, **AP3039** Evolutionary Psychology, **BL4004** Frontiers in Biology, **BL3004** Research Skills in Biology, **ZY4021** Evolutionary Ecology. **Research project:** The largest component of the MRes degree is the research project. Students will select or design a project, together with your supervisor. Work on your project will be compiled into an MSc dissertation.

FACTS: The major component of the programme is a research thesis, the subject of which will be agreed between the student and supervisor. The focus of research topics can range from domestic animals in a production or companion setting, exotic animals in a managed park, to native or introduced wild animals. The School of BEES works closely with colleagues at Fota Wildlife Park and Teagasc (Moorepark) and research may be carried out at these nearby locations. There is a diverse range of staff at the School of BEES available to supervise the research thesis component, allowing for all interests to be covered.

MSc Analytical Chemistry/MSc Environmental Analytical Chemistry/MSc Analysis of Pharmaceutical Compounds/ PGDip Analytical Chemistry

Teaching Mode:	Full-time/Part-time
Qualifications:	MSc/PG Dip
*Fees:	**MSc** (EU) €7,630 and €1,000 Bench fee (Non-EU) €23,100 and €1,000 Bench fee **PGDip** (EU) €6,130 and €1,000 Bench fee (Non-EU) €19,900 and €1,000 Bench fee
Duration:	1 Year Full-time; 2 Years Part-time
Web links:	**www.ucc.ie/mscacm www.ucc.ie/mscecm www.ucc.ie/msccmp www.ucc.ie/pdacm**
Contact:	Dr Eric Moore; +353 21 490 2208 **e.moore@ucc.ie**

The taught postgraduate programmes in Analytical Chemistry are designed to provide skilled training in modern chemical methods of analysis in the above thematic areas. While building on core Analytical Chemistry modules, the emphasis is also on method selection, development, and validation, as for example required in pharmaceutical quality control and in trace drug analysis.

Career Opportunities

Many analytical chemists, pharmaceutical chemical analysts and environmental chemical analysts go on to pursue careers in industry, government and forensic laboratories and opportunities for further research often result. The course sets out to bridge the gap between the current undergraduate degree knowledge and what is relevant and expected by the industry. There is a strong emphasis on developing transferable skills and ensuring that the career path for the student is either industry or academically focused. A large percentage of students gain employment in industry after completion of the course; however, a number of graduates also decide to progress to international Ph.D. opportunities.

Entry and Eligibility

Candidates must hold at least a Second-Class Honours, Grade II degree or equivalent in a subject(s) related to that of the MSc programme. All candidates are required to have a sufficient level of English. 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.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Analytical/ Pharmaceutical/Environmental Chemistry worth 30 credits is undertaken.

What you will study

CORE MODULES (PART I)

CM6012 Modern Analytical Techniques, Chemical Data Analysis and GLP, (10 credits), **CM6013** Separation Science, Sensors and Process Analytical Technology, (10 credits), **CM6014** Materials, Pharmaceutical and Bio-analysis, (10 credits), **CM6015** Practice of Analytical Chemistry, (10 credits), **CM6026** Industry Led Workshops, (5 credits), **CM6027** Taught Postgraduate Transferable Skills Development, (5 credits). Analytical and PGDip students have a choice from the following 10 credit modules: ***EV4002** Environmental Monitoring, ***PF6301** Biopharmaceuticals: Formulation Design, Secondary Processing and Regulatory Compliance.

RESEARCH PROJECT MODULE (PART II)

*uboCM6019** Research Project in Analytical Chemistry, (10 credits), *uboCM6020** Research Project and Dissertation in Analytical Chemistry, (30 credits), *uboCM6022** Research Project and Dissertation in Pharmaceutical Analysis, (30 credits), *uboCM6021** Research Project and Dissertation in Environmental Analytical Chemistry, (30 credits).

* These modules are specific to the degree programmes and dependant on your course choice.

FACTS: The MSc programmes in Analytical Chemistry have become the first taught postgraduate courses in Ireland to achieved professional accreditation by the Royal Society of Chemistry. The School of Chemistry at University College Cork now offer Master's degree courses that are accredited by the Royal Society of Chemistry for satisfying the academic requirements for the award of Chartered Chemist (CChem). You will have the opportunity to carry out your 6 month research project in either one of the research laboratories of University College Cork or with an industrial partner.

MSc in Bioinformatics and Computational Biology

Teaching Mode:	Full-time/Part-time
Qualifications:	MSc
*Fees:	(EU) €6,130; (Non-EU) €18,900
	Part-time Year 1 (EU): €3,130
	Part-time Year 2 (EU): €3,130
Duration:	1 Year full-time; 2 Years part-time
Web link:	**www.ucc.ie/mscbcb**
Contact:	Dr Marcus Claesson; +353 21 490 1390
	M.Claesson@ucc.ie

The MSc in Bioinformatics and Computational Biology at University College Cork is a one-year taught Masters course running from October to September. This programme is also run over two years part time. Bioinformatics is a fast-growing field at the intersection of Biology, Mathematics and Computer Science. It seeks to create, advance and apply computational algorithms and statistical techniques to solve formal and practical problems arising from the management and analysis of very large biological data sets.

Career Opportunities

Our programme has now been running since October 2009, and graduates to date are working here in UCC and other academic institutions in Ireland or abroad, some are working in Teagasc, some with computing multinationals in Ireland, and some have moved further afield to the Netherlands, Austria, U.S.A and New Zealand to mention a few. There are many opportunities for bioinformaticians in many countries worldwide, as the skill is always in short supply. This MSc qualification is recognised worldwide, and graduates will be able to work in any country for which they have the appropriate working visa.

Entry and Eligibility

Candidates must hold at least a Second-Class Honours, Grade II degree or equivalent in a Geological/Earth Sciences/Geographical/Engineering area or a related relevant degree or have reached an equivalent standard through completion of a relevant postgraduate qualification.

Candidates must hold at least a Second-Class Honours, Grade I degree or equivalent in a discipline with a significant element of Mathematics, Statistics, Engineering, Computer Science or Biology.

Candidates with Second Class Honours Grade II may be considered, following assessment by the Programme Director, if they are also proficient in mathematics as evident from grades in Higher Leaving Cert maths or Undergraduate maths modules, and have at least one year of proven and relevant Biological, Mathematical or Computational work or Postgraduate experience.

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.

Programme Structure

This programme has four different streams, for Biology, Mathematics, Statistics and Computer Science graduates (graduates of related disciplines such as Engineering, Physics, Medicine, etc. will be enrolled in the most appropriate stream).

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Bioinformatics and Computational Biology (30 credits).

What you will study

ST5005 Introduction to statistics, **ST3300** Data analysis I, **ST4400** Data analysis II, **MS6005** Discrete Mathematics, **AM6014** Mathematical Modelling for Biology, **AM6020** Open Source Infrastructure for Modelling and Big Data, **CS6501** Python Programming, **CS6502** Python Programming 2, **CS6503** Introduction to relational databases, **CS6405** Data mining, **BL6023** Cells, Biomolecules, Genetics and Evolution, **BC6003** Biomolecules, **MB6300** Computational Systems Biology, **MB6301** Genomic Data Analysis, **MB6303** (Research) Dissertation.

FACTS: This master programme is a unique full-time or part-time programme, providing graduates with a truly interdisciplinary educational experience. Depending on background, students are divided into four different streams (Biology, Mathematics, Statistics or Computer Science) when being allocated taught modules. A four-month research project extends and deepens the practical skills already developed in labs of the taught modules, and provides training in effective scientific communication.

MSc Biotechnology

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €7,130 and €1,000 Bench fee
	(Non-EU) €23,100 and €1,000 Bench fee
Duration:	1 Year
Web link:	**www.ucc.ie/mscbty**
Contact:	Professor Tommie McCarthy; +353 21 420 5436
	t.mccarthy@ucc.ie

The MSc in Biotechnology is a one-year course designed to provide you with the theoretical and practical skills for employment in the industries of biopharmaceuticals, biologics, biomedical research, agrochemicals and biotechnology. The course curriculum consists of six months of lectures, laboratory practical sessions, career development workshops, industry-based seminars and a six-month research project. The curriculum has been developed with input from the biotechnology and biopharmaceutical industries, to provide you with the key skills sought by employers. Irish / EU students have the choice to complete the six-month research project in the national or international biotechnology industry or university environment. Non-EU International students complete the six-month research project in a university research laboratory.

Career Opportunities

The Masters in Biotechnology is designed to provide graduates with the appropriate skills for leadership positions in the industry. Graduates of the programme have typically gained employment in the broad biotechnology area including; Biomanufacturing, Process Science, Quality Assurance, Quality Control, Microbiology, Bioanalytical Science, Regulatory Affairs and Research and Development. Graduates of the programme with a strong interest in research have secured both industry sponsored and university funded PhD positions nationally and internationally.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade I degree or equivalent in a subject(s) related to that of the Masters in Biotechnology programme. Graduates with equivalent qualifications in related areas of science and technology, or with proven and relevant industrial experience can be considered for places following interview and assessment by the Director of the Masters in Biotechnology Programme.

Candidates must be approved by the Masters in Biotechnology course team and/or the Director of the Masters in Biotechnology. 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.

Programme Structure

Part I of the programme comprises 50 credits of taught modules. Part II comprise an in-depth work placement /internship programme and a dissertation in Biotechnology (40 credits).

What you will study

BC6001 Cell and Molecular Biology, **BT6001** Genetic Engineering, **CM6011** Modern Methods in Analytical Chemistry, **MB6003** Functional Foods for Health, **MB6004** Advanced Molecular Microbial Biotechnology, **PE6008** Bioprocess Engineering or Advanced Case Studies in Biotechnology, **PF6301** Biopharmaceuticals: Formulation Design, Secondary Processing and Regulatory Compliance, **PS6001** Plant Genetic Engineering, Research Project Module **BT6002** Work Place Skills and a Dissertation in Biotechnology.

FACTS: All students complete a six-month individual industry related research project in biotechnology. The project is carried out during work placement with an industrial partner or in a selected UCC research laboratory or an approved national or international academic laboratory.

MSc in Molecular Cell Biology with Bioinnovation

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €7,130; (Non-EU) €23,100
Duration:	1 Year
Web link:	**www.ucc.ie/mscmcb**
Contact:	Dr Kellie Dean; +353 21 420 5421
	k.dean@ucc.ie

The MSc in Molecular Cell Biology with Bioinnovation is an innovative course aimed at highly motivated students with an interest in biomedical research in the areas of cancer biology, infection, immunity or molecular neuroscience, along with entrepreneurial thinking. The course will provide you with an interdisciplinary educational experience by combining advanced discipline-specific training with core scientific research, technical expertise and business skills.

Career Opportunities

Potential graduates are highly competitive to enter PhD studies but are equally well-equipped to pursue a number of career paths in various sectors and industries, including biotechnology, pharmaceutical, medicine, commercialisation, technology transfer, education and publishing. The programme also provides graduates with the skills and supports required to develop their own start-up ventures. Based on a first destination surveys with multiple class cohorts, nearly 100% of graduates are in employment or in further study within one-year of completing the MSc in Molecular Cell Biology with Bioinnovation.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade I degree or equivalent in Biochemistry, Biology, Microbiology, Neuroscience, Pharmaceutical Science or a similar science-based subject. Graduates with a second class honours grade II degree will be considered on a case-by-case basis, provided that there is additional relevant experience, and will be subject to interview and approval by the Director of the MSc Programme in Molecular Cell Biology with Bioinnovation. 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.

Programme Structure

Part I of the programme comprises 50 credits of taught modules. In Part II, a dissertation in Molecular Cell Biology (40 credits).

What you will study:

ML6004 Cell and Molecular Biology, **ML6006** Human Molecular Genetics and Genetic Engineering Techniques, **ML6002** Biological and Clinical Perspectives of Human Disease, **ML6005** Molecular Techniques in the life Sciences, **ML6003** Scientific Communication of Current Topics in Molecular Cell Biology, **MG6705** Marketing for High Technology Entrepreneurs, **IS6306** Technology and Business Planning.

5 credits from: **IS6307** Creativity and Opportunity Recognition, **IS6032** Venture Capital and Private Equity, **AC6301** Innovation Finance or **LW6104** Intellectual Property Law for High-Tech Entrepreneurs, Research Project Module **ML6001** Molecular Cell Biology Research Dissertation.

FACTS: This masters is a unique full-time programme, providing graduates with a truly interdisciplinary educational experience and includes: *Taught programme-specific modules focused on molecular cell biology, human genetics, genetic engineering techiques and clinical perspectives of disease. *Entrepreneurship and innovation training offered by the College of Business and Law. *A six-month research project that gives students a hands-on experience in theoretical and technical approaches to research with internationally recognised principal investigators and select industrial partners. *Practical skills development in laboratory techniques and scientific communication.

MSc Marine Biology
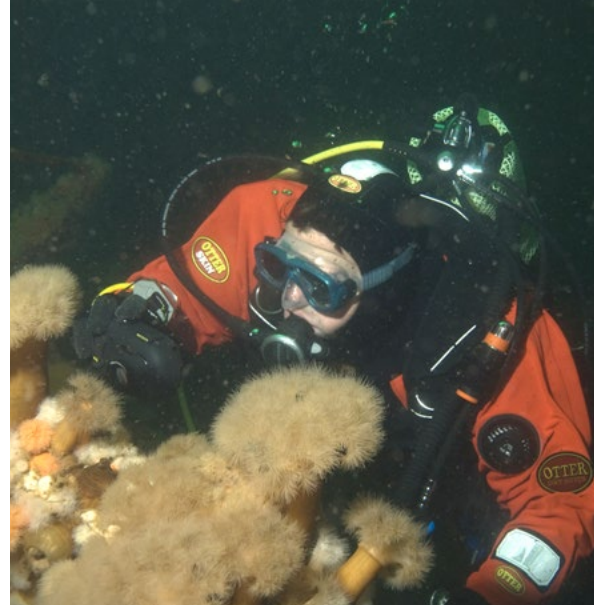
Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €6,130 and €2,500 Bench fee (Non-EU) €23,100 and €2,500 Bench fee
Duration:	1 Year
Web link:	**www.ucc.ie/mscmby**
Contact:	Professor Rob McAllen; +353 21 490 4647 **r.mcallen@ucc.ie**

The MSc in Marine Biology is a full-time multidisciplinary degree running for 12 months from the date of first registration for the programme. The aim of the MSc programme is to train and educate graduates in multiple areas of Marine Biology and to provide an understanding of the disciplines, which impinge upon these areas in order to meet the growing demand for such personnel at home and abroad.

Career Opportunities

The need to understand and protect the Marine Environment is becoming of paramount importance on a global scale. Key employers of our Marine Graduates in Ireland and the UK are The Marine Institute, Joint Nature Conservation Committee, Natural Environment Research Council, British Antarctic Survey, The Department of the Marine, Environmental Protection Agency, National Parks and Wildlife Service, Loughs Agency and Bord Iascaigh Mhara (Irish Sea Fisheries Board). In addition, the marine environment is going to experience major developments in the areas of windfarms, mineral extraction, marinas, wave and tidal barrages over the coming years. The wide-ranging module content combined with the Professionally Certified Courses and advanced Fieldwork experience on offer in this Masters programme will allow graduates to enter a wide range of Marine orientated careers. The Masters programme will also be highly relevant to those graduates wishing to continue with further education programmes (e.g. PhD or Teaching Training).

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade II degree or equivalent in any Biological Science or Environmental Science. Candidates, for whom English is not their primary language, should possess an IELTS of 7.0 (or TOEFL equivalent) with no less than 7 in writing and 6.5 in each other individual category.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Marine Biology (30 credits).

What you will study

BL6012 Marine Megafauna, **BL6013** Marine Fisheries and Aquaculture, **BL6014** Marine Fieldwork and Survey Techniques, **BL6015** Practical Marine Workplace Skills, **BL6016** Marine Ecology and Conservation, **BL6019** Ecological Applications of Geographical Information Systems, **BL6020** Genetics and the Marine Environment, **BL6026** Introductory Quantitative Skills for Biologists using R, **BL6017** Marine Biology Research Project.

FACTS: Several accredited professionally certified courses will be provided throughout the programme in collaboration with the National Maritime College of Ireland in Ringaskiddy. These courses will include Sea Survival (PST), Marine Radio Use (GMDSS), and Boat Handling (Powerboat level 2). Candidates successfully completing the module will be equipped with professional qualifications essential for work in the Marine Environment.

MSc Freshwater Quality Monitoring and Assessment

Teaching Mode:	Part-time
Qualifications:	MSc
*Fees:	(EU) €8,270 (Year 1 €2,380; Year 2 €2,380; Year 3 €3,510); (Non-EU) €16,400 (Year 1 €4,700; Year 2 €4,700; Year 3 €7,000); GEMS/Water sponsored (UN) €1,750 (Year 1 €500; Year 2 €500; Year 3 €750)
Duration:	3 Years
Web link:	**www.ucc.ie/mscfqm**
Contact:	Dr Lucia Hermida; +353 21 420 5276 **Lucia.hermidagonzalez@ucc.ie**

The MSc in Water Quality Monitoring and Assessment will provide existing or future water professionals with the necessary knowledge to design and implement freshwater quality monitoring programmes and to assess water quality. The programme is offered in a part-time, online format on a cyclical basis with an intake of students every second year. It will be useful to those already working in the water sector, including government agencies, and to staff in higher level education institutes who wish to gain a specialised postgraduate qualification in surface and groundwater monitoring, quality assurance and control, and data analysis and presentation. Rivers, lakes and groundwaters are covered in detail and there is an option to study biological and ecological methods, the use of particulate material in monitoring and to take part in an online or in situ field module abroad or in Ireland during the second year of the programme.

Career Opportunities

The MSc is designed to give students a strong foundation in all aspects of water quality monitoring and assessment, equipping them to work in the area of water quality management in public or private sectors, including water and environment ministries, regulatory agencies, agriculture and industry. The programme will be of particular benefit for the career advancement of employees already working in the water quality monitoring sector.

Entry and Eligibility

Candidates must hold at least a Second-Class Honours, Grade II degree or equivalent in Environmental Science or cognate discipline. All candidates are required to have a sufficient level of English. 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.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. Year 1 consists of 30 credits: **EV6001** (Monitoring programme design for freshwater bodies), **EV6002** (Quality assurance in freshwater quality monitoring programmes), **EV6003** (Data handling and presentation for freshwater quality monitoring programmes). Year 2 comprises **EV6005** (Monitoring and assessment of surface waters) and **EV6007** (Monitoring and assessment of groundwater); and any two from the following: **EV6004** (Freshwater quality monitoring in the field), **EV6008** (Freshwater quality monitoring using biological and ecological methods) or **EV6009** (Freshwater quality monitoring with particulate material). The online course is part-time with the exception of module **EV6004**, which is an online or in situ field module abroad or in Ireland.

In Part II, students undertake an independent research project on a topic within the field of freshwater quality monitoring and assessment (**EV6010**). This project will be carried out either in their workplace (if appropriate), in an environmental agency or similar setting, or in collaboration with an academic research institution in the student's country of residence.

FACTS: The United Nations Environment Programme (UNEP) GEMS/Water Capacity Development Centre (CDC) was founded in 2015 to provide global capacity development in water quality monitoring and assessment to the UNEP's global water quality monitoring system (GEMS/Water), through the provision of education, training and expert advice. The UN Agenda 2030 Sustainable Development Goal for water (SDG 6) is leading to an increased demand for knowledge, understanding and capacity in water quality monitoring and assessment worldwide, and through this postgraduate programme, the Centre is supporting this demand.

Masters Degree in Applied Environmental Geoscience

Teaching Mode:	Full-time/Part-time
Qualifications:	MSc
*Fees:	(EU) €7,130 and €1,000 Bench fee (Non-EU) €23,100 and €1,000 Bench fee Part-time Year 1 (EU): €4,630 and €500 Bench fee Part-time Year 2 (EU): €4,630 and €500 Bench fee
Duration:	1 Year full-time; 2 Years part-time
Web link:	**www.ucc.ie/mscags**
Contact:	Ed Jarvis; +353 21 490 4576 Christine Dennehy **D.Jarvis@ucc.ie** **c.dennehy@ucc.ie**

Featuring strong links with industry, the vocational programme provides a comprehensive training in the theory and practice of environmental geoscience that equips graduates for careers in scientific, engineering and environmental consultancies, regulatory agencies and natural resource management as well as geoscience research in Ireland, the EU and further afield.

Career Opportunities

MSc qualified environmental geoscientists are currently in high demand across Ireland, the EU and beyond. Our graduates are employed in water and soil analysis, site investigations, pollutant monitoring, risk assessments and remediation of legacy pollutants in complex subsurface settings. Environmental geoscientists are also concerned with the application of geological principles to help solve engineering challenges and design engineering systems with, on, and in geological materials, while, at the same time, protecting the environment. In the first year of the programme, all course participants were in geoscience related employment by the time of their graduation.

"The course incorporates a wide range of modules so that students are employable in a range of different sectors. As if this was not enough, lecturers and industry professionals genuinely look to help in any way they can." (MScGraduate, 2018)

"The industry connections made during my time in UCC were invaluable when seeking employment. The lecturers gave a huge amount of support and advice with finding a placement for the end of year research project and invested a lot of time with helping me find employment even when I was no longer a student." (MScGraduate,2018)

Entry and Eligibility

Candidates must hold at least a Second-Class Honours, Grade II degree or equivalent in a Geological/ Earth Sciences/Geographical/Engineering area or a related relevant degree or have reached an equivalent standard through completion of a relevant postgraduate qualification.

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.
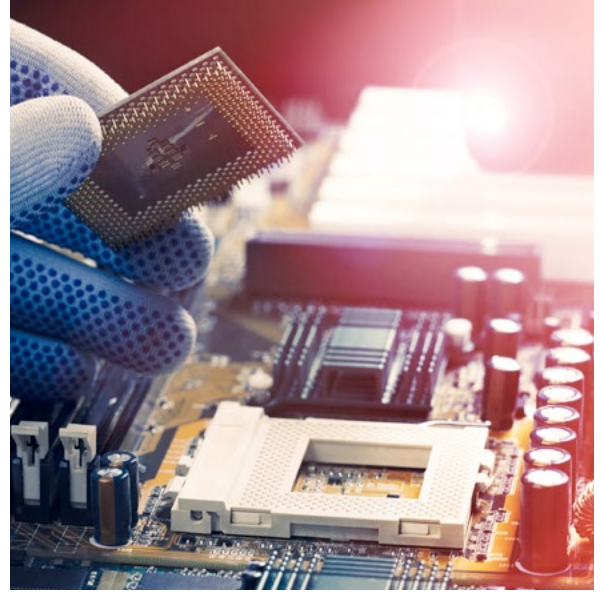
Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a substantial industry based environmental geoscience research project worth 30 credits is undertaken with one of our industry partners

What you will study

GL6020 Hydrogeology, Contaminated Land & Assessment, **GL6021** Engineering Geology, **GL6022** Environmental Planning & Regulation, **GL6023** Offshore Environmental Geology, **GL6024** Applied Geophysics, **GL6025** Geoinformatics for Environmental Geology, **GL6028** Applied Hydrogeology Skills, **GL6029** Applied Geotechnical Skills, **EV6011** Environmental Assessment & Monitoring, Research Project Module **GL6019** Applied Environmental Geoscience Research Project

FACTS: MSc Applied Environmental Geoscience graduates from non-EEA countries are entitled to remain in Ireland for up to 24 months after graduation to gain work experience under the Irish Third Level Graduate Scheme. The current employment rate of graduates from this MSc programme is high as there is significant domestic and international demand for environmental geoscientists.

MSc Computing Science

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €7,130; (Non-EU) €18,900
Duration:	1 Year Full-time
Web link:	**www.ucc.ie/msccs**
Contact:	Dr Marc Van Dongen; +353 21 420 5903
	director-msccs@cs.ucc.ie

The MSc in Computing Science provides students with the skills required to appreciate the entrepreneurship and innovation required in the software industry. Many national and multinational companies employ UCC Computer Science Graduates in areas such as software development & engineering, artificial intelligence and data mining, systems and networks, database and systems security as well as mobile multimedia, modelling, and research and development. In addition to undertaking formal modules students get a chance to apply the skills they have learned by completing a substantial research and development project leading to a dissertation.

Career Opportunities

The ICT sector in Ireland is a thriving and growing industry, with the top 5 global software companies and 9 of the top 10 US technology companies maintaining a presence in Ireland (**IDA Ireland**). This sector is one of the country's most prevalent employers with over 81,000 people employed by ICT companies in Ireland. Graduates of the MSc Computing Science can take up employment in areas such as Software Development, Systems design, architect and management, Cybersecurity, Product Management, Systems Administration, and Network Engineering.

The most recent survey of graduates, reported 92% were in employment one year after graduation. Some of the companies employing MSc graduates include Accenture, Altada Technology Solutions, Clearstream, Dell EMC, Ericsson, Firefox, IBM, VMware to mention but a few.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade I degree or equivalent from an NFQ Level 8 BSc in Computer Science or relevant equivalent area. Candidates who have obtained at least a First Class Honours in a Higher Diploma conversion course, such as the Higher Diploma in Applied Computing Technology offered at UCC will be considered. Applicants with equivalent technical experience/qualification will be considered on a case-by-case basis. 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.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. Part II comprises a dissertation in Computing Science (30 credits).

What you will study

CS6403 Case Studies in Computing Entrepreneurship, **CS6408** Database Technology, **CS6409** Information Storage and Retrieval, **CS6410** Project Development Skills, **CS6422** Complex Systems Development, **CS6423** Scalable Computing for Data Analytics. Three modules from: **CS6301** Design of Cyber-Physical Systems, **CS6311** Mobile Network Protocols, **CS6312** Mobile Devices and Systems, **CS6314** Mobile Applications Design, **CS6320** Formal Methods for Distributed Systems, **CS6321** Model-Based Software Development, **CS6322** Optimisation, **CS6326** Applied Computer Simulation and Analysis, **CS6402** Virtualisation Technologies, **CS6420** Topics in Artificial Intelligence, **CS6424** Special topics in Computing Science. Three modules from: **CS6313** Services and Mobile Middleware, **CS6315** Mobile Systems Security **CS6316** Cellular Network Services, **CS6317** Multimedia Technology in Mobile Networks, **CS6325** Network Security, **CS6327** Internet of Things: Technology and Application, **CS6405** Datamining, **CS6421** Deep Learning, **CS6425** Special Topics in Computing Science II, Research Project Module **CS6400** Dissertation in Computing Science. Any modules listed above are indicative of the current set of modules for this course but are subject to change from year to year.

FACTS: Many employment agencies report on typical salaries for different sectors; an example of those reported for careers in computer science are as follows: Python developer: €55,000- 65,000 IT manager: €75,00- 80,000 Software development manager: €85,000-120,000 These figures are indicative only. Salaries are in general higher than many other industries.

MSc Data Science and Analytics

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €7,130; (Non-EU) €18,900
Duration:	1 Year Full-time
Web link:	**www.ucc.ie/mscdsa**
Contact:	Dr Ahmed Zahran; +353 21 420 5926
	Dr Eric Wolsztynski; +353 21 420 5823
	director-mscdsa@cs.ucc.ie

The MSc in Data Science & Analytics, jointly offered by the School of Computer Science and the Department of Statistics, provides an education in the key principles of this rapidly expanding area. The combination of sophisticated computing and statistics modules will develop skills in database management, programming, summarisation, modelling and interpretation of data. The programme provides graduates with an opportunity, through development of a research project, to investigate the more applied elements of the disciplines.

Career Opportunities

The most recent survey of graduates of the MSc Data Science and Analytics indicated that 95% were in employment or undertaking further study one year after graduation. The positions they held included data scientist/analyst, software engineer, statistical modeller in companies such as Ericsson, Ervia, Janssen, Mobacar, Xanadu Consultancy. There is an increasing demand for graduates that can collate, interpret, manage and store large volumes of data. Graduates can be employed as analysts, database administrators, data warehouse consultants, business intelligence consultants to name but a few. Employment agencies report typical salaries ranging from €50,000- €85,000 depending on industry and experience.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade I degree or equivalent in any Computer Science or Mathematical Sciences or relevant equivalent area with a strong numerate content (e.g. engineering, finance, physics, biosciences or economics). Applicants who do not meet the above standard entry requirements will also be considered if they have an undergraduate degree (at Level 7 or > Level 8) and a minimum of 5 years verifiable relevant industrial experience. Applicants who do not have a primary degree will only be considered with a minimum of 10 years verifiable relevant industrial experience. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Data Analytics (30 credits).

What you will study

CS6405 Datamining, **CS6421** Deep Learning, **ST6030** Foundations of Statistical Data Analytics, **ST6033** Generalised Linear Modelling Techniques. Students who have adequate database experience take: **CS6408** Database Technology. Students who have not studied databases take: **CS6503** Introduction to Relational Databases. Elective Modules (30 credits) Students must take at least 10 credits of CS (Computer Science) modules and at least 10 credits of ST (Statistics) modules from: **CS6322** Optimisation, **CS6409** Information Storage and Retrieval, **CS6420** Topics in Artificial Intelligence, **ST6034** Multivariate Methods for Data Analysis, **CS6426** Data Visualization for Analytics Applications, **ST6035** Operations Research, **ST6036** Stochastic Decision Science, **ST6040** Machine Learning and Statistical Analytics I, **ST6041** Machine Learning and Statistical Analytics II. Students who have adequate programming experience take: **CS6422** Complex Systems Development, **CS6423** Scalable Computing for Data Analytics. Students who have not studied programming take: **CS6506** Programming in Python, **CS6507** Programming in Python with Data Science Applications, Research Project Module **CS6500** Dissertation in Data Analytics/**ST6090** Dissertation in Data Analytics.

FACTS: UCC's School of Computer Science is internationally recognised for its research leadership in several areas of Computer Science e.g. Artificial Intelligence; Distributed Computing; Foundations of Computing; Multimedia; Networking & Systems and Secure, Reliable and Scalable Computing. The Department of Statistics in the School of Mathematical Sciences is the oldest such department in Ireland. The Department has a strong research record in Health and Biostatistics, Medical Imaging, Risk & Actuarial Science, Social Networks and Data-mining, including in the use of machine learning for these applications. UCC is also one of the lead institutions in the Insight SFI Research Centre for Data Analytics, one of the largest data analytics centres in Europe.

MSc Interactive Media

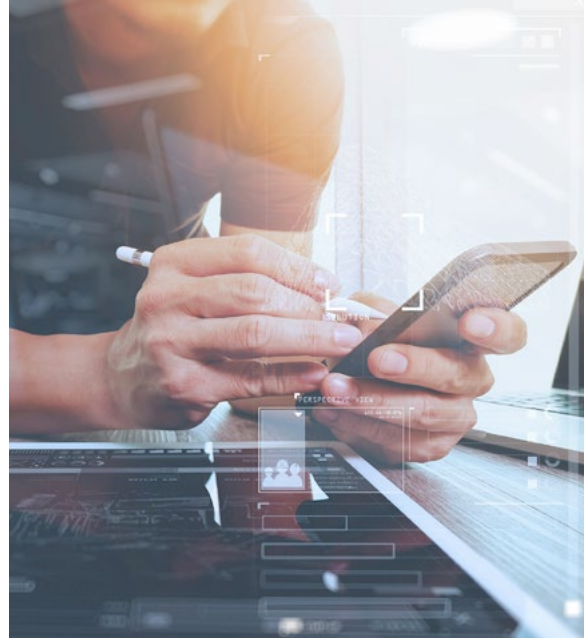|	
Teaching Mode:	Full-time/Part-time
Qualifications:	MSc
*Fees:	(EU) €7,130; (Non-EU) €18,900 Part-Time Fees: (EU): €3,630 (Year 1 Part-time); €3,630 (Year 2 Part-time).
Duration:	1 Year Full-time; 2 Years Part-time
Web link:	**www.ucc.ie/mscim**
Contact:	David Murphy; +353 21 420 5908
	director-mscim@cs.ucc.ie

The MSc in Interactive Media is a conversion course. The programme is an intensive taught course focusing on the practical and technical aspects of interactive media. The broad aim of the course is to equip you with a thorough understanding of the technology and industry-standard tools used in the digital media sector. Interactive digital media seeks to entertain, inform and inspire an audience. The creation of interactive digital media is a challenging and complex activity requiring a blend of creative and technical skills using a range of existing and emerging technologies. An exciting conversion programme that prepares students for a career in the creative and technical industries. A programme for those who are passionate about designing and developing interactive systems for great user experiences. The MSc Interactive Media is a taught programme that may be taken full-time over 12 months or part-time over 24 months from the date of first registration for the programme.

Career Opportunities

The ICT sector in Ireland is a thriving and growing industry with the top 5 global software companies and 9 of the top 10 US technology companies maintaining a presence in Ireland. This sector is one of the country's most prevalent employers with over 81,000 people employed by ICT companies in Ireland and accounts for over €50 billion of Irish exports each year (**ICS**). Numerous national and international reports have highlighted the digital media industry as one of the fastest growing industries in a high-value sector with significant employment and strong revenues. Graduates of the MSc Interactive Media have successful careers in areas such as, Graphic Design & UI/UX Software Development/Designer, Social Media/Digital Content, Digital Analytics/Visualisation, Data/Statistical Analysis, Business Intelligence. Companies who have hired graduates from the programme include Amazon, Accenture, Apple, Electronic Arts (EA), GlobeTech, Johnson Controls, Screendragon, Sky Broadcast, Tencent, and more.

Starting Salaries. Salaries are in general higher than many other industries. The following link to Brightwater Salary Survey provides more details; **www.brightwater.ie/salary-survey**

Entry and Eligibility

Open to graduates of any discipline who have achieved at least a Second Class Honours, Grade II degree, or those with an equivalent professional qualification, are eligible to apply, provided there is no significant overlap between their previous courses of study and the content of this course. Candidates from Grandes Écoles Colleges are also eligible to apply if they are studying in an ENSEA or EFREI Graduate School and are eligible to enter the final year (M2) of their programme, provided there is no significant overlap between their previous courses of study and the content of this course. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Interactive Media (30 credits).

What you will study

CS6100 Authoring, **CS6101** Web Development for Digital Media, **CS6102** Graphics for Interactive Media, **CS6103** Audio and Sound Engineering, **CS6104** Digital Video Capture and Packaging, **CS6111** 3D Graphics and Modelling, 30 credits from the following elective modules: **CS6105** Future and Emerging Interaction Technologies, **CS6110** Animation, **CS6112** Image Processing, **CS6113** Internet-based Applications, **CS6114** Digital Video Compression and Delivery, **CS6115** Human-Computer Interaction, **CS6116** Mobile Multimedia, **CS6117** Audio Processing, **CS6118** Speech Processing, **CS6119** Interactive Visualisation, **CS6120** Intelligent Media Systems, Research Project Module **CS6200** Dissertation in Interactive Media.

FACTS: The MSc Interactive Media is a long established and highly regarded taught Masters programme in both industry and academia. UCC's School of Computer Science & Information Technology is internationally recognised for its research leadership in several areas of Computer Science e.g. Universal Design, Multimodal Computing, Virtual Reality and Affective Computing.

MSc Food Microbiology

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €6,880; (Non-EU) €23,100
Duration:	1 Year
Web link:	**www.ucc.ie/mfstmb**
Contact:	Jennifer Mahony; +353 21 490 2392
	J.Mahony@ucc.ie

Food is necessary for human survival, is an important source of pleasure, and plays an enormous role in the global economy. Microbes play an essential role in food preservation and safety, food for health and food biotechnology. These are growing areas in all global economies. UCC Microbiology has established a global reputation in food microbiology, based on its research profile and the impact of its graduates in the food industry. This course covers the breadth of classical and modern food microbiology, including food safety and spoilage; food fermentation; food biotechnology; hygienic production of food; the impact of diet on health; the molecular mechanisms of infectious microbes and the role of the gut microbiota in human health. The aim of this course is to educate students to a masters level in Food Microbiology, emphasising areas in which UCC engages actively in research (e.g. Food biotechnology, Food fermentations, Food safety, Food for Health) and to provide graduates with the knowledge and skills to enable them to contribute to Irish and international food industries.

Career Opportunities

The Masters in Food Microbiology is designed to equip graduates to work in a range of management and research roles within the Irish and international food industries, including food and beverage industries, product development, quality assurance, contract food testing laboratories, and further studies (e.g. PhD).

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade II degree or equivalent in a discipline with a significant element of laboratory science. 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.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Food Microbiology (30 credits).

What you will study:

MB6006 Library project in Food Microbiology, **MB6027** Research Frontiers in Food Microbiology, **ML6005** Molecular Techniques in the Life Sciences, **PG6001** STEPS - Scientific Training for Enhanced Postgraduate Studies, **MB6010** Analytical Food Microbiology, 25 credits from the following:

FE6110 Food Markets and Policy, **MB4110** Food Fermentation and Mycology, **MB4111** Microbial Food Safety, **MB4113** Food Biotechnology, **MB6014** Hygienic Production of Food, **MB6103** Functional Foods for Health, Research Project Module Dissertation in Food Microbiology.

FACTS: The Masters in Food Microbiology is a structured 12 month full-time programme which includes a six-month lab-based research dissertation on a topic in the area of food microbiology, performed under the supervision of a member of staff and in some cases co-supervised by collaborating research centres. The project aims to enhance your laboratory skills and critical abilities in identifying, analysing, and solving problems in scientific research and to develop your skills in communicating your results. The 10-credit module **MB6010** Analytical Food Microbiology, is an intensive Laboratory-based training module which provides students with an extensive, industry-relevant, practical experience in the microbiological analysis of foods.

MSc Food Science

Teaching Mode:	Full-time/Part-time
Qualifications:	MSc
*Fees:	(EU) €6,880 and €1,000 bench fee (Non-EU) €23,000 and €1,000 Bench fee Part-Time Fees: (EU): €3,440 (Year 1 Part-time); €3,440 (Year 2 Part-time)
Duration:	1 year full-time; 2 years part-time
Web link:	**www.ucc.ie/mfstfs**
Contact:	Dr Seamus O'Mahony; +353 21 490 3625 **sa.omahony@ucc.ie**

The MSc in Food Science is a 12 month post-graduate programme in Food Science consisting of 90 credits including coursework and library and laboratory research projects. Courses include modules in research methods, and advanced courses in established and emerging areas of Food Science. UCC has a history of nearly a century of teaching and research in the food sciences and is now amongst Europe's largest multidisciplinary education and research institutions with world-class academics working in all aspects of Food Science. Our first-rate facilities include extensive and well equipped laboratories and a large pilot plant with excellent dairy, meat and bakery facilities, in addition to a unique pilot-scale brewery.

Career Opportunities

Graduates of this MSc programme are suitably skilled to work in a variety of roles across the food industry in both the private and public sector. Examples of roles filled by previous graduates of this programme include, research scientist, product development technologist, quality assurance technician/co-ordinator, production supervisor, regulatory affairs specialist, clinical trials co-ordinator and analytical specialist. The food industry is the largest indigenous sector in Ireland, with an extensive global reach. It is growing steadily and is incredibly resilient, even during periods of economic uncertainty. The programme also serves as a route to further study in this area, with a small number of past graduates having subsequently pursued research MSc and PhD opportunities.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade I degree or equivalent in cognate or biological sciences discipline with a significant element of laboratory science. 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.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Food Science (30 credits).

What you will study

Modules in this programme include: **PG6001** STEPS - Scientific Training for Enhanced Postgraduate Studies, **FE6101** Food Business: Markets and Policy, **FS6101** Library Project in Food Science, **FS6103** Novel Processing Technologies and Ingredients, **FS3013** Protein and Lipids in Food Systems, **FS6120** Cheese and Fermented Dairy Products, **FS6121** Meat Science and Technology and 20 credits from: **FE6902** Global Food Policy Issues, **FS3014** Macromolecules, Emulsions and Food Structure, **FS4014** Food Product Development and Innovation, **FS4606** Cereals and Related Beverages, **MB4611** Microbial Food Safety, **MB6003** Functional Foods for Health, **MB6114** Hygienic Production of Food, **NT6102** Public Health Nutrition, **FS3022** Sensory Evaluation for Food and Nutritional Sciences, Research Project Module Dissertation in Food Science.

FACTS: This MSc provides you with the opportunity to learn and apply new knowledge and develop a range of skills that are very much in demand by food industry employers. It presents a unique, compact, high quality offering for high achieving graduates to translate and refocus their undergraduate qualification towards the food industry, and benefit from its excellent employment opportunities. The structure of the programme is also very flexible in helping you realise your ambitions.

MSc Human Nutrition and Dietetics

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €12,130 Year 1; €12,130 Year 2
Duration:	2 Years
Web link:	**www.ucc.ie/mfsthn**
Contact:	Majella O'Keefe; +353 21 420 5684
	majella.okeeffe@ucc.ie

The MSc Human Nutrition and Dietetics is an integrated postgraduate course which enables graduates with a BSc or MSc in Nutrition or equivalent degree to meet the standards of proficiency and professional competency so they are eligible to apply to the Dietitians Registration Board (CORU) for registration as a dietitian. The programme is delivered full-time over two calendar years. The course is delivered through lectures, workshops, practice education and problem-based learning tutorials. Practice Education (clinical placement) comprises of 1,000 hours of clinical placement spread throughout the programme in years 1 and 2 to facilitate the application of knowledge gained during the academic year. Practice Education is delivered through a partnership between the University, the Health Service Executive, and voluntary and private sector providers. Students will complete three compulsory placements in a variety of settings (hospitals, clinics, community settings) throughout Southern Ireland.

Career Opportunities

Dietitians are employed in a variety of locations, providing opportunities in areas such as: Clinical Nutrition and Dietetics (hospital and community dietetics), Private Practice, Clinical Nutrition Industry, Public Health Nutrition (government health, promotion agencies), Pharmaceutical industry, Sports Nutrition, Education, Research (nutrition and medical research-public and private sectors), graduates can also apply for registration as a dietitian in the USA, UK, Canada, Australia and New Zealand once local registration requirements are met.

Entry and Eligibility

Candidates must have obtained a BSc (NFQ level 8 or equivalent) with at least a Second-Class Honours Grade I degree or a postgraduate degree (Level 9 NFQ or equivalent). Candidates must have successfully completed human physiology and biochemistry modules (a minimum of 10 credits for each module are required) as part of the primary or postgraduate degree. Suitable degrees include nutrition, biochemistry, physiology, biology and nursing. Applicants will be shortlisted for interview on the basis of educational qualifications, CV, references and relevant work experience. Where relevant, candidates will have to prove their proficiency in the English language by achieving at least a score of 7.0 overall with no individual component less than 6.5 (International English Language Testing System).

Programme Structure

The course is arranged over two academic years. Students take modules to the value of 120 credits.

What you will study

Year 1 - Students take 60 credits as follows: **DT6002** Nutritional Assessment in the Clinical Setting, **DT6003** Advanced Medical Nutrition Therapy, **DT6004** Food Skills and Food Service Management, **DT6006** Professional Practice and Interpersonal Skills, **DT6007** Public Health Nutrition, **DT6008** Medical Management of Disease, **DT6009** Clinical Practice Placement 1, **DT6010** Applied Research for Dietetics, **DT6014** Dietetics Through the Lifecycle, Students take 5 credits from the following: **EH6158** Health promotion I, **NT6107** Integration and Regulation of Nutrient Metabolism.

Year 2 - Students take 60 credits as follows: **DT6011** Clinical Practice Placement 2, **DT6012** Clinical Practice Placement 3, **DT6015** Advanced Clinical Nutrition and Dietetics, **DT6013** Research Dissertation in Dietetics.

FACTS: The course offers a balance of university and practice-based experiences with students completing over 1000 hours of clinical placement in the South/South West region of Ireland. The School of Food and Nutritional Sciences has a longstanding national and international reputation for provision of quality education in Food Science and Technology as well as in Nutritional Sciences and Dietetics.

MSc in Financial and Computational Mathematics

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €8,130; (Non-EU) €18,900
Duration:	1 Year
Web link:	**www.ucc.ie/mscfcm**
Contact:	Dr Cónall Kelly; +353 21 420 5848 **Conall.kelly@ucc.ie**
	Dr Tom Carroll; +353 21 420 5811 **t.carroll@ucc.ie**
	Professor Bernard Hanzon; +353 21 420 5839 **b.hanzon@ucc.ie**

This course equips graduates in mathematics, physics, or engineering with the skills necessary to pursue a successful career in quantitative finance. Modern financial technology is based upon sophisticated computational techniques for the modelling of asset and market movements, and the valuation of financial derivatives. Employers actively seek graduates with an understanding of the mathematical background as well as the computational skills needed to apply it. This course provides a solid grounding in both, and includes a team-based research project with opportunities to work in partnership with industry.

Career Opportunities

Past graduates of this programme have been recruited to roles in quantitative finance (China Reinsurance Corporation, Quaternion Risk Management / Acadia Inc., Kroll Bond Ratings Agency), and have moved on to SFI-funded study at PhD level in the application of machine learning to finance. You will be prepared for a broad selection of roles in the financial services sector and particularly in quantitative finance, financial engineering, and investment analysis.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade II degree or equivalent in the mathematical sciences or another quantitative subject. Candidates who have obtained at least a 2.2 honours degree in Engineering or Physics will be considered, and should be able to demonstrate to the Course Coordinator some prior experience of probability and statistics, linear algebra, multivariate calculus, ordinary differential equations, and programming. 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.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Financial and Computational Mathematics (30 credits).

What you will study

MF6010 Probability Theory in Finance, **MF6011** Derivatives, Securities, and Option Pricing, **MF6012** Computational Finance I, **MF6013** Computational Finance II, **MF6014** Topics in Financial Mathematics, **MF6015** Continuous-Time Financial Models, **AM6004** Numerical Methods and Applications, **CS6322** Optimisation. Choose 15 credits from: **AM4062** Applied Stochastic Differential Equations, **AM6007** Scientific Computing with Numerical Examples, **AM6019** Partial Differential Equations, **ST4400** Data Analysis II, **ST6040** Machine Learning and Statistical Analytics I, **ST6041** Machine Learning and Statistical Analytics II, **CS6503** Introduction to Relational Databases, Research Project Module **MF6016** Dissertation in Financial and Computational Mathematics.

What our students say

"The three areas that have most interested me are mathematics, finance and programming/software development. Thanks to what I had learned and developed through this MSc programme, I was able to demonstrate a good understanding of the methodologies and risk management framework on which my current company (Acadia) builds upon with their analytics software, and I was able to get up to speed with our full tech stack at a quick pace." **Nathaniel Volfango, Quantitative Developer at AcadiaSoft, graduated 2021.**

"I absolutely love maths and its logical problem-solving element. I enjoyed programming from my undergrad, and so this programme was the natural way to go to learn more about a field that incorporates both of things I like in a practical financial context. The programme has helped me learn a lot more and develop skills that I know that are in high demand in the finance sector." **Arinjoy Bhanja, current student.**

Mathematical Modelling and Machine Learning

Teaching Mode:	Full-time
Qualifications:	MSc
*Fees:	(EU) €8,130; (Non-EU) €18,900
Duration:	1 Year
Web link:	**www.ucc.ie/mscmsl**
Contact:	Dr Andrew Keane
	Professor Sebastian Wieczorek; +353 21 420 5839
	andrew.keane@ucc.ie; **Sebastian.Wieczorek@ucc.ie**

The primary aim of this course is to provide training in the use and development of modern numerical methods and self-learning software. Graduates will develop and apply new skills to real-world problems using mathematical ideas and techniques together with software tailored for complex networks, self-learning and dynamic machine learning systems. While there is a strong focus on modern applications, graduates will gain in-demand skills in mathematical modelling, problem-solving, scientific computing, dynamic machine learning, complex networks and communication of mathematical ideas to a non-technical audience.

Career Opportunities

Graduates with quantitative skills and expertise in self-learning and machine learning algorithms are in high demand in industry according to the Governments Expert Group on Future Skills Needs. Demand for these skills is projected to rise over the coming years not just in Ireland but in the EU and globally. Graduates from a similar MSc have secured jobs in the following areas: banking, financial trading, consultancy, online gambling firms, software development, logistics, data analysis and with companies such as AIB, McAfee, Fexco, DeCare Systems, MpStor, the Tyndall Institute, Matchbook.com, First Derivatives and KPMG.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade II degree 2.2 honours degree or equivalent in a numerate discipline (i.e., commensurate with science or engineering programmes). Candidates are expected to have taken courses in mathematics, applied mathematics or statistics at university level, and be familiar with calculus, vectors, matrices and elementary statistics. They are expected to have sufficient background in university-level mathematics as assessed by the course coordinator. For online modules, students are advised to have access to a laptop/home computer with internet connection, modern browser, word processing and spreadsheet software. 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. 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.

Programme Structure

Part I of the programme comprises 60 credits of taught modules. In Part II, a dissertation in Mathematical Modelling and Self-Learning Systems (30 credits).

What you will study

AM6004 Numerical Methods and Applications, **AM6005** Nonlinear Dynamics, **AM6007** Scientific Computing with Numerical Examples, **AM6013** Statistical, Dynamical and Computational Modelling, **AM6015** Computational Techniques with Networks, **AM6016** Dynamic Machine Learning with Applications, **AM6017** Complex and Neural Networks, **AM6020** Open Source Infrastructure for Mathematical Modelling and Big Data Applications, **ST4060** Statistical Methods for Machine Learning I, **ST4061** Statistical Methods for Machine Learning II, Research Project Module **AM6018** Dissertation in Mathematical Modelling and Self-Learning Systems.

FACTS: This MSc reflects a philosophy of cutting edge teaching methods and pragmatism. As well as providing you with a host of abilities which are in demand in industry, this MSc provides skills which are complementary to most scientific and engineering undergraduate courses. The MSc not only opens up new possibilities, you also gain a set of skills that sets you apart from the crowd in your original field of study. The final project is an excellent opportunity for you to showcase your abilities to future employers or to undertake a detailed study in a new area of interest. The course is extremely flexible in helping you realise your ambitions.

MEngSc Electrical and Electronic Engineering

Teaching Mode:	Full-time
Qualifications:	MEngSC
*Fees:	(EU) €6,630; (Non-EU) €23,100
Duration:	1 Year
Web link:	**www.ucc.ie/menee**
Contact:	Dr Gordon Lightbody; +353 21 490 2027 **g.lightbody@ucc.ie**

Electrical and Electronic Engineering drives many of the technological advances that we see in our fast changing world, from smart grids and robotics to smart phones and the internet of things. It is an exciting and challenging career choice, characterised by constant personal development, innovation and invention. The aim of the MEngSc (Electrical and Electronic Engineering) programme is to build on the good engineering foundations of your undergraduate degree, to develop advanced skills and to introduce you to some of the key exciting areas of today and the future. As part of this degree you will carry out a substantial research project. There is also the opportunity to apply for a paid summer industrial placement.

Career Opportunities

MEngSc (Electrical and Electronic Engineering) graduates will have a competitive advantage in the jobs market by virtue of the cutting edge expertise obtained through their research project and the advanced and specialised coursework in Electrical and Electronic Engineering - particularly in areas which are now in high demand, such as machine learning, smart grids, embedded systems, and the internet of things.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade I degree in Electrical and/or Electronic Engineering, or equivalent engineering qualification. Candidates from Grandes Écoles Colleges are also eligible to apply if they are studying in an ENSEA or EFREI Graduate School and are eligible to enter the final year (M2) of their programme. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

Part I of the programme comprises 50 credits of taught courses and a preliminary research report worth 10 credits. Part II – Option 1, a research dissertation in Electrical and Electronic Engineering (30 credits). Option 2, work placement with a research project.

What you will study

EE6019 Research Report worth 10 credits. At least 35 credits from Group A: **EE6024** Engineering Machine Learning Solutions, **EE6034** Optoelectronic Communications and Optoelectronics, **EE6048** Smart Grids, **EE6035** Electrical Power Systems, **EE6036** Design of RF Integrated Circuits, **CS6327** Internet of Things: Technology and Application, **EE6038** Advanced VLSI Design, **EE6040** Mobile and Cellular Communications, **EE6041** Advanced Digital Signal Processing, **EE6042** Frequency Synthesizers for Wireless and Cellular Systems, **EE6043** Design of Digital Integrated Circuits, **EE6044** Advanced Analogue IC Design, **EE6045** Data Converter Techniques: Circuits and Architectures, **EE6047** Semiconductor IC Processing, **EE6049** Design of Analogue Integrated Circuits, **ME6009** Industrial Automation and Control.

At most 15 credits from Group B: **CS6301** Design of Cyber-Physical Systems, **CS6322** Optimisation, **CS6325** Network Security, **CS6506** Programming in Python, **CS6507** Programming in Python with Data Science Applications, **EE4001** Energy Systems, Power Electronics and Drives, **EE4002** Control Engineering II, **EE4004** Telecommunications II, **EE4012** Biomedical Systems, **EE4019** Photonic Signals and Systems Application, **ME6008** Robotics, **ME6012** Advanced Robotics, **NE4008** Photovoltaic Systems, **ST6030** Foundations of Statistical Data Analytics.

Research project module **EE6023** Dissertation in Electrical and Electronic Engineering (worth 30 credits). **OR** Research project module **EE6008** Research Project for Placement Students (worth 20 credits) and work placement module **EE6009** MEngSc Placement (worth 10 credits).

FACTS: There is the opportunity to participate in our work-placement scheme, to further develop your professional engineering skills. Many of our students have obtained paid work-placements with some of the world's best known high-tech companies who have facilities in the Cork area. The School of Engineering also has a close relationship with large UCC research institutions such as the Tyndall National Institute and MaREI, the SFI Research Centre for Energy, Climate and the Marine.

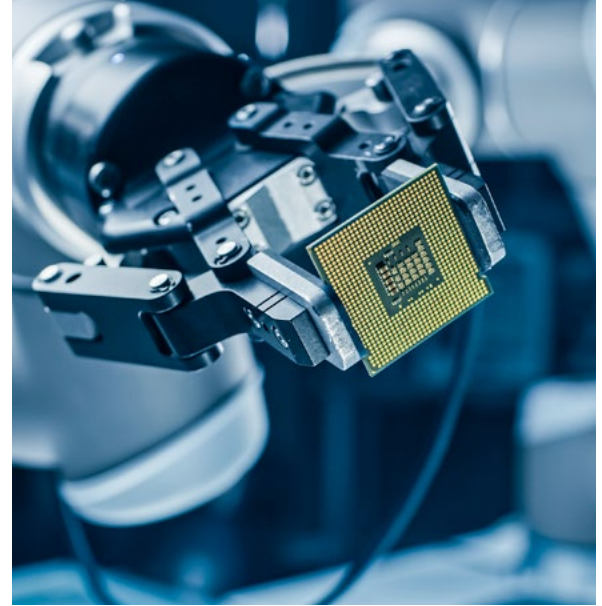# MEngSc Mechanical Engineering- Manufacturing, Process and Automation Systems (MPAS)

Teaching Mode:	Full-time
Qualifications:	MEngSC
*Fees:	(EU) €6,630; (Non-EU) €23,100
Duration:	1 Year
Web link:	**www.ucc.ie/menmec**
Contact:	Dr William Wright; +353 21 490 2213
	bill.wright@ucc.ie

The MEngSc in Mechanical Engineering (Manufacturing, Process, and Automation Systems) is designed to extend and broaden a range of engineering skills for maximum employment flexibility in a rapidly evolving global economy.

Career Opportunities

In response to increasing international demand for highly skilled graduates in the field of mechanical engineering applied to the manufacturing and pharma-chem industries, this 1-year full-time course will produce mechanical engineering postgraduates who are proficient in the development and realisation of modern manufacturing, process and automation systems. This is achieved through developing an understanding of the concepts of manufacturing systems, and the skills to analyse, design and implement manufacturing systems in practice. This is combined with an understanding of process automation and operational management. The course will equip you with an-up-to date knowledge of manufacturing techniques and automation processes.

Entry and Eligibility

Candidates must have obtained at least a Second Class Honours Grade II degree in mechanical engineering or a closely related engineering discipline that should have covered mechanical engineering fundamentals such as mechanics, thermodynamics, fluid mechanics and materials. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

Part I of the programme comprises 20 credits of core modules and 40 credits of elective modules. Part II of the programme comprises a dissertation module in Mechanical Engineering (30 credits).

What you will study

20 credits, **ME6019** Preliminary Research Project (10 credits), **MG6021** Operations Management (5 credits), **MG6315** Project Management (5 credits). Part I elective modules: 40 credits, with a minimum of 25 credits taken from Group A elective modules (all 5 credits): **ME6002** CAD/CAM, **ME6006** Non-Destructive Testing, **ME6007** Mechanical Systems, **ME6008** Robotics, **ME6009** Industrial Automation and Control, **ME6012** Advanced Robotics, **CE6024** Finite Element Analysis, **EE4012** Biomedical Design, **CS6506** Programming in Python, **CS6507** Programming in Python with Data Science Applications. The balance of up to 15 credits is taken from Group B elective modules (all 5 credits): **PE6009** Pharmaceutical Engineering, **PE6002** Optimisation and Continuous Process Improvement, **PE6003** Pharmaceutical Process Validation, **PE6007** Mechanical Design of Process Equipment, **CE3010** Energy in Buildings, **CE4016** Energy Systems in Buildings. Part II core module: **ME6020** Dissertation in Mechanical Engineering (30 credits).

FACTS: Graduates of this programme are highly employable and go on to pursue careers with a wide variety of local, national, and international employers, or further postgraduate studies

MEngSc Pharmaceutical & Biopharmaceutical Engineering

Teaching Mode:	Full-time 12 months; Part-time, Minimum of 24 months, Maximum of 60 months
Qualifications:	MEngSC
***Fees:**	(EU): Full-time €9,260; Part-time: (Per 30 Credits) €4,630; Per individual 5 Credit Module: €1,000; (NEU) Full-time €23,100
Web link:	**www.ucc.ie/menpbe**
Contact:	Dr Denis Ring +353 21 490 2549 **d.ring@ucc.ie**

The MEngSc in Pharmaceutical and Biopharmaceutical Engineering is a full time programme running for 12 months from the date of first registration for the programme or a part-time programme programme running for a minimum of 24 months (maximum 60 months) from the date of first registration for the programme. You will have the opportunity to gain a formal qualification in areas of particular topical interest to the bio/pharmaceutical industry; to upskill your competence for these important industrial sectors, including issues such as product containment, powder/particle technology, design of API and secondary production facilities, current Good Manufacturing Practice (cGMP), design of classified facilities, aseptic processing facility design, utilities and services, data analysis and process validation.

Career Opportunities

The course offers graduates working in the pharmaceutical industry the opportunity to further develop your skills set and employability across a wider range of roles in the industry through enhanced continuing professional development. Through the opportunities provided by participation on the programme, you are provided with opportunities to enable greater cohesion and understanding among inter-and multi-disciplinary teams while earning a formal qualification in engineering.

Entry and Eligibility

Candidates must have a BE (Hons) or BEng (Hons) Degree or equivalent engineering qualification, with a minimum Second Class Honours Grade II degree, or a level 8 BSc degree, with a minimum Second Class Honours Grade II, where the BSc graduate has a recognised qualification in Process or Chemical Engineering (e.g. the Diploma in Process and Chemical Engineering at UCC or equivalent). Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The programme comprises 60 credits of taught modules, which after completion students may select to graduate with a PG Diploma. Students progressing to the MEngSc will also complete a dissertation in Pharmaceutical and Biopharmaceutical Engineering (30 credits).

What you will study

Students can choose any 12 of the following modules: **PE6004** Biopharmaceutical Support Systems, **PE6010** Pharmaceutical Engineering, **PE6011** Biopharmaceutical Engineering, **PE6012** Pharmaceutical Process Equipment, Materials and Mechanical Design, **PE6013** Powder and Particle Technology and Unit Operations, **PE6019** Process Analytical Technology, **PE6023** Pharmaceutical and Biopharmaceutical Utilities, **PE6027** Advanced Biopharmaceutical Engineering, **CM6010** Introductory Pharmaceutical Chemistry, **PE6016** Pharmaceutical Industry; Manufacturing and Optimisation, **PE6018** Pharmaceutical Process Validation and Quality (5 credits), **PE6022** Aseptic Manufacturing Design, **PE6024** Advanced Process Design & Safety Engineering, **PE6026** Project Engineering - From Concept to Completion, **PE6021** Dissertation in Pharmaceutical and Biopharmaceutical Engineering (30 credits).

FACTS: This programme can be taken full-time over 12 months or part-time running over 2 years (24 months) with the option to exit with either with a Postgraduate Diploma or a Masters in Engineering Sciences. This programme is principally organised to accommodate part-time students who are working in industry by holding lectures and tutorials in full day sessions every 3-4 weeks, mostly on a Saturday. Full time students will follow the same lecturing regime but do the full complement of necessary modules and research activity within in 1 year, whereas part-time students will be do their modules and research typically over 2 years. The course was established in 2007 and since then we have graduated in excess of 65 students with the PG Diploma or MEngSc.

More module information: **www.ucc.ie/admin/registrar/calendar/postgraduate/Masters/engineering/page08.html**

MEngSc Sustainable Energy

Teaching Mode:	Full-time
Qualifications:	MEngSC
*Fees:	(EU) €6,630; (Non-EU) €23,100
Duration:	1 Year
Web link:	**www.ucc.ie/mense**
Contact:	Professor Brian Ó Gallachóir; +353 21 490 1954
	b.ogallachoir@ucc.ie

If you want to be part of the solution to climate change, then Ireland's first Masters in Engineering Science degree programme in Sustainable Energy is for you. Our modern world needs sustainable, secure, reliable, and affordable energy systems. Sustainable energy focuses on increasing the efficiency of energy end use in our homes, businesses and in transportation, and on maximising the penetration of renewable energy supply. The MEngSc in Sustainable Energy builds on UCC's leading research track record in sustainable energy engineering. Sustainable Energy graduates will have skills to source, design, convert, transmit and supply useful energy to meet our present and long-term needs for electricity, mobility and heating and cooling.

Career Opportunities

Our graduates are now directly engaged in the energy transition to a sustainable low carbon future in Ireland, across the EU and further afield. Some have taken up leadership roles in wind energy development, intelligent energy efficiency, solar and bioenergy companies. Other graduates are working in the areas of consultancy and in energy and climate policy. One example is Nigel Hayes, '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.' A second example is Catherine O'Brien, who works in Management Consultancy at Accenture 'The MEngSc programme 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.' In addition, some have also embarked on a research career in sustainable energy. We offer PhD research degrees sustainable energy engineering in the world-leading SFI MaREI Research Centre for Energy, Climate and Marine. **www.marei.ie**

Entry and Eligibility

Candidates must have a BE (Hons) or BEng (Hons) Degree or equivalent engineering qualification, with a minimum Second-Class Honours Grade II degree. 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 information available at: **www.ucc. ie/en/study/comparison/english/postgraduate/**

Programme Structure

Part I of the programme comprises 50 credits of taught modules. In addition, all students must take **NE6008** Preliminary Research Report in Sustainable Energy Research Project Module. In Part II, a dissertation in Sustainable Energy (30 credits).

What you will study

NE4008 Photovoltaic Systems, **NE6003** Wind Energy, **NE6004** Sustainability, Bioenergy and Circular Economy Systems, **NE6005** Ocean Energy, **NE6006** Solar and Geothermal Energy, **NE6007** Energy Systems Modelling, **NE6012** Energy in Buildings, **NE6013** Sustainable Energy, **NE6016** Energy Systems in Buildings, **CE6042** Transportation and Energy.

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 with alternatives including: **NE6010** Offshore Wind Energy, **NE6011** Advanced Energy Systems Modelling, **NE6014** Energy Innovation, **NE6015** Data Analytics for Engineering, **EE3012** Electric Vehicle Energy Systems, **EE6048** Smart Grids.

FACTS: UCC established this MEngSc in Sustainable Energy (first in Ireland) in 2005, in recognition of the growing need for sustainable energy systems and the shortage of qualified engineers to address the challenges of climate change.

MArch of Architecture

Teaching Mode:	Full-time
Qualifications:	MArch
*Fees:	(EU) €9,270; (Non-EU) €23,500
Duration:	1 Year
Web link:	**www.ucc.ie/meat**
Contact:	Dr Jason O'Shaughnessy
	j.oshaughnessy@ucc.ie

The Master of Architecture Degree is a joint course between University College Cork and Cork Institute of Technology and operates full-time over 12 months. The course has been designed to provide a qualification in architecture under Article 46 of Directive 2005/36/EC, the Building Control Act 2007, and is required by the RIAI before starting a minimum period of post-qualification supervised practical experience in preparation for the RIAI Examination in Professional Practice, Registration and/or RIAI Membership.

Career Opportunities

Our March Course encourages a distinctive design-based culture. Through it, we encourage the development of conceptual and innovative design and there are significant opportunities to anticipate, speculate upon, and define new possibilities in the field of architecture. Upon graduating from the Course, you will have the ability to think critically about architecture and be able to form studies involving advanced spatial analysis and innovative design approaches. Many professional opportunities exist for our graduates both in Ireland and internationally - not only in the field of architecture in private and public sectors - but also in other related spatial practices and disciplines - such as film, immersive media, and exhibition design. The way in which students investigate and develop their design thesis project also means that they are aware of Postgraduate research practices and methodologies and some have chosen to pursue doctoral studies through a PhD.

Entry and Eligibility

Candidates must meet the following criteria: (a) a BA/BSc (Hons) degree in Architecture from an accredited school of architecture with a minimum Second-Class Honours Grade II; or, (b) Holders of BA/BSc (Hons) Architecture degree with less than Second Class Honours Grade II PLUS a period of work-based learning presented in the form of a portfolio of a standard equivalent to, or higher than, Second Class Honours Grade II. Where a candidate has less than Second Class Honours Grade II, a period of work-based learning presented in the form of a portfolio of a standard

equivalent to, or higher than, Second Class Honours Grade II will be considered. Note: In addition to the minimum criteria, all applicants are required to submit a portfolio of architectural design work to be evaluated by at least two of the following: Centre Director, Associate Director, Programme Director (or their nominees) - who will assess the suitability of the candidate. Please see **www.ucc.ie/en/media/studyatucc/postgraduate-gsomedialibrary/2documentsandforms/MArchGuidanceNotes20.11.20.pdf**. Portfolio Guidance Document MArch. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The course is arranged over three teaching periods during the academic year (September to September). You will take modules to the value of 90 credits.

What you will study

AT6011 Design Research: Cultures and Context, **AT6012** Design Research: Technology Transformations, **AT6013** Design Research Studio: Investigation and Formation, **AT6014** Design Project, **AT6015** Exhibition Design and Implementation, **AT6016** Documentation and Dissemination of Design and Design Process.

FACTS: This Course is intelligently paced and driven by a thematic framework. During your study, you will be introduced to a diverse research framework - approached through creativity and scholarship. Normally based in a significant European city, you will be required to address the wider problematics that are raised by changes in contemporary society and provide clues as to how architecture might operate in such an environment. You will speculate on the patterns of organisation, the accretion of historical strata, and the network of infrastructural connections, political and economic frameworks that define the twenty-first-century city. Our aim is to form architectural scenarios based on sets of contextual (mnemonic) outputs that bear witness to these strands of development - whilst at the same time, defining something new, unexpected and ultimately challenging.

PG Diploma Freshwater Quality Monitoring and Assessment

Teaching Mode:	Part-time
Qualifications:	PG Dip
*Fees:	Part-time Year 1 (EU): €2,380
	Part-time Year 2 (EU): €2,380
	Part-time Year 1 (Non-EU): €4,700
	Part-time Year 2 (Non-EU): €4,700
	GEMS/Water sponsored (UN) €1,000 (€500 per year)
Duration:	2 Years
Web link:	**www.ucc.ie/pdfqm**
Contact:	Dr Lucia Hermida; +353 21 420 5276
	Lucia.hermidagonzalez@ucc.ie

This Postgraduate Diploma will provide existing or future water professionals with the necessary knowledge to design and implement freshwater quality monitoring programmes and to assess water quality. The programme is offered in a part-time, online format on a cyclical basis with an intake of students every second year. It will be useful to those already working in the water sector, including government agencies, and to staff in higher level education institutes who wish to gain a specialised postgraduate qualification in surface and groundwater monitoring, quality assurance and control, and data analysis and presentation. Rivers, lakes and groundwaters are covered in detail and there is an option to study biological and ecological methods, the use of particulate material in monitoring and to take part in an online or in situ field module abroad or in Ireland during the second year of the programme.

Career Opportunities

The Postgraduate Diploma is designed to give students a strong foundation in all aspects of water quality monitoring and assessment, equipping them to work in the area of water quality management in public or private sectors, including water and environment ministries, regulatory agencies, agriculture and industry. The programme will be of particular benefit for the career advancement of employees already working in the water quality monitoring sector.

Entry and Eligibility

Candidates must hold a BSc in Environmental Science or cognate discipline; or a relevant professional qualification; or a portfolio of work and experience in the area of freshwater quality monitoring. Candidates who do not hold a BSc will be judged on a case-by-case basis as to their suitability for the programme, subject to the approval of the College of Science, Engineering and Food Science.

All candidates are required to have a sufficient level of English. 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.

Programme Structure

Year 1 of the programme comprises 30 credits of taught modules: **EV6001** (Monitoring programme design for freshwater bodies), **EV6002** (Quality assurance in freshwater quality monitoring programmes), **EV6003** (Data handling and presentation for freshwater quality monitoring programmes). Year 2 comprises **EV6005** (Monitoring and assessment of surface waters), and **EV6007** (Monitoring and assessment of groundwater); and any two from the following: **EV6004** (Freshwater quality monitoring in the field), **EV6008** (Freshwater quality monitoring using biological and ecological methods) or **EV6009** (Freshwater quality monitoring with particulate material). The online course is part-time with the exception of module **EV6004**, which is an online or in situ field module abroad or in Ireland. Students who achieve an overall aggregate of 50% across Year 1 and 2 can progress to the MSc (page 18).

FACTS: The United Nations Environment Programme (UNEP) GEMS/Water Capacity Development Centre (CDC) was founded in 2015 to provide global capacity development in water quality monitoring and assessment to UNEP's global water quality monitoring system (GEMS/Water), through the provision of education, training and expert advice. The UN Agenda 2030 Sustainable Development Goal for water (SDG 6) is leading to an increased demand for knowledge, understanding and capacity in water quality monitoring and assessment worldwide, and through this postgraduate programme, the Centre is supporting this demand.

PG Diploma Pharmaceutical & Biopharmaceutical Engineering

Teaching Mode:	Full-time 9 months; Part-time, Minimum of 24 months, Maximum of 60 months
Qualifications:	PG Dip
*Fees:	(EU): Full-time €9,130; Part-time: (Per 30 Credits) €4,630; Per individual 5 Credit Module: €1,000; (NEU) Full-time €18,900
Web link:	**www.ucc.ie/pdpbe**
Contact:	Dr Denis Ring; +353 21 490 2549 **d.ring@ucc.ie**

The Postgraduate Diploma in Pharmaceutical and Biopharmaceutical Engineering is a full time programme running for 9 months or a part-time programme running for a minimum of 18 months over 2 academic years (maximum 45 months over 5 academic years) from the date of first registration for the programme. You will have the opportunity to gain a formal qualification in areas of particular topical interest to the bio/pharmaceutical industry; to upskill your competence for these important industrial sectors, including issues such as product containment, powder/particle technology, design of API and secondary production facilities, current Good Manufacturing Practice (cGMP), design of classified facilities, aseptic processing facility design, utilities and services, data analysis and process validation.

Career Opportunities

The course offers graduates working in the pharmaceutical industry the opportunity to further develop your skills set and employability across a wider range of roles in the industry through enhanced continuing professional development. Through the opportunities provided by participation on the programme, you are provided with opportunities to enable greater cohesion and understanding among inter-and multi-disciplinary teams while earning a formal qualification in engineering.

Entry and Eligibility

Candidates must have a BE (Hons) or BEng (Hons) Degree or equivalent engineering qualification, with a minimum Second Class Honours Grade II degree, or a level 8 BSc degree, with a minimum Second Class Honours Grade II, where the BSc graduate has a recognised qualification in Process or Chemical Engineering (e.g. the Diploma in Process and Chemical Engineering at UCC or equivalent). Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The programme comprises 60 credits of taught modules, which after completion students may select to graduate with a PG Diploma. Students with a minimum 50% aggregate in the 12 modules of the PG Diploma can progress to the MEngSc by undertaking an additional dissertation in Pharmaceutical and Biopharmaceutical Engineering (30 credits, with an additional fee of €4,000).

What you will study

PE6004 Biopharmaceutical Support Systems, **PE6010** Pharmaceutical Engineering, **PE6011** Biopharmaceutical Engineering, **PE6012** Pharmaceutical Process Equipment, Materials and Mechanical Design, **PE6013** Powder and Particle Technology and Unit Operations, **PE6019** Process Analytical Technology, **PE6023** Pharmaceutical and Biopharmaceutical Utilities, **PE6027** Advanced Biopharmaceutical Engineering, **CM6010** Introductory Pharmaceutical Chemistry, **PE6016** Pharmaceutical Industry; Manufacturing and Optimisation, **PE6018** Pharmaceutical Process Validation and Quality (5 credits), **PE6022** Aseptic Manufacturing Design, **PE6024** Advanced Process Design & Safety Engineering, **PE6026** Project Engineering - From Concept to Completion.

FACTS: This is programme can be taken full-time over 9 months or part time over 2 years (24 months) exiting with a Postgraduate Diploma and maximum of 5 years (60 months), with the option to exit with a Masters in Engineering Sciences when continuing towards the dissertation. This programme is principally organised to accommodate part-time students who are working in industry by holding lectures and tutorials in full day sessions every 3-4 weeks, mostly on a Saturday. Full time students will follow the same lecturing regime but do the full complement of necessary modules and research activity within in 1 year, whereas part-time students will be do their modules and research typically over 2 years. The course was established in 2007 and since then we have graduated in excess of 65.

More information: **www.ucc.ie/admin/registrar/calendar/postgraduate/Masters/engineering/page08.html**

Higher Diploma Applied Computing Technology

Teaching Mode:	Full-time/Part-time
Qualifications:	HDip
*Fees:	(EU) €6,130 (Non-EU) €18,900 Part-time Year 1 (EU): €3,130 Part-time Year 2 (EU): €3,130
Duration:	1 year full-time; 2 years part-time
Web link:	**www.ucc.ie/hdact**
Contact:	Dr Marc Van Dongen; +353 21 420 5903
	director-hdact@cs.ucc.ie

The Higher Diploma in Applied Computing Technology is a CONVERSION COURSE open to graduates from non-computing disciplines. The course provides you with an understanding of the principles of internet-based computer systems and will equip you with a range of core IT skills, including web design, web server configuration, managing and manipulating multimedia content, interfacing with databases and working with common office software.

Career Opportunities

Graduates of the Higher Diploma in Applied Computing Technology can take up employment in areas such as: Software Development - with experience leading to becoming a Senior Software Developer, Systems Designer; Test / QA - with experience leading to Test Automation, Business / Systems Analysis and Management; Desktop / Helpdesk Support - with experience leading to Network / Systems Administration, Cloud / Virtualization Engineer.

Graduates can continue to the MSc Computing Science having achieved a 1H award.

The IT sector is booming and the demand for graduates outstrips demand. **The Technology Skills 2022: Ireland's Third ICT Action Plan** outlines the current status of the ICT sector in Ireland and the growing demand for skilled IT graduates.

Entry and Eligibility

This conversion course is open to graduates of any discipline other than Computer Science or a similar discipline. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The Higher Diploma is offered as a one-year full-time (9 months) course or a two-year part-time (18 months) course. Students take a total of 60 credits: 30 credits in teaching Period I and 30 credits in Period II. Part-time students take 30 credits in each of the two academic years.

What you will study

CS5002 Web Development 1, **CS5007** Computer Applications Programming, **CS5008** Internet Computing, **CS5009** Multimedia, **CS5018** Web Development 2, **CS5019** Computer Hardware Organisation, **CS5020** Systems Organization II, **CS5021** Introduction to Relational Databases, **CS5222** Introduction to Programming and Problem Solving, **CS5523** Multimedia 2.

FACTS: Companies who have hired graduates of the Higher Diploma in Applied Computing Technology include: Accenture, Amazon, Apple, Bank of Ireland, Dell EMC, Enterprise System Partners, First Data, Permanent TSB, PWC, Tyndall National Institute, and more. These graduates were employed in roles such as Software Developer, Software Engineer, Quality Advisor, IT Analyst, and Senior Analyst, among others.

Post Graduate Certificate/Masters in Sustainability in Enterprise

Teaching Mode:	Part-time online
Qualifications:	PG Cert/MSc
*Fees:	PG Cert, Year 1 (EU) €3,500; (Non-EU) €7,100 MSc, Year 2 (EU) €6,500; (Non-EU) €18,500
Duration:	1 year/2 years
Web link:	**www.ucc.ie/en/pcse/**
Contact:	Dr Marguerite Nyhan
	marguerite.nyhan@ucc.ie

Are you concerned about sustainability and climate action? Are you someone who is interested in achieving real systems change across enterprise and industry? Do you want to know how business can play a part in the transition to a sustainable, net zero and nature-positive society? If so, then the Postgraduate Certificate (PG Cert) and Masters in Sustainability in Enterprise (MSc) online programmes could be for you.

Under the Sustainable Futures theme, University College Cork, Maynooth University, and the Atlantic Technological University in Sligo, have developed a joint PG Cert and MSc in Sustainability in Enterprise, in recognition of the growing national and international market for graduates in sustainability.

This unique joint programme also includes industry and enterprise guest lectures. By design, the programmes offer great flexibility for students, especially those who are also working. The programme aims to support the transformation to a sustainable and net zero economy across a range of industry sectors using a flexible programme design that is responsive to emerging skills needs.

UCC is a national and global leader in Sustainability and was ranked 8th in the world in the Times Higher Education Impact Rankings in 2021 for its work related to the United Nations Sustainable Development Goals. The programmes leverage UCC's Sustainability Strategy, and the interdisciplinary strengths and capacity developed over 20 years within the Environmental Research Institute. The programmes also draw on the strength of UCC's commitment and success in its Green Campus initiative.

The Atlantic Technological University (ATU) in Sligo has recognised expertise in environmental science and management. Their educational programmes are informed by research at their Centre for Environmental Research Innovation and Sustainability. The School of Business at Maynooth University (MU) is a management education research leader whose expertise includes contributions in the field of sustainability in management education and whose teaching is supported by the Irish Climate Analysis and Research Unit (ICARUS).

Career Opportunities

The PG Cert and MSc in Sustainability in Enterprise will develop highly competitive graduates with expertise in environmental sustainability, sustainability in business and management, and in systems thinking. These combined skills ensure that graduates will be able to solve complex multi-faceted sustainability challenges both now and in the future.

Graduates will be employed in sustainability roles in business, industry, enterprise, and large organisations across a variety of sectors.

Entry and Eligibility

Applicants must have a primary honours degree (NFQ, Level 8) with at least a Second-Class Honours Grade 2 in any of the following: Science, Engineering, Business, Management, Economics, Sustainability, or a related discipline (e.g. Finance, Mathematics, Physics, Chemistry, Biology, Environmental Science, Computer Science or Medicine). Candidates, for whom English is not their primary language, should possess an overall IELTS score of 6.5, with no other individual section lower than 6.5.

Programme Structure

Year 1 - PG Certificate in Sustainability in Enterprise (NFQ Level 9, Minor Award)
The PG Certificate in Sustainability in Enterprise comprises modules to the value of 30 credits. Following successful completion of Year 1, you can exit with a PG Certificate or progress to the MSc programme in Year 2.

Year 2 - For completion of the MSc in Sustainability in Enterprise (NFQ Level 9, Major Award)
The MSc comprises an additional 60 credits to make up 90 credits in total. This includes taught modules to the value of 30 credits and a Dissertation in Sustainability in Enterprise to the value of 30 credits, completed over the summer months.

What you will study

Postgraduate Certificate Sustainability in Enterprise:
CE6045 Introduction to Sustainability & the Natural Environment, **CE6046** Introduction to Sustainable Enterprise, **CE6047** Systems Thinking in Environmental Sustainability

MSc Sustainability in Enterprise:
CE6048 Responsible Management for Sustainable Enterprise, **CE6049** Sustainable Resource Management & Decarbonisation, **CE6050** Applied Research Methods in Sustainability in Enterprise, **CE6051** Dissertation in Sustainability in Enterprise

FACTS: On successful completion of this programme, students will be able to display expertise in environmental sustainability, sustainability in business and management, and in systems thinking. These combined skills will ensure that graduates can solve complex and multi-faceted sustainability challenges both now and in the future.

PG Certificate in Marine Biology Conversion Programme

Teaching Mode:	Part-time
Qualifications:	PG Cert
*Fees:	(EU) €2,880; (Non-EU) €5,800
Duration:	6 months
Web link:	**www.ucc.ie/pcmby**
Contact:	Professor Rob McAllen; +353 21 490 4647 **r.mcallen@ucc.ie**

The Postgraduate Certificate in Marine Biology (Conversion Programme) is a part-time programme running from September to March for graduates from non-biological or environmental disciplines unable to meet the entry requirements for direct entry onto the MSc in Marine Biology programme. Students successfully passing all modules will be awarded the Postgraduate Certificate in Marine Biology. Those wishing to progress onto the MSc in Marine Biology must obtain an aggregate of at least 60% to be eligible to transfer onto the Master's programme in the following academic year and will hold exemptions in passed modules taken in the Postgraduate Certificate in Marine Biology if she/he applies for the Master's in Marine Biology within 5 years from the date of successful completion of the Certificate Examinations.

Career Opportunities

Throughout the course, students will gain a variety of technical skills associated with research, statistics and computer skills (GIS in particular) as well as a grounding in fundamental Marine Biology theory and practical work in both the lab and field. Many transferable skills are also fostered through different learning approaches, including critical thinking, problem solving, report writing, oral presentations, statistical analysis, independent research and time management.

Entry and Eligibility

Candidates must have obtained at least an Upper Second-Class Honours in a primary degree. Candidates, for whom English is not their primary language, should possess an overall IELTS score of 7.0, and writing 7.0 with no other individual section lower than 6.5.

Programme Structure

The Postgraduate Certificate is a part-time course as it does not run for a full academic year. Students take a total of 30 credits between September and March and the course runs Monday-Friday in this time period.

What you will study

BL6012 Marine Megafauna, **BL6016** Marine Ecology and Conservation, **BL6019** Ecological Applications of Geographical Information Systems, **BL6026** Introductory Quantitative Skills for Biologists using R.

FACTS: On successful completion of this programme, students should be able to: Describe key marine flora and fauna, the marine environment and its biological and physical properties and processes. Define the roles of management and conservation across the marine environment. Apply the knowledge and skills acquired in this course in the working environment enabling the development of policy.

PG Certificate in Dairy Technology and Innovation

Teaching Mode:	Part-time
Qualifications:	PG Cert
*Fees:	(EU) €5,130; (Non-EU) €10,500
Duration:	1 year
Web link:	**www.ucc.ie/pcdti**
Contact:	Vicky Snook; +353 21 490 2799
	vicky.snook@ucc.ie

University College Cork (UCC), in association with Teagasc, has developed a part-time, blended-learning Postgraduate Certificate in Dairy Technology and Innovation. This level 9 qualification is part-time and is tailored to dairy industry needs and delivered online and by block-release to suit the seasonal nature of the dairy industry. The programme runs from September - December and January-March.

Career Opportunities

In line with the development of a knowledge economy this qualification will enable and empower dairy industry personnel and those wishing to join the industry to implement best practice and embrace new technological developments in dairy processing. Examples of occupations associated with the Postgraduate Certificate in Dairy Technology and Innovation include roles in production, quality control, quality assurance, and R&D in primary dairy processing companies and suppliers to the dairy industry.

Entry and Eligibility

Candidates must be holders of an honours BSc degree, or equivalent qualification in food science, nutritional sciences, agricultural sciences, microbiology, biochemistry, engineering or related biological sciences with a minimum of a Second-Class Honours Grade II or equivalent, ideally with experience working in the dairy industry. Holders of UCC's Level 7 Diploma in Food Science and Technology with a minimum second-class honour Grade I and a minimum of two years' experience working in the dairy industry will also be eligible for admission. Candidates, for whom English is not their primary language, should possess an IELTS score of 6.5, with no individual section lower than 6.0.

Programme Structure

The programme will be delivered in a blended-learning fashion incorporating traditional face-to-face lectures (mainly in a block-release fashion) and online learning tools.

What you will study

September-December
FS6201 Milk production and quality (3 days block-release). **FS6202** Dairy chemistry (online module delivered September-November). **FE6501** Business processes across the supply chain (2.5 days block release).

January-March
FS6203 Dairy processing technology (5 credits) 3 days block-release. **MB6201** Dairy microbiology (online module delivered January-March). **FE6502** Trends and dynamics across dairy markets (2.5 days block-release).

FACTS: Applicants will be BSc graduates with a food science, nutritional sciences or biological/life sciences background, ideally who are currently working in the dairy industry, or dairy industry personnel with UCC's Level 7 Diploma in Food Science and Technology. All students must have access to a high-speed broadband internet connection and basic computing skills, including access to and some proficiency in Microsoft Excel. This is an intensive Level 9 programme and considerable commitment from students is expected. Additional contributions will be made by several experienced teaching/research staff from Teagasc. All participating staff members have direct experience of developing and delivering technical training materials for an industry audience.

LANGUAGE REQUIREMENTS

Applicants from non-native English-speaking countries will be required to undertake a recognised English language test such as IELTS, TOEFL, Cambridge, Pearson and Duo Lingo. This requirement will only be waived in situations where a student has completed their full undergraduate degree or postgraduate degree in a native English-speaking country (e.g. Ireland, UK, Australia, New Zealand, Canada, USA) through English and written up their dissertation in English. Full details of accepted tests and minimum requirements are:

IELTS: 6.5 With no individual section lower than 6.0. Except MSc Marine Biology – Score of 7.0 overall; 7.0 in the written category and with no less than 6.5 in the remaining category and MSc Human Nutrition and Dietetics Score of 7.0 overall with no less than 6.5 in the remaining category.

TOEFL: 90 With minimum scores as follows: – Listening: 20 – Reading: 19 – Speaking: 21 – Writing: 20. Except MSc Marine Biology –100 with minimum scores as follows: Listening - 23; Reading - 21; Speaking - 22; Writing 27 and MSc Human Nutrition and Dietetics- 100 with minimum scores as follows: Listening - 23; Reading - 21; Speaking - 22; Writing 27.

Cambridge Proficiency Exam

176 overall with not less than 169 in each element of the test, Except MSc Marine Biology: 185 overall with not less than 176 in writing and 169 in each element of the test and MSc Human Nutrition and Dietetics 185 overall with not less than 176 in each element of the test.

Cambridge Advanced Exam

176 overall with not less than 169 in each element of the test, Except MSc Marine Biology: 185 overall with not less than 176 in writing and 169 in each element of the test and MSc Human Nutrition and Dietetics 185 overall with not less than 176 in each element of the test.

Pearson PTE: Minimum Score of 63 with no section score below 59. Except MSc Marine Biology- Minimum Score of 72, writing 72 with no section score below 63 and MSc Human Nutrition and Dietetics Minimum Score of 72 with no section score below 72.

DUO LINGO (DET): DET 110-115 + Skills Check DET 120 or more eligible for full offer. Except MSc Marine Biology DET 120 + Skills Check DET 125 or more eligible for full offer and MSc Human Nutrition and Dietetics DET 120 + Skills Check DET 125 or more eligible for full offer.

All accepted English language tests are valid for no longer than a period of two years.

MORE INFORMATION

Application Information European students
Graduate Studies Office

E: **graduatestudies@ucc.ie**

W: **www.ucc.ie/en/study/postgrad/**

Application Information for Non-European students
International office

W: **www.ucc.ie/en/international/studyatucc/**

For all module information:
www.ucc.ie/admin/registrar/modules/

HOW DO I APPLY

Applications for all SEFS taught postgraduate and research programmes can be made through the online application portal at **www.ucc.ie/apply**

All prospective students can use this website to apply for programmes and to track the status of their application at all stages.

Information on the application process for international students is outlined at: **www.ucc.ie/en/international/studyatucc/**

Information on the application process for EU students is outlined at: **www.ucc.ie/en/study/postgrad/studytaught/apply/**

FEES

*Details of individual programme fees for both EU and International students can be found on the SEFS programme page. Additionally, for more information on payment of fees you can visit the UCC Fees Office W: **www.ucc.ie/en/financeoffice/fees**. The Fee schdule is subject to change each year.

SCHOLARSHIPS

Information on scholarships is available from the following link: **www.ucc.ie/en/scholarships/**

INTERNATIONAL STUDENT HUB

www.ucc.ie/en/international/studentinfohub/

NON-EU RECRUITMENT MANAGER

Ms Neasa O'Connor, **neasa.oconnor@ucc.ie**

EU AND DOMESTIC RECRUITMENT OFFICER

Órla O'Regan, **orlaoregan@ucc.ie**

![UCC logo]

University College Cork, Ireland

Coláiste na hOllscoile Corcaigh

College of Science, Engineering & Food Science

ww.ucc.ie/stem