UCD SCIENCE

TAUGHT MASTERS

ENTRY 2026

Biotechnology, Biomedical, Biomolecular & Chemical Sciences

Geoscience, Natural Resources, Climate, Environment & Sustainability

Mathematics, Actuarial Science, Finance & Data Analytics

Physics, Space Science, Nanotechnology, Biological & Medical Physics

Computer Science & Data Science

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This booklet (Version 2 Entry 2026 published on 26 November 2025) is intended to assist prospective UCD students, and the information is given in good faith. It is not, however, an official publication of the university and does not bind the university in any way. The information provided in this booklet is correct at the time of going to press but degree courses are subject to continuing development and the university reserves the right to make changes at any time, before or after a student's admission.

WELCOME TO UCD SCIENCE

University College Dublin has a long and proud history of education, research and high achievement. Set in the heart of the beautiful Belfield campus in south Dublin, the UCD O'Brien Centre for Science provides a vibrant and state-of-the-art centre of learning, welcoming students and staff from all corners of the world.

At the UCD College of Science, our mission is to advance scientific knowledge and foster the next generation of scientific leaders who are ready to address global challenges. Our core values of excellence in research and education, innovation in discovery and application, and a deep commitment to societal impact underpin everything we do.

As one of Ireland's largest and most research-active science faculties, we are home to seven dynamic academic schools: Biology and Environmental Science, Biomolecular and Biomedical Science, Chemistry, Computer Science, Earth Sciences, Mathematics and Statistics, and Physics. Our Masters courses are designed with flexibility in mind, offering full-time, part-time, and online study options in selected disciplines to meet diverse global demands. We truly foster an inclusive and supportive learning environment, dedicated to developing future scientific leaders.

The choice of university and course can be a daunting one, and this is something that we recognise at UCD.

In order to ensure that our university and degree courses are the right fit for your needs, we encourage all prospective students to engage with our series of events and to feel free to contact us if you have any queries. No problem is too trivial for us in this important phase of your career.

We look forward to welcoming you to UCD.

Professor Jeremy Simpson
Dean of Science

> "Our mission is to advance scientific knowledge and foster the next generation of scientific leaders who are ready to address global challenges."

CALENDAR OF EVENTS

For EU and Non-EU Applicants and Offer Holders

August 2025 - June 2026

Global Graduate Events & Fairs
Meet us at a range of International Events and Fairs. For more details visit **www.ucd.ie/science/study/global**

8 October 2025

gradIreland Graduate Careers Fair
Ireland: RDS, Dublin

26 November 2025

UCD Masters Week
Virtual: EU and Non-EU

25 February 2026

UCD Postgraduate Open Day
Ireland: University College Dublin, Dublin

14 - 15 April 2026

UCD Science Graduate Taught Courses Offer Holder Webinars
Virtual: EU and Non-EU

Register for the events at
www.ucd.ie/science/newsevents/events

MSc Biotechnology

1 Year Full Time

Course Code: X439

Biotechnology encompasses all aspects of the industrial application of living organisms and/or biological techniques. Ireland has an enviable biotechnology sector and is home to the world's top global biopharmaceutical companies.

The MSc Biotechnology is taught by leading academics in the UCD School of Biomolecular and Biomedical Science. It focuses on broadening your knowledge and understanding of the current technologies and processes in the biotechnology industry, including approaches being applied to further advance the discovery and design of new and highly innovative biotechnology and pharmaceutical products. It also provides modules on food and environmental biotechnology, as well as industrially relevant expertise in bioprocess technology, regulatory affairs and clinical trials.

Course Content and Structure

90 CREDITS Taught Masters	=	60 CREDITS Taught Modules	+	30 CREDITS Individual Research Project/Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

Core Modules

- Biological Imaging
- Multicellular Systems
- Pharmacology and Drug Development
- Medical Device Technology
- Biomedical Diagnostics
- Recombinant DNA Technology
- Food Biotechnology
- Microbial and Animal Cell Culture
- Environmental Biotechnology
- Regulatory Affairs
- Drug Development and Clinical Trials
- Bioprocessing Laboratory Technology

Assessment

- Your work will be assessed using a variety of methods including coursework, group and individual reports, written and online exams, and presentations.

Internship Opportunities*

In the Summer Trimester you will either complete an internship in a relevant biotechnology company or conduct a research project in the UCD School of Biomolecular and Biomedical Science. The following internships are examples of past placements and are a guide only: AstraZeneca, Pfizer, MSD, Alltech, ICON plc, Alexion.

*Placements are secured through a competitive process and are not guaranteed.

Graduate Testimonial

Craig Jakes
Research Assistant at NIBRT (National Institute for Bioprocessing Research and Training)

For my summer research project I was offered the opportunity to conduct research in the Food Safety Authority of Ireland (FSAI). My research looked into zoonosis trends in Ireland, which all EU countries are required to monitor. After finishing my research project, I secured employment as a regulatory affairs officer with a scientific company.

Career Opportunities

This graduate degree in Biotechnology has been developed in consultation with employers and therefore is recognised and valued by them. A key feature is the opportunity to carry out a project in industry which will allow graduates to develop connections with prospective employers, thereby enhancing chances of employment on graduation. You will also have the opportunity to become part of a network of alumni in the field of Biotechnology.

Graduates will be well prepared to pursue careers with companies such as Abbott, Allergan, Amgen, Baxter Healthcare, Beckman Coulter, Biotrin International Ltd., Boston Scientific, Elan Corporation, Eli Lilly and Co., Celltech, GSK, Icon Clinical Research, Johnson & Johnson Ltd., Kerry Group Plc., MSD, Quintiles, Sandoz, Serology Ltd.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Biotechnology & Business

1 Year Full Time

Course Code: X447

Biotechnology encompasses all aspects of the industrial application of living organisms and/or biological techniques. Ireland has an enviable biotechnology sector and is home to the world's top global biopharmaceutical companies. The MSc Biotechnology & Business is an exciting course designed for non-business graduates who want to become managers or entrepreneurs in complex business environments in technology and science-based fields.

The MSc Biotechnology & Business provides you with a solid grounding in the science underpinning biotechnology, coupled with a comprehensive business education. The course is the result of a close collaboration between the UCD School of Biomolecular and Biomedical Science and the UCD Michael Smurfit Graduate Business School, which is Ireland's leading business school.

Course Content and Structure

90 CREDITS Taught Masters	=	70 CREDITS Taught Modules	+	20 CREDITS Group Business Plan Research Project

You will spend 50% of your time studying biotechnology and 50% of your time studying business. You may choose optional biotechnology modules to ensure that you specialise in your area of interest. Depending on your chosen subjects you will also gain experimental and theoretical knowledge in the following topics:

Modules and Topics (Subject to change and are not guaranteed by UCD)

Core Modules
- Biotech Case Study
- Professional Career Development
- Business Strategy
- The Business of Biotechnology and Science
- Feasibility and Business Plan
- Teams in Biotech Enterprise
- Corporate Finance
- Marketing Management
- Regulatory Affairs in Science

Option Modules
- Biomedical Diagnostics and Devices
- Recombinant DNA Technology
- Microbial and Animal Cell Products
- Emerging Issues in Biotechnology
- Food Biotechnology
- Environmental Biotechnology

Graduate Testimonial

Jennifer McKeever
Senior Analyst at Seroba Life Sciences

During the MSc in Biotechnology & Business, I broadened my knowledge in key modules including medical devices, diagnostics and regulatory affairs, while also developing core business skills in finance, marketing and management. The highlight was developing a business plan for a NovaUCD start-up company. I am currently working as an Investment Analyst in a life sciences venture capital firm.

Career Opportunities

This graduate degree in Biotechnology & Business has been developed in consultation with employers and therefore will be recognised and valued by them. A key feature is the opportunity to carry out a business development plan which will allow graduates to develop connections with prospective employers such as Abbott, Allergan, Alpha Technologies, Amgen, Avonmore Foods, Baxter Healthcare, Beckman Coulter, Biotrin International Ltd., Boston Scientific, Elan Corporation, Eli Lilly and Co., Celltech, GSK, Icon Clinical Research, ImmunoGen Inc., Janssen Pharmaceutical Ltd., Johnson & Johnson Ltd., Kerry Group Plc., Medtronic, MSD, Olympus Diagnostica, Quintiles, Quest International, Sandoz, Seroba Life Sciences, Serology Ltd.

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Applying to UCD

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MSc Biotherapeutics

1 Year Full Time

Course Code: F102

The MSc in Biotherapeutics educates students on the practical uses of molecular advances in the discovery of protein and other biomolecular drug candidates and their development into biotherapeutics. It will provide you with a comprehensive understanding of the development of biotherapeutics, beginning with pre-clinical modelling and target identification together with antibody engineering, biochemical and biophysical characterisation, and development issues for bioprocessing.

Systems biology of biotechnological processes and approaches to the analysis of proteomics-based discovery data will be covered in detail together with mathematical modelling, bioinformatics analysis and data integration strategies. Regulatory issues and innovation and commercialisation strategies will also be covered. A practical 6-month drug discovery laboratory project will form a significant component of the experience of how drug candidates are identified and brought through the development pipeline.

Course Content and Structure

90 CREDITS Taught Masters = **45 CREDITS** Taught Modules + **45 CREDITS** Project

Modules and Topics (Subject to change and are not guaranteed by UCD)

Autumn Trimester

- Biotherapeutic Discovery and Development I
- Professional Career Development
- Recombinant DNA Technology
- Business of Biotechnology and Science
- Biomedical Diagnostics
- Pharmacology and Drug Development

Spring and Summer Trimesters

- Biotherapeutic Discovery and Development II
- Systems Biology in Drug Development
- Professional Career Development
- Bioprocessing Laboratory
- Emerging Issues in Biotechnology
- Regulatory Affairs
- Microbial and Animal Cell Products
- Project – Biotherapeutic Development
- High Content Screening Microscopy

Faculty Profile

Associate Professor David O'Connell
UCD School of Biomolecular and Biomedical Science

My core research focus is on the activity of calcium-binding proteins involved in homeostatic mechanisms in the cell using an integrated platform of proteomic technologies. I have patented a novel affinity tag platform for improved protein immobilisation for purification, biophysical analysis and detection in multiple biopharmaceutical applications.

Career Opportunities

This graduate degree in Biotherapeutics has been developed in consultation with the Biopharmaceutical industry and is recognised and valued by them. A key feature is the undertaking of a significant drug discovery and development laboratory project which is reviewed by industry partners. This engagement is designed to help graduates identify opportunities in the industry at the earliest stage.

Graduates will be well prepared to pursue careers with companies such as Novartis, GSK, Eli Lilly and Co., Johnson & Johnson Ltd., Pfizer, Janssen Biologics, AstraZeneca, MSD, Bristol Myers Squibb, Abbott, and Sanofi.

Enquiries

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Entry Requirements

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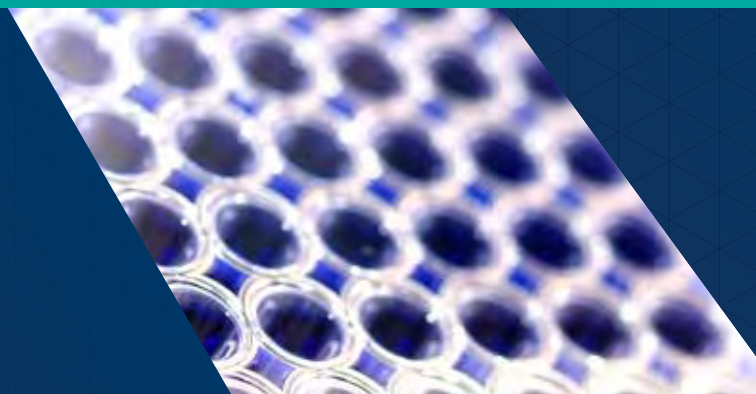
Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Biotherapeutics & Business

1 Year Full Time

Course Code: F103

The MSc in Biotherapeutics & Business educates students on the practical uses of molecular advances in the discovery of proteins and other biomolecular drug candidates and their development into biotherapeutics. It will provide you with a comprehensive understanding of the development of biotherapeutics, beginning with pre-clinical modelling and target identification together with antibody engineering, biochemical and biophysical characterisation, and development issues for bioprocessing.

Regulatory issues, and innovation and commercialisation strategies, will also be covered. You will also receive a comprehensive business education. You will learn to identify and solve business problems in local and international settings, enhance your communication and leadership skills, and improve your ability for independent thinking and developing creative solutions.

Course Content and Structure

90 CREDITS Taught Masters	=	60 CREDITS Taught Modules	+	30 CREDITS Project

Modules and Topics (Subject to change and are not guaranteed by UCD)

Core Modules

- Professional Career Development
- Business Strategy
- The Business of Biotechnology and Science
- Feasibility and Business Plan
- Teams in Biotech Enterprise
- Corporate Finance
- Marketing Management
- Biotherapeutic Pipeline 1
- Biotherapeutic Pipeline 2
- Systems Biology in Drug Development
- Biotherapeutics Case Study

Option Modules

- Biomedical Diagnostics and Devices
- HCS Microscopy
- Recombinant DNA Technology
- Microbial and Animal Cell Products
- Emerging Issues in Biotechnology
- Regulatory Affairs in Science

Faculty Profile

Associate Professor David O'Connell
UCD School of Biomolecular and Biomedical Science

My core research focus is on the activity of calcium-binding proteins involved in homeostatic mechanisms in the cell using an integrated platform of proteomic technologies. I have patented a novel affinity tag platform for improved protein immobilisation for purification, biophysical analysis and detection in multiple biopharmaceutical applications.

Career Opportunities

This graduate degree in Biotherapeutics & Business has been developed in consultation with employers and therefore will be recognised and valued by them. A key feature is the opportunity to carry out a business development plan, which will allow graduates to develop connections with prospective employers, thereby enhancing chances of employment on graduation.

Graduates will be well prepared to pursue careers with companies such as Abbott, Allergan, Amgen, Baxter Healthcare, Eli Lilly and Co., Dignity Sciences, GSK, Icon Clinical Research, ImmunoGen Inc., Janssen Pharmaceutical Ltd., Johnson & Johnson Ltd., MSD, Quintiles, Quest International, Sandoz and Seroba Life Sciences.

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Entry Requirements

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Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Plant Biology & Biotechnology

1 Year Full Time

Course Code: F080

Rapid developments in our understanding of plants and their significance to our wellbeing has been achieved through advances in a range of disciplines including genetics, genomics, cell biology, physiology, ecology and studies on climate change. Graduates of this one-year MSc will be equipped with the knowledge and skills in these recent advances to rise to the future challenges in academia, industry and policy development. Innovation and entrepreneurship permeate the course as central themes and, in addition, a specific module on entrepreneurship in plant biology is delivered. This MSc covers a wide diversity of both topics and approaches, and is taught by a high-profile research-oriented group of academics.

Researchers from the UCD School of Biology and Environmental Science represent the single largest grouping of plant scientists in Ireland, with research interests ranging from genetics and molecular biology of the cell to plant physiology and ecology.

Course Content and Structure

90 CREDITS Taught Masters = **60 CREDITS** Taught Modules + **30 CREDITS** Research Project/Minor Thesis

Modules and Topics (Subject to change and are not guaranteed by UCD)

Modules include:

- Entrepreneurship in Plant Biology
- Current Developments in Plant Biology
- Plant Pathology and Biotechnology
- Biological Imaging
- Developmental Plant Genetics
- Programmed Cell Death in Plants
- Plant Phenotyping
- Applied Bioinformatics
- Biological Invasions
- Plants and Stress

Research Project

The research project involves the planning, execution and implementation of Plant Biology and/or Plant Biotechnology that will be carried out independently by the student in an academic research laboratory or a company research laboratory.

Graduate Testimonial

Adam Morgan

Lab Analyst at the Department of Agriculture, Food and the Marine

I was attracted to UCD and this MSc by the fantastic research output of the faculty and the great facilities available on campus. A particular strong point of this course is the range of modules available. During my undergraduate degree I took a lot of molecular biology modules, but this MSc really broadened my horizons by allowing me to take modules from several disciplines including environmental science, zoology and of course botany. My time at UCD has provided me with a number of skills, both lab and desk based, that I employ in my work as a lab analyst for the Department of Agriculture, Food and the Marine.

Career Opportunities

Graduates will have a distinct advantage when applying for PhD studentships or other more advanced graduate training in the area of plant biology and biotechnology. This MSc is ideal for graduates interested in pursuing scientific careers in academia, agriculture and plant science-based or biotechnology industries.

Graduates will have opportunities to pursue postgraduate education and research and work in areas such as plant biotechnology, scientific journalism/publishing and for government agencies involved in governmental and non-governmental policy.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Biological & Biomolecular Science

Negotiated Learning

1 Year Full Time

Course Code: F104

The MSc Biological & Biomolecular Science (Negotiated Learning) will broaden your understanding of biological and biomolecular science against a backdrop of learning core technical, methodological and innovation skills relevant to industry and academia. Taught modules from several innovative specialisations are available from the UCD School of Biomolecular and Biomedical Science and the UCD School of Biology and Environmental Science. The course provides students with an exciting prospect of studying and researching in the interdisciplinary fields of genetics, cell biology, biochemistry, molecular biology, microbiology, bioinformatics and biodata analysis. Guidance from expert faculty is provided to tailor a course that will meet the anticipated requirements of the student's objectives and career goals.

Course Content and Structure

90 CREDITS Taught Masters	=	40 CREDITS Taught Modules	+	30 CREDITS Core Laboratory Skills	+	20 CREDITS Core Professional Skills

Modules and Topics (Subject to change and are not guaranteed by UCD)

Course divided into:

- **Core Laboratory Research Skills** (30 credits) includes training in techniques such as qPCR, western blotting, genomics analysis, microbiome studies, and fluorescence imaging, carried out as part of an original research thesis.

- **Core Professional Taught Skills Modules** (20 credits) including career development, quantitative tools, science writing and communication skills and data management.

- **Optional Taught modules** (40 credits) where students select one of the following specialisations to ensure their learning objectives are met.

The Specialisations Available:

- **Genetics and Cell Biology** investigates cancer biology, the genetic basis of disease, ageing, cellular signalling, cellular trafficking and transport, model organisms, etc.

- **Microbiology and Infection Biology** investigates mechanisms of pathogenic micro-organisms, host response to infection, immunopathologies, hostpathogen interactions, development of diagnostics, applied microbiology, etc.

- **Biochemistry and Synthetic Biology** investigates metabolism and disease, protein-protein interactions, cell signalling, protein structure and analysis, etc.

- **Applied Bioinformatics** introduces the basic principles and practical applications of computational tools for the analysis and interpretation of data from a wide range of biological and biomolecular disciplines.

Course Highlights

- The MSc Biological & Biomolecular Science is the first of its kind in Ireland, offered through a Negotiated Learning model

Graduate Testimonial

Ines Jover Bravo
Research Assistant at UCD School of Biology and Environmental Science

I chose MSc Biological & Biomolecular Science (Negotiated Learning) because it offered a varied array of optional modules to choose from, which was interesting in terms of both flexibility and variety. I enjoyed the research project the most, as it gave me insights into what it would be like to continue pursuing a PhD or work in academia.

Upon the end of the course I was offered a position as a lab manager in the department where I did my research project, although with another group.

Career Opportunities

This course will enable you to choose from a wide range of careers and areas of postgraduate study, including pursuing a PhD degree and a career in academia. This multidisciplinary course provides a solid grounding for careers in industry, health and research, such as Quality Assurance, Quality Control, Microbiology, Process Control, Technical Transfer, Research and Development, and Regulatory Affairs, Scientific Editor or Writer, Lab Technician or Analyst roles. An academic staff member will advise you on a specialisation and module choices based on the opportunities you hope to unlock. Examples of potential employers are Eurofins BioPharma (Bioanalyst), Boston Scientific (Microbiologist), Takeda (Quality Control Analyst), Frontiers (Research Integrity Specialist), Megazyme (Biomedical QC Analyst), Novartis (Client Service Manager), Roche (Data Science Analyst) and Systems Biology Ireland (Research Assistants).

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Regulatory Affairs & Toxicology
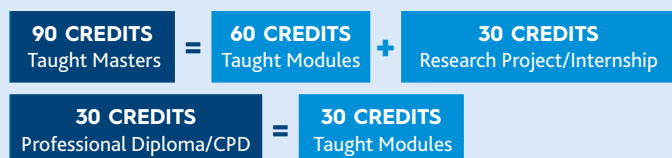
1 Year Full Time | 2 Years Part Time

Course Code: F167

Also Available: Prof Diploma/Prof Certificate/CPD

Toxicology is the study of how man-made and naturally occurring substances can have adverse effects on humans, animals, plants, and the environment, and how these effects can be minimised or avoided. Regulatory Affairs is a closely related field which focuses on applying toxicology for the protection of public health in the areas of human medicines, medical devices, biotechnologies, foods, agrichemicals and cosmetics. These courses explore the important role of toxicology in modern society with particular focus on the pharmaceutical, food and chemical industries.

Course Content and Structure

90 CREDITS Taught Masters = **60 CREDITS** Taught Modules + **30 CREDITS** Research Project/Internship

30 CREDITS Professional Diploma/CPD = **30 CREDITS** Taught Modules

Modules and Topics (Subject to change and are not guaranteed by UCD)

- Introduction to Regulatory Affairs
- Healthcare and Pharma Regulatory Affairs
- Business for Regulatory Affairs Professionals
- Essential Pharmacology for Toxicologists
- Experimental Toxicology and Risk Assessment
- Medical and Forensic Toxicology
- Food and Environmental Toxicology
- Regulatory Affairs/Toxicology Internship

Internship Opportunities*

All students are offered the opportunity to apply for an internship during the course. The following are examples of previous placements: Novartis, Food Safety Authority of Ireland, Medical Bureau of Road Safety, Forensic Science Ireland, Pfizer, Alexion Pharmaceuticals, Deenamic Ltd, Aspen Pharmacare, Life Scientific, Boston Scientific, BD and more.

Placements are secured through a competitive process and are not guaranteed.

Graduate Testimonial

Thomas Dillane
Global Regulatory Intelligence Specialist at Alexion Pharmaceuticals

My time during the MSc in Regulatory Affairs & Toxicology gave me the skills and knowledge to step into the global world of regulatory affairs. I now work in regulatory intelligence and policy, where I must understand and communicate important regulatory updates from around the world, and this MSc gave me the foundation to build these skills.

This MSc also raised my awareness and understanding that there is a much wider world when working in regulatory affairs and that there are huge opportunities for me to grow and develop in my career.

Career Opportunities

This focused MSc course has been developed in consultation with global industry partners and regulatory authorities, and will comprehensively prepare graduates for diverse careers in pharmaceuticals, biopharmaceuticals, medical devices, food, cosmetics, personal care products and chemical sectors. All aspects of product lifecycle management are explored including discovery and invention, quality and CMC, non-clinical testing, management of clinical development, and post-marketing activities. Our graduates are trained in lifecycle and dossier management, regulatory submissions, auditing, pharmacovigilance and safety reporting. They also receive comprehensive instruction in toxicological science, risk assessment and risk management. Graduates will gain the required level of professional ability to operate as independent regulatory toxicologists by developing a sophisticated level of data interpretation, strong communication skills, excellence in problem solving, and ability to critically evaluate and form judgements on complex toxicological problems.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Chemistry

Negotiated Learning

1 Year Full Time | 2 Years Part Time

Course Code: F042

The MSc Chemistry (Negotiated Learning) is a flexible course which offers a diverse array of modules in a variety of chemistry topics. The course is suitable for you if you wish to sample different sides of the discipline ranging from the mathematical, physical and materials disciplines to the biological ends of the scientific spectrum. Initial academic advice ensures that your module choices can match your career aspirations or areas of interest. If you wish to broaden your understanding of chemistry, you could choose a range of modules across the discipline. If you are interested in progressing to a PhD programme, or into particular industries, you may choose to concentrate on a specific area, e.g., chemical biology, nanochemistry, medicinal, sustainable or materials chemistry.

The UCD School of Chemistry has vibrant research in areas such as catalysis and new transformations, bionano interface, advanced spectroscopy, new materials for magnetic, medicinal, and electronic applications, and carbohydrate chemistry.

Course Content and Structure

| 90 CREDITS Taught Masters | = | 60 CREDITS Taught Modules | + | 30 CREDITS Research Project/Internship |

Modules and Topics (Subject to change and are not guaranteed by UCD)

Modules on offer cover all the major themes of chemistry including:

- Advanced Synthetic Organic and Inorganic Chemistry
- Materials Chemistry
- Advanced Spectroscopy
- Advanced Crystallography
- Commercialisation of Laboratory Research
- Biological, Medicinal and Pharmaceutical Chemistry
- Sustainable and Environmental Chemistry
- Nanochemistry
- Biophysical Chemistry
- Polymer Chemistry
- Computational Chemistry
- Research Project

During the summer trimester students are placed within the research groups of a member of staff in the School to carry out a 30-credit three-month research project.

Internship Opportunities*

Limited places are available for a 30 credit industrial placement as an alternative to the research project.

Placements are secured through a competitive process and are not guaranteed.

Graduate Testimonial

Cillian O'Beirne
Process Development Scientist

I chose to undertake the MSc Chemistry (Negotiated Learning) course as a pathway to both refreshing and improving my chemistry knowledge with hopes that it would lead to further career and postgraduate opportunities. In my time at UCD, I was challenged by a broad range of topics in organic, inorganic and physical chemistry, whilst interacting with lecturers and professors and gaining insight to the requirements of further postgraduate study in a PhD. The climate in UCD School of Chemistry was welcoming and supportive, with the ChemSoc society providing a way to meet peers and colleagues that are still in my life to this day. The final lab project is an important aspect of the course and helped to reintegrate me into a research environment and eventually led to undertaking a PhD in chemistry. This has helped me in my career by allowing me to travel to France and Germany in a research capacity and find an exciting role as a Process Development Scientist in Ireland.

Career Opportunities

The MSc Chemistry (Negotiated Learning) provides a basis for graduates to enter the chemical, pharmaceutical, bio-pharmaceutical and materials industries. Analytical services, environmental protection and primary and secondary school teaching present other possible opportunities.

Furthermore, through judicious choice of modules within one particular sub-discipline of chemistry, the course is an attractive route for some students into a PhD programme.

Enquiries

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Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Advanced Synthetic Chemistry

1 Year Full Time | 2 Years Part Time

Course Code: F267

This course is designed for Chemistry graduates who are interested in deepening their knowledge of synthetic chemistry with a view to pursuing a career in either the fine chemical or pharmaceutical industries. There is a strong demand for these synthetic chemistry skills. Ireland is home to some of the world's leading pharmaceutical and biotechnology companies making some of the world's blockbuster medicines.

You can focus on areas such as the synthesis of organic compounds and drug-like substances, techniques for structure determination, and methods for drug discovery. In addition, you will complete a research project from topics in relevant areas, including catalysis, carbohydrate chemistry and asymmetric synthesis.

Course Content and Structure

90 CREDITS Taught Masters = **60 CREDITS** Taught Modules + **30 CREDITS** Research Project/Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

The structure of the course is as follows:

Autumn Trimester
- Organic Synthesis
- Metals in Biology
- Topics in Medicinal Chemistry
- Spectroscopic Techniques
- Professional Career Development

Spring Trimester
- Organic Synthesis 2
- Modern Methods and Catalysis
- Chemistry Lab to Commercialisation
- Catalytic Asymmetric Synthesis
- Advanced NMR and MS
- Advanced Organic Synthesis and Drug Discovery

Summer Trimester
- Research Project/Internship

Internship Opportunities*

Limited places are available for a 30 credit industrial placement as an alternative to the research project during the Summer Trimester.

Placements are secured through a competitive process and are not guaranteed.

Graduate Testimonial

Gemma Tiffoney

I was initially attracted towards an MSc Advanced Synthetic Chemistry at UCD because of the particular focus on modern research and the emphasis on learning new skills that can be carried into industry. This course has allowed me to complete a variety of subjects outside the range of my undergraduate degree which is beneficial for new future career possibilities.

The structure of the course is extremely flexible and the lectures provide an even mixture between individual and team-based work. This was important for me as I wanted to develop my ability to learn independently but also be able to make friends during the process.

Career Opportunities

The MSc Advanced Synthetic Chemistry course provides a basis for graduates to enter the chemical, pharmaceutical, biopharmaceutical and materials industries. Other areas include analytical services and environmental protection.

This course is also a route for some students into a PhD programme. For example, the UCD School of Chemistry has vibrant research in areas such as catalysis, the synthesis of biologically active compounds and the development of new materials for magnetic and electronic applications, and it has strong links with pharmaceutical and fine chemical companies in Ireland and around the world.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Applied Environmental Science

1 Year Full Time | 2 Years Part Time

Course Code: X062

CIEEM ACCREDITED DEGREE

The study of Applied Environmental Science is critical for establishing policies in environmental assessment, evaluating potential change in environmental quality in response to various land use and other activities, and in the development of management and conservation strategies, as well as contributing to policy formulation. This course has a heavy emphasis on practical training in fieldwork, laboratory analyses, information sourcing, data analysis, planning, reporting and communication.

You will work with an interdisciplinary team of experts covering the key aspects of Environmental Science, encompassing marine, freshwater and terrestrial systems. This is the only Applied Environmental Science course in Ireland to include a major input from civil engineering, relating particularly to water quality, hydrology and waste treatment processes. The UCD MSc Applied Environmental Science is the first on the island of Ireland to be approved as an Accredited Degree Programme of the Chartered Institute of Ecology and Environmental Management (CIEEM).

Course Content and Structure

90 CREDITS Taught Masters = **65 CREDITS** Taught Modules + **5 CREDITS** Placement/Internship + **20 CREDITS** Research Project/Task

Modules and Topics (Subject to change and are not guaranteed by UCD)

- Water Resources Engineering
- Environmental Impact Assessment
- Quantitative Tools for the Life Sciences
- Freshwater Resources Assessment
- Global Change Ecology
- Wildlife and Resources Management
- Marine/Coastal Ecology
- Soil Ecology
- Environmental Geology
- Ecotoxicology and Air Quality Monitoring
- Vegetation Ecology
- Remote Sensing

- Geographic Information Systems (GIS) and Data Analyses
- Ecological Modelling
- Integrated Municipal Solid Waste Management
- Water, Waste and Environmental Modelling
- Carbon and Sustainability
- Sustainable and Nature Based Water Infrastructure
- Research Project/Task (20 credits) This project includes time spent collecting data in the field on a research topic towards the production of journal ready articles.

Internship Opportunities*

Internship opportunities are available for at least a 6-week period in the environmental sector (including consultancies, government agencies and industry) over the Summer Trimester. Examples of previous placements are RPS Group, Dublin City Council, Department of Agriculture, Food and the Marine, Rediscovery Centre and Dublin Urban Rivers Life Project.

Placements are secured through a competitive process and are not guaranteed.

Graduate Testimonials

Hannah Fearon
RPS Environmental
The course was an eye-opening experience with a great mixture of lab sessions, field work and lectures. The highlight was the opportunity to gain professional work experience and I would encourage anyone interested in following a career in the Environmental sector to seriously consider this course.

Betsy Townsend
Physical Scientist at U.S. Environmental Protection Agency
The MSc coursework paired with my 6-week placement at Dublin City Council prepared me for a career in the environmental sector, and gave me proficiency in the collection, processing, analyses, and interpretation of environmental data.

Career Opportunities

Our graduates are building successful varied careers in environmental resources assessment, management and protection. A considerable number have been employed in environmental consultancy and national and International government agencies, such as Inland Fisheries Ireland and the Environmental Protection Agency (EPA). Some graduates have also continued their studies at PhD level in the areas of fisheries, biomass fuels, soil, water engineering and invertebrate ecology. The course gives due consideration to key legislative requirements and policy developments.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Global Change: Ecosystem Science & Policy

16 Months Full Time

Joint International Degree

Course Code: F038

JUSTUS-LIEBIG-UNIVERSITAT GIESSEN

Global change refers to planetary-scale changes occurring in complex socio-ecological systems, which are affected by climatic and non-climatic drivers (e.g., changes in human society). Understanding the intricate, medium- to long-term changes in our land, air and water requires advanced scientific knowledge in measurement, modelling and prediction. This should in turn inform the science-policy interface. This joint international MSc in Global Change is the response to these global change challenges and will suit graduates wishing to develop a scientific career in ecosystem research as well as those aiming to contribute to evidence-based environmental policy. Students will study at both UCD, Dublin and Justus Liebig University (JLU) Giessen, Germany where you will be involved in active research groups, contributing to their ongoing ecosystem and policy consultancy studies. Graduates receive a joint international degree from two well-established universities, which have combined their complementary and multidisciplinary research profiles and cutting-edge expertise.

Course Content and Structure

| 120 CREDITS Taught Masters | = | 70 CREDITS Taught Modules | + | 30 CREDITS Individual Research Project | + | 20 CREDITS Work Placement |

Modules and Topics (Subject to change and are not guaranteed by UCD)

- Global Change: Ecology
- Global Change: Techniques and Adaptation
- Biodiversity Informatics
- Science and Policy
- Environmental Law and Policy (Env. Impact Assessment)
- Policy Consulting
- Resource Economics and Environmental Management

The first trimester is based at UCD, followed by a 6-week minimum internship in a company or institution of your choice.

The second taught trimester is based in JLU, Giessen, Germany.

The last trimester is devoted entirely to a research project (minor thesis) which can be undertaken in either UCD, JLU or another host institution.

Internship Opportunities*

The course includes a 20 credit professional work placement (up to 10 weeks) in highly recognised international institutions. The following internships are examples of past placements: Institute for Global Environmental Strategies (Japan), Potsdam Institute for Climate Impact Research (Germany), Deltares (The Netherlands), RISE Foundation (Belgium), Irish and German EPA, An Taisce, Sonairte, Rediscovery Centre and Irish Peatland Conservation Council, IAEA: International Atomic Energy Agency (Vienna), Center for International Forestry Research, Forschungsinstitut für biologischen Landbau FiBL (Switzerland), Das Bundesamt für Naturschutz (BfN) and Government agencies like Coillte and Irish Water.
*Placements are secured through a competitive process and are not guaranteed

Graduate Testimonial

Michael Chase

The opportunity to study at two top research universities in Europe in the same course was incredibly beneficial to my knowledge and skill development. The courses provided in-depth and broad learning opportunities across the realms of ecology and environmental policy. After graduating, I joined a non-profit organization that is one of less than 30 Global Centres for Species Survival under the International Union for Conservation of Nature (IUCN). I feel more confident in my skills and knowledge, having gone through this course. If I had to restart, I would choose UCD, and this course just as quickly as I did the first time.

Career Opportunities

Graduates may pursue roles as policy advisers, scientific analysts or researchers in government, international organisations, NGOs, research institutes or consulting companies. There are also many opportunities for further studies. The skills you acquire, particularly through the completion of the minor thesis, provide a strong foundation for PhD research. Prospective employers include the Environmental Protection Agency, governmental departments, European Commission, European Environment Agency and International organisations (e.g. Intergovernmental Panel on Climate Change, United Nations Environment Programme, International Union for the Conservation of Nature, Food and Agricultural Organisation).

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

www.MasterGlobalChange.org

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Environmental Sustainability

Negotiated Learning | Online

2 Years Full Time | 4 Years Part Time

Course Code: F058

Also Available: Graduate Diploma/Graduate Certificate

Dwindling natural resources and environmental quality issues are challenging businesses to work within a sustainability framework, while at the same time maximising employment provision and profitability. Consequently, there are a growing number of green technology and related enterprises that require a skilled and knowledgeable workforce. Equally, those within the regulation or policy environment must have the knowledge base to address the complexities of the 'sustainability' challenge.

Course Content and Structure

| 90 CREDITS Taught Masters | = | 65 CREDITS Taught Modules | + | 25 CREDITS Practicum Research Study Project | OR | 75 CREDITS Taught Modules | + | 15 CREDITS Practicum Desk Study |

| 60 CREDITS Graduate Diploma | = | 60 CREDITS Taught Modules |

| 30 CREDITS Graduate Certificate | = | 30 CREDITS Taught Modules |

This course is taken online in your own time and you can choose to study for a 30-credit Graduate Certificate, a 60-credit Graduate Diploma or a 90-credit MSc degree.

Modules and Topics (Subject to change and are not guaranteed by UCD)

- Impact Assessment Procedures
- Managing the Interface between Science and Policy
- Ecology and its Application
- Wildlife Management/ Conservation
- Natural Heritage Conservation
- Management of Sustainable Fisheries
- Bioinvasions: Impact to Management
- Applied Ecotoxicology

- Soil Resources
- Carbon and Sustainability
- Peatlands and Global Change
- Genetics for Environmental Scientists
- Water Quality Assessment, Protection and Management
- Water Resource Engineering
- Nature Based Water Infrastructure
- Environmental Geoscience
- Air Pollution
- Sustainable Energy and Environment

- Green Technology Project
- Energy, Climate and Sustainability
- Technical Communications
- GIS for Environmental Investigations
- Data Analysis and Interpretation
- Practicum (Research: lab/ field)
- Practicum (Desk Study)

Course Highlights

- The MSc, Diploma and Certificate will provide you with the theoretical background, practical training and ancillary workplace skills needed for a successful career in your chosen field.

- The course focuses on delivery of the knowledge and skills required to address sustainability challenges across a broad spectrum of activities such as agriculture, industry, green technology and resource management.

Graduate Testimonial

Susan Vickers

I found the course refreshing in terms of content, delivery and the online virtual classroom discussions which allowed people on the course to communicate and share ideas. Working professionally full time, and with a young family, I found the online format superb as well as the flexibility that this allowed me.

Career Opportunities

Successful completion of this course will provide you with the professional competitive advantage to choose from careers in the application of green energy technology, environmental engineering, environmental monitoring and protection, resource and waste management, consultancy, research, heritage, conservation and education, either within regulatory bodies or in a wide range of industries, both multinational organisations and small- and medium-sized enterprises. The course also opens up opportunities to pursue further studies including up to PhD level.

Enquiries

EU/Non-EU ✉ askscience@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

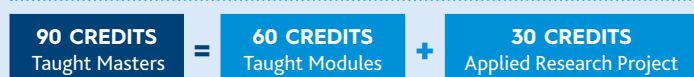# MSc Subsurface Geomodelling

1 Year Full Time
Course Code: F283

This unique and forward-looking MSc is designed to provide you with a solid grounding in key modern principles and methods required for a career in applied geology in our changing world. The course is taught by experts from diverse geoscience disciplines, including pure and applied geology, geophysics, geomodelling and computational geoscience, with experience of the minerals and geoenergy sectors. It focuses on generic aspects of data interpretation, analysis and computer modelling of the deeper and shallow subsurface using real-world data and leading industry software (e.g., Petrel, Leapfrog, ArcGIS Pro).

This sought-after and transferable expertise will provide you with the flexibility needed for a geoscience career in an increasingly populous and resource-constrained world.

Course Content and Structure

90 CREDITS Taught Masters **=** **60 CREDITS** Taught Modules **+** **30 CREDITS** Applied Research Project

Modules and Topics (Subject to change and are not guaranteed by UCD)

The course combines classroom-based instruction, practical workstation experience, team-based exercises and field visits. It also includes a three-month applied research project.

- Careers in Geoscience
- Stratigraphic Prediction
- Applied Structural Geology
- Mineral Systems Geoscience
- Geofluids and Geomechanics
- Near-surface Geophysics
- Digital Field Skills and GIS
- Fieldwork
- Seismic Interpretation and Framework Modelling
- Drilling and Well Logging
- Remote Sensing
- Geocomputation
- Methods in Geomodelling
- 3D Modelling of Ore Systems
- Geostatistical and Fracture Modelling
- Team-based Modelling Exercises

Research Project

Students will undertake a three-month applied research project in the technical area of their choosing. Projects will be selected and developed in consultation with relevant staff members and will have an industry focus in terms of the issues addressed and the data on which the project is based.

Graduate Testimonial

Hannah Talbot

One of the best aspects of this course was the variety of modules which included group-based projects, hands-on practical classes, lectures and fieldwork. During this course, training was provided for modelling software such as Petrel subsurface software and LeapFrog which are actively used in industry. This training is only offered at UCD and is one of the main reasons I chose this course. I enjoyed having the opportunity to explore many aspects of applied geology which allowed me to find my own interests and build on my skillset. I am now working as a geologist at a consultancy firm focusing on modelling mineral deposits and producing resource estimates.

Career Opportunities

The course is industry facing and designed to equip you for a career in a broad range of industries and research organisations requiring digital subsurface characterisation and modelling.

Application areas include mineral resources, the energy sector including oil and gas, geothermal, groundwater, carbon sequestration and storage, geotechnical services, national geological surveys and waste management. You will also receive training in the range of soft skills (e.g. reporting, programming) required by industry.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Environmental & Engineering Geoscience

1 Year Full Time

Course Code: F290

Environmental and engineering geoscience is the application of knowledge on Earth's near-surface materials and processes to inform the design, implementation and operation of solutions in our natural and built environments. Such insights are key to multiple UN Sustainable Development Goals (e.g. clean water, affordable clean energy, sustainable cities and communities), as they underpin resilient construction projects (e.g., transport infrastructure, buildings, dams, tunnels), efficient renewable energy systems (e.g., wind farms, geothermal energy), and effective water resource and land management (e.g., groundwater supply, waste disposal, land decontamination). This new MSc course will provide graduates in geoscience (or cognate subjects) with high-level knowledge and technical skills relevant for the vibrant environmental and geotechnical sectors in Ireland and elsewhere.

Course Content and Structure

90 CREDITS	=	70 TAUGHT CREDITS Autumn/Spring/Summer Trimesters	+	20 CREDITS Research Project, Internship or Dissertation

Modules and Topics (Subject to change and are not guaranteed by UCD)

Autumn Trimester

Core modules
- Digital Mapping and GIS
- Drilling and Well Logging
- Hydrogeology
- Geocomputation
- Methods in Geomodelling
- Geotechnics 1

Option modules
- Natural Hazards and Risk
- Marine Geoscience
- Applied Hydrology
- Peatlands and Environmental Change
- Environmental Impact Assessment

Spring Trimester

Core modules
- Rock Engineering
- Near-Surface Geophysics
- Applied Quaternary Geology
- Satellite Earth Observation
- Environmental Geochemistry
- Geotechnics 2

Option modules
- Soil Ecology
- Applied Geophysics
- Sustainable Geoenergy
- Mineral Systems Geoscience
- Geostatistics and Geomodelling

Summer Trimester

Core modules
- Topics in Environmental and Engineering Geoscience
- Environmental and Engineering Geoscience

Faculty Profile

The MSc course will be delivered primarily by staff in UCD School of Earth Sciences with contributions from staff in UCD School of Civil Engineering and UCD School of Biological and Environmental Science. Staff expertise covers a range of relevant specialisations including engineering geology, geotechnical engineering, Quaternary geology, geophysics, structural geology, geomodelling, hydrogeology, geochemistry, marine geoscience and environmental biology.

Career Opportunities

Environmental and Engineering Geoscience contributes to the Civil Engineering economic sector, which is a growing area of employment for geoscience graduates in Ireland and internationally. Graduates are therefore expected to have diverse job prospects in areas such as geotechnical engineering and ground investigation (where there is a skills shortage in both the UK and Ireland), hydrogeology, environmental impact assessment, construction site investigation, mine reclamation, slope/ground stability assessment, land-use planning, forestry planning, natural hazard assessment and risk mitigation, etc.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

There is one intake per year in September. This course will receive significant interest so please apply early online at **www.ucd.ie/apply**

MSc Actuarial Science

1 Year Full Time
Course Code: F034
Also Available: Graduate Diploma

The MSc Actuarial Science is designed for students from quantitative disciplines who wish to train as an actuary upon completion of the course. The MSc can help fast track your career as an actuary by supporting you through the initial examinations of the Institute and Faculty of Actuaries (IFoA), UK and is fully accredited by the IFoA, UK.

The course provides a solid foundation in mathematics, statistics, economics and finance for future actuarial studies. You will also have the opportunity to undertake a dissertation in a topical area of actuarial science under the supervision of a member of the UCD School of Mathematics and Statistics. The course is suitable for students with no prior exemptions and for students who wish to add to any exemptions they already have.

Course Content and Structure

90 CREDITS Taught Masters = **60/70 CREDITS** Taught Modules + **30/20 CREDITS** Research Project
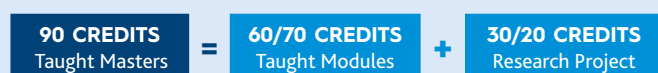
Modules and Topics (Subject to change and are not guaranteed by UCD)

The MSc in Actuarial Science covers the Core Principles subjects (CS1, CS2, CM1, CM2, CB1, CB2) and Core Practices subject CP1 of the examinations of the Institute and Faculty of Actuaries, UK.

The Core Principles subjects are:

- Actuarial Statistics (CS1)
- Risk Modelling and Survival Analysis (CS2)
- Actuarial Mathematics (CM1)
- Financial Engineering and Loss Reserving (CM2)
- Business Finance (CB1)
- Business Economics (CB2)

Depending on your subject choices in the Autumn and Spring Trimesters you may also undertake advanced modules in finance at the UCD Michael Smurfit Graduate Business School. Module topics may include regulation, corporate governance, ethics in finance, asset valuation, and financial management.

Internship Opportunities*

There will be opportunities for some students to complete their thesis as a paid research placement with an actuarial company. The internships listed are examples of past placements and are a guide only: Allianz, AIG, Canada Life, Central Bank of Ireland, Irish Life, Mercer, New Ireland Assurance, Liberty Mutual and Greenval Insurance.

Placements are secured through a competitive process and are not guaranteed.

Graduate Testimonial

Jiawen Li

I ultimately chose to pursue the MSc in Actuarial Science because the course filled in the gaps in my prior work experience and provided me with a valuable skill set for my future career. The course structure is well designed, ensuring that I am challenged every day, and pushing me to work harder to achieve my goals.

I am grateful for the opportunities and experiences that have come my way through my studies, and I would highly recommend UCD to anyone considering pursuing higher education.

Career Opportunities

As a graduate you can look forward to a career ranging from the traditional areas of insurance and pension consultancy to the rapidly expanding areas of investment and risk management. Throughout your actuarial career you can rely on the support and guidance of the actuarial profession, and upon qualification you can expect a rewarding career that will continue to offer opportunities for further development.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Data Science

2 Years Part Time | Online

Course Code: F275

Also Available: Professional Diploma

This online-delivered Masters course is designed to provide you with all the essential skills of the modern data scientist, including data handling, programming, machine learning and AI methods and advanced statistical analysis. There is an increasing demand for graduates with these valuable skills in a wide range of industries, and currently a shortage of qualified graduates. There are no lectures to attend in person as the courses are delivered completely online by staff of the UCD School of Mathematics and Statistics. Students will learn through video classes, online demonstrations and interactive data analysis and coding projects with regular feedback and interaction with course tutors. This provides flexibility to students who can learn wherever they like at a pace that suits them. Students are required to take in-person examinations at the end of the second trimester of year 1. Other assessments are planned to be online, but this is subject to change.

Course Content and Structure

90 CREDITS Taught Masters	=	55 CREDITS Taught Modules	+	35 CREDITS Projects
20 CREDITS Professional Diploma	=	20 CREDITS Taught Modules		

The first two trimesters of both courses will introduce you to statistical and mathematical concepts in data science and machine learning, and provide a solid grounding in statistical programming with data. In the second year of the MSc students learn the theory behind prediction models, classification techniques, machine learning and AI methods, and a range of advanced statistical modelling techniques, while also developing programming abilities in R and Python.

In parallel with these taught modules, students will combine their theoretical knowledge, research skills and programming abilities in a series of linked projects, where they will develop a web-based data analysis application to solve a data science problem of their choice.

Modules and Topics (Subject to change and are not guaranteed by UCD)

Statistics and Machine Learning Modules
- Machine Learning and AI
- Predictive Analytics
- Multivariate Analysis
- Stochastic Models
- Bayesian Analysis
- Network Analysis

Programming Modules
- R
- Python

Practical Skills Workshops
- SQL Databases
- Data Visualisation
- Project Management skills (e.g. version control and documentation)

Implementation Project
- Students develop a web-based data analysis and visualisation application to address a research question of their own choosing.

Graduate Testimonial

Fergal Kelly
Data Analyst at the Central Bank of Ireland

I wanted to re-skill so that I could move to a different role and the content and online aspect of the masters was perfect for me. I wouldn't have been able to commit to going into a university on set nights for 3 years. I also would like to commend all the lecturers and tutors who always responded on time to questions. I've been able to make a contribution to my new team pretty much straight away.

Career Opportunities

Data Scientists and Analysts are in strong demand from industry; those who are successful in completing the course are highly employable in fields as diverse as pharmaceuticals, finance and insurance, as well as cloud computing. Some examples of prospective employers include:
- ICT companies (e.g., Google, eBay, Meta, Amazon, Paddy Power)
- The pharmaceutical industry (e.g., Janssen, MSD, GSK)
- The financial services industry (e.g., Bank of Ireland, AXA, EY, Accenture, Deloitte)

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Data & Computational Science

1 Year Full Time

Course Code: T306

The MSc Data & Computational Science course is aimed at students who wish to gain a deep understanding of applied mathematics, statistics and computational science at the graduate level. The course will equip such students with the skills necessary to carry out research in these computationally based sciences and will prepare them well for a career either in industry or in academia. The taught modules in the course provide a thorough grounding in the areas of applied mathematics, statistics and computational science; all students complete project work in data and computational science with the option of (supervised) research dissertation.

We expect our students to gain a thorough understanding of data and computational science at the graduate level, as well as a broad understanding of currently relevant areas of active research and to become autonomous learners and researchers capable of setting their own research agenda.

Course Content and Structure

RESEARCH Stream	=	60 TAUGHT CREDITS Autumn/Spring Trimester	+	30 CREDITS Research Project Summer Trimester
TAUGHT Stream	=	90 TAUGHT CREDITS Autumn/Spring/Summer Trimester		

Modules and Topics (Subject to change and are not guaranteed by UCD)

Core Modules

Computational Science and Mathematics:
- Optimisation in Machine Learning
- Applied Matrix Theory
- Uncertainty Quantification
- Data Programming with Python
- Data Programming with R

Core Modules

Statistics and Data Analytics:
- Probability and Statistics
- Modern Regression Analysis
- Multivariate Analysis
- Bayesian Analysis

Optional Modules:
- Machine Learning and AI
- Scientific Computing
- High-Performance Computing
- Numerical Algorithms
- Monte Carlo Inference
- Statistical Machine Learning

Graduate Testimonial

Sathvik Srinath Gaurav

This course provides the ideal combination of applied mathematics, statistics, and computational tools. What I appreciate most about my studies at UCD is how the course matches theoretical concepts with applied uses. The educational experience is academically challenging as well as highly supportive, and it has motivated me to grow both academically and personally. Beyond the classroom, I've found UCD's vibrant student life to be a valuable part of my experience. I've presented at various club events and actively participated in societies which were fantastic for building connections and feeling at home in a new country. Looking ahead, my goal is to work as a Data Scientist at a top technology company where I can apply the skills I've developed to solve meaningful, data-driven challenges.

Career Opportunities

Our graduates will be suitably qualified for research at the PhD level at the interface of applied mathematics, statistics and computational science. They will be valued for their technical knowledge and research skills. Equally, our graduates will be in demand by employers for their acquired skills in data analytics and computational and statistical modelling.

Recent graduates from this course work in ICT (including Amazon, IBM, Intel, Meta, Paypal and Vodafone), financial services (including AIB, Aon, Fidelity Investments), and other data-intensive industries (e.g. Accenture, Bosch, EY)

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Financial Mathematics

1 Year Full Time | 2 Years Part Time
Course Code: T341

The MSc in Financial Mathematics is designed for students with an undergraduate degree in Mathematics or a related field, who wish to gain a competitive advantage in the financial sector by acquiring the strong mathematical and statistical background demanded by high-level quantitative roles. The proposed course will equip students with the relevant contemporary knowledge and skills, including new digital innovations such as machine learning with financial applications, computational finance and statistical and data analysis. In the Summer Trimester students will explore their theoretical and applied knowledge in greater depth by completing a dissertation or they will be able to apply their theoretical knowledge to real-world situations via a work placement with a financial firm.

Course Content and Structure

In the Autumn and Spring Trimesters, you will take a mixture of face-to-face and online modules (indicative module list below). In the Summer Trimester, you will have the opportunity to apply for a summer work placement with a Dublin-based financial firm, or a dissertation supervised by a member of faculty. Upon completion of the course, you will be able to understand, critique and judge the suitability of a number of advanced financial mathematical models, manipulate, analyse and discern the reliability of financial data sets, and be acquainted with industry practice.

90 CREDITS Taught Masters	=	**60 CREDITS** Taught Modules	+	**30 CREDITS** Dissertation/Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

Core Modules

- Advanced Financial Models
- Counterparty Credit Risk
- Financial Risk Measurement and Management

Option Modules

- Computational Finance
- Statistical Machine Learning
- Optimisation for Machine Learning
- Data Programming with Python
- Data Programming with R
- Measure Theory and Integration
- Stochastic Calculus
- PDEs in Financial Maths
- Big Data Programming
- Advanced Econometrics: Time Series
- Behavioural Economics
- Energy Economics and Policy
- Introduction to Relational Databases and SQL Programming

Internship Opportunities*

Internship opportunities are available and the following are industry partners where students were previously placed for a summer work placement: AIB, FINCAD (Zafin Capital Markets Group), Grant Thornton Advisory, Quantitative Risk, Mazars and Murex.

Placements are secured through a competitive process and are not guaranteed.

Graduate Profile

Sam O'Neill
Quantitative Risk at Grant Thornton

I found the degree throughout engaging. I enjoyed the broad range of topics covered in the degree from pure mathematics to behavioural economics and game theory. I was heavily involved with the Chess Society, serving as Secretary and then Auditor during my time at UCD and I still compete with the UCD chess team in the Leinster leagues. I have since graduated and am now working in Quantitative Risk at Grant Thornton.

Career Opportunities

Graduates with training in Financial Mathematics are suited for upper-level quantitative roles in several sub-sectors such as quantitative analysis in financial firms and hedge funds, risk modelling in banking and insurance, computational modelling in fintech and research and academia.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Statistical Data Science

1 Year Full Time | 2 Year Part Time

Course Code: T387

Also Available: Graduate Certificate/Higher Diploma

The goal of the UCD MSc Statistical Data Science is to train the new generation of data scientists, by empowering them with a broad range of foundational and applied skills in statistics and machine learning. On completion of the MSc Statistical Data Science, you will be able to demonstrate in-depth understanding of statistical concepts, apply advanced statistical reasoning, techniques and models in the analysis of real data and employ technical computing skills. The MSc Statistical Data Science is ideal for students interested in data science careers in industry, business, government, or to those interested in pursuing a subsequent PhD in statistics or in related areas.

The course trains students in both applied and theoretical statistical data science, and prepares them well for a career as research data scientists. A wide variety of taught modules provides a thorough grounding in statistics and machine learning. Compulsory modules are intended to ensure that all students have appropriate statistical knowledge and experience, while optional modules provide depth and exposure to the diverse range of statistical methods and applications. In addition, students take a supervised research module where they develop a project that addresses a present-day statistical problem.

Course Content and Structure

90 CREDITS Taught Masters = **65 CREDITS** Taught Modules + **25 CREDITS** Research Project/Dissertation

Modules and Topics (Subject to change and are not guaranteed by UCD)

- Mathematical Statistics
- Monte Carlo Inference
- Actuarial Statistics
- Survival Models
- Data Mining
- Time Series
- Multivariate Analysis
- Statistical Network Analysis
- Data Programming with R
- Stochastic Models
- Data Programming with Python
- Applied Statistical Modelling
- Statistical Machine Learning
- Advanced Predictive Analytics
- Optimisation
- Data Programming with C

Graduate Testimonial

Valda Murphy
Project Lead at Novartis

This MSc had a strong theoretical foundation and gave me an education in how to apply statistics. My research project inspired me to go into the area of medical statistics after graduation. The course served as a launch pad for my career in pharmaceutical statistics where I now work as a project lead, overseeing the quantitative aspects of several drugs in development.

Career Opportunities

The MSc Statistical Data Science graduates typically pursue careers related to data science as research data scientists, data analysts, and data engineers.

As the demand for data scientists is growing, career opportunities exist in a variety of industries including pharmaceutical companies, banking, finance, government departments, risk management and the IT sector. A number of past students also embarked on a career in academia by proceeding to study for a PhD in statistics, data science, or related fields.

MSc Statistical Data Science graduates are currently working for companies such as Google, Western Union, AIB, Norbrook, Ernst & Young, Novartis, Deloitte, Meta and Eaton. Demand for our MSc Statistical Data Science graduates continues to be very strong both in Ireland and abroad.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MA Statistical Data Science

16 Months Full Time | 32 Months Part Time
Course Code: F261

The MA Statistical Data Science is aimed at graduates from numerate subjects with good statistical and mathematical training, or who have completed the Higher Diploma or the Graduate Certificate Statistical Data Science. The MA Statistical Data Science brings the students to the same level as the MSc Statistical Data Science: once completed, the degrees are equivalent. However, in contrast to the MSc Statistical Data Science, the MA Statistical Data Science is 16 months long, and it includes several foundational statistics modules in its core structure. These modules cover the fundamentals of statistics, machine learning, and data science, and prepare the students for more advanced modules. In addition, students take a supervised research module where they develop a project that addresses a present-day statistical problem. The course trains students in both applied and theoretical statistical data science, and prepares them well for a career as research data scientists.

The MA Statistical Data Science is an EMOS (European Master in Official Statistics) labelled course, which means that some students may choose to take modules and an individual project on official statistics, and potentially receive the EMOS certification of their degree. The EMOS MA Statistical Data Science course also includes an internship at an Irish public institution that deals with official statistics. The EMOS MA Statistical Data Science provides an excellent opportunity to get involved and pursue a career in official statistics in Ireland or abroad, and there is no comparable course in Ireland or the UK.

Course Content and Structure

120 CREDITS Taught Masters	=	95 CREDITS Taught Modules	+	25 CREDITS Dissertation/Data Analytics Project

The MA Statistical Data Analysis is of 16 months' duration (four trimesters) and will bring students to the same level as the MSc in Statistical Data Science.

Modules and Topics (Subject to change and are not guaranteed by UCD)

Modules offered change from year to year and the list includes:

- Data Mining
- Time Series
- Multivariate Analysis
- Mathematical Statistics
- Monte Carlo Inference
- Actuarial Statistics
- Survival Models
- Stochastic Models
- Data Programming with R
- Applied Statistical Modelling
- Optimisation
- Statistical Machine Learning
- Advanced Predictive Analytics
- Data Programming with C

Faculty Profile

Dr Michelle Carey
UCD School of Mathematics and Statistics

The ever-increasing rise of automated measurements allows us an unprecedented view of the world around us. Traditional statistical methodology is challenged by this more complex and high-dimensional data. My research advances statistical and numerical methods for the analysis of high-dimensional functional data in climatology, finance and medicine.

Career Opportunities

Career prospects on completion of the Statistical Data Science are equivalent to those of the MSc Statistical Data Science and graduates typically pursue careers related to data science as research data scientists, data analysts, and data engineers. As the demand for data scientists is growing, career opportunities exist in a variety of industries including pharmaceutical companies, banking, finance, government departments, risk management and the IT sector. A number of past students also embarked on a career in academia by proceeding to study for a PhD in statistics, data science, or related fields. Statistical Data Science graduates are currently working for companies such as Google, Western Union, AIB, Norbrook, Ernst & Young, Novartis, Deloitte, Meta and Eaton. Demand for our MA in Statistical Data Science graduates continues to be very strong both in Ireland and abroad.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Artificial Intelligence for Weather & Climate Change

1 Year Full Time

Course Code: F297

This MSc integrates artificial intelligence, meteorology, and climate science to equip graduates with advanced data-driven and modelling skills for understanding and predicting weather and climate phenomena. Co-delivered with Met Éireann, the Irish Meteorological Service, the programme combines rigorous theoretical foundations with practical training in AI, machine learning, and numerical modelling. Students learn to design and implement AI systems for environmental data, forecast extremes, and assess climate impacts. The course prepares graduates to contribute to cutting-edge research and to address real-world challenges in climate forecasting, disaster mitigation, and environmental policy. Graduates will be uniquely positioned to apply AI in global weather and climate contexts.

Course Content and Structure

90 CREDITS Taught Masters	=	60 CREDITS Taught Modules	+	30 CREDITS Research Project/Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

Autumn Trimester

Core modules:
- Physical Meteorology and Climatology
- AI for Weather and Climate
- AI & Extremes for Weather and Climate
- Synoptic Meteorology

Option modules:
- Remote Sensing
- Urban Data Analytics
- Marine Geoscience
- Natural Hazards and Risks
- Applied Hydrology
- Machine Learning with Python

Spring Trimester

Core modules:
- Impacts Modelling for Weather and Climate
- AI, Computing and Visualisation for Weather Applications
- Dynamical Meteorology & Numerical Weather Prediction

Option modules:
- Geostatistics and Programming for GIS
- Coastal Risks
- Weather, Climate and Climate Change
- Uncertainty Quantification
- Data Science in Python
- Machine Learning with Python

Summer Trimester

Core module:
- MSc Dissertation (30 credits, research-led, in collaboration with Met Éireann)

Option modules:
- AI Ethics

Faculty Profile

Andrew Parnell
Met Éireann Professor of Data Science for Climate and Weather, UCD

Andrew Parnell is the Met Éireann Professor of Data Science for Climate and Weather at University College Dublin and Director of the AIMSIR research institute for Artificial Intelligence in Meteorological Services, Innovation and Research. His research is in AI, machine learning and statistical modelling applied to many different weather, climate and ecological areas.

He is currently Principal Investigator and Deputy Director of the Research Ireland Co-Centre in Climate, Biodiversity and Water, and a funded investigator in the SFI Insight Centre for Data Analytics.

Career Opportunities

Graduates will gain highly sought-after skills at the interface of AI, meteorology, and climate science, positioning them for roles in national meteorological services, renewable energy, environmental consultancy, and climate technology sectors. Typical roles include data scientist, climate modeller, AI researcher, or environmental analyst. Organisations such as Met Éireann, The European Centre for Medium Range Weather Forecasting, and climate-focused start-ups are key employers. Graduates will also be well prepared for PhD-level research in AI and atmospheric science, contributing to innovations in weather prediction, sustainability, and climate adaptation.

Enquiries

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Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Physics

Negotiated Learning

1 Year Full Time | 2 Year Part Time

Course Code: F012

Physics provides us with a model of the universe, on an incredible range of scales, from inside the nucleus of the atom towards the edge of the observable universe. Advances in Physics underpin many technological developments, for example our knowledge of electron transport in semiconductors has led us to the point where computer processors and memory are almost ubiquitous.

This UCD MSc in Physics offers a negotiated learning (NL) model for students with a Physical Science or Engineering background that allows you to customise your learning path and to tailor what you learn to your own specific needs and career aspirations. It can prepare you with skills, including data analytics, either for further research in a PhD programme, or employment directly after graduation.

Course Content and Structure

90 CREDITS Taught Masters	=	30/60 CREDITS Taught Modules	OR	60/30 CREDITS Research Project/Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

Course Modules

- Ultrafast Soft X-ray Photonics
- Physics Tutoring and Demonstrating
- Applied Quantum Mechanics
- Applied Optics
- Nano-optics and Biophotonics
- Nanomaterials
- Bio-inspired Technologies
- The Space Environment
- Quantum Condensed Matter
- Advanced Statistical Mechanics
- Nanomechanics
- Data Science using Python

Research Project/Internship Opportunities*

There are opportunities to apply for an internship in an academic or industry workplace. The internship comprises a research project, the theme of which is chosen by the student in agreement with the supervisor and MSc Course Director. The project may include experimental research, modelling/simulations research, and/or other research appropriate to the MSc course theme.

Placements are secured through a competitive process and are not guaranteed.

Graduate Testimonial

Oisín Maguire
PhD Student in Plasma Spectroscopy at UCD School of Physics

I chose to study the MSc Physics (Negotiated Learning) due to its flexibility and engaging topics: from nano-mechanics and nano-optics to plasma physics. A wide variety of prospective research projects will fit practically every student, regardless of their specific background and research interests. Overall, this MSc gave me the insight I needed to progress my career and the knowledge that is required to have a successful career.

Career Opportunities

This course offers the possibility for graduates to go on to PhD programmes. The MSc will prepare you for employment in the semiconductor industry as a process engineer, the financial sector as a modelling and data expert, or as an engineer in the space sector. Prospective employers include Intel Ireland, Airbus, Analog Devices, Met Éireann, and companies in the Irish Financial Services Centre.

Enquiries

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Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Nanotechnology

1 Year Full Time

Course Code: F122

Nanotechnology is an emerging sector, which covers many areas of both academic science and device design and innovation. Manipulating matter at the nanoscale has already led to new technology in many areas such as electronics, displays, sensors, and green technology. The design, fabrication and control of devices with nanoscale (billionth of a metre) dimensions, is an engine of innovation in almost every sector.

This course is suitable for graduates who wish to apply their degree expertise in the nanoscale science and related sectors. This specialisation is for students excited by the prospect of studying and researching in an interdisciplinary area, where physics, chemistry and engineering all come together.

Course Content and Structure

90 CREDITS Taught Masters **=** **45/60 CREDITS** Taught Modules **+** **45/30 CREDITS** Research Project/Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

Modules will be decided upon agreement with the Course Director.

You will gain experimental, theoretical and computational training in the following topics:

- Nano-Optics
- Physics of Nano-Materials
- Ultrafast Soft X-ray Photonics
- Nano-Mechanics
- Atomic Force Microscopy
- Biophysics at the Nanoscale
- Bio-inspired Technologies
- Innovation
- Data Science using Python

Research Project/Internship Opportunities*

There are opportunities to apply for an internship in an academic or industry workplace. The internship comprises a research project, the theme of which is chosen by the student in agreement with the supervisor and MSc Course Director. The project may include experimental research, modelling/simulations research, and/or other research appropriate to the MSc course theme.

Placements are secured through a competitive process and are not guaranteed.

Faculty Profile

Associate Professor James Rice
UCD School of Physics

The research projects in Associate Professor Rice's group at UCD are in the area of experimental nanoscience. His main scientific contributions are related to understanding optical processes in nanoscale materials, concentrating on semiconducting and metallic nanostructured materials. He contributed to the development of novel nanomaterial designs that possess plasmonic properties and the use of biomaterials as functional conducting nanomaterials.

Career Opportunities

The course prepares you for industry or further PhD research. Career opportunities include the semiconductor industry, telecommunications, diagnostic imaging, green technologies and sensor applications, both in Ireland and internationally. It is also a stepping stone to PhD research in the areas of photonics, nanotechnology and computational physics and nanoscience. Prospective employers include Abbott, Allergan, Andor, Asylum Research, Becton Dickinson, Boston Scientific, Carl-Zeiss Meditec, Covidien Imaging, Eblana Photonics, Intel, Intune Networks, Park Systems, Pharma-Bio Serv, Philips, and SensL.

Enquiries

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Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc NanoBio Science

1 Year Full Time

Course Code: T149

This MSc course unites the technological with the biological aspects of nanotechnology in a unique way, equipping graduates with a truly interdisciplinary perspective of the field. Manipulating matter at the nanoscale is already leading to new and improved imaging and display technologies, biomedical sensors, and solar cells for environmentally friendly energy production. The design, fabrication and control of devices with nanoscale (billionth of a metre) dimensions is an engine of innovation in almost every sector.

The MSc in NanoBio Science at the UCD School of Physics is for students excited by the prospect of studying and researching in this emerging interdisciplinary area, where physics, chemistry, engineering and life sciences all come together.

Course Content and Structure

| 90 CREDITS Taught Masters | = | 45 CREDITS Taught Modules | + | 45 CREDITS Research Project/Internship |

Modules and Topics (Subject to change and are not guaranteed by UCD)

You will gain experimental and theoretical knowledge in the following topics:

- Nano-Optics and Bio-Photonics
- Physics of Nanomaterials
- Ultrafast Soft X-ray Photonics
- Nano-Mechanics
- Atomic Force Microscopy
- Computational Biophysics
- Biophysics at the Nanoscale
- Bio-inspired Technologies
- Innovation
- Data Science using Python

Research Project/Internship Opportunities*

There are opportunities to apply for an internship in an academic or industry workplace. The internship comprises a research project, the theme of which is chosen by the student in agreement with the supervisor and MSc Course Director. The project may include experimental research, modelling/simulations research, and/or other research appropriate to the MSc course theme.

Placements are secured through a competitive process and are not guaranteed.

Graduate Testimonial

JiaJun Li
Chinese Academy of Sciences, Shanghai

I chose to study the MSc in NanoBio Science because of its huge potential. The subjects in this course cover areas from physics to biology and the cutting-edge experiments and research will benefit you in your future career. The international aspect definitely brings new ideas and gives you a chance to get to know people in your area of study from around the world.

Career Opportunities

The course prepares you for industry or further research. Career opportunities include the pharmaceutical industry, telecommunications, diagnostic imaging, green technologies and sensor applications, both in Ireland and internationally. It is also a stepping stone to PhD research in the areas of nanoscience, biophotonics and nanotechnology.

Prospective employers include Abbott, Alcon, Allergan, Bausch & Lomb, Becton Dickinson, Boston Scientific, Eblana Photonics, Intel, Pfizer, Pharma-Bio Serv, Philips, and SensL.

Enquiries

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Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Space Science & Technology

1 Year Full Time
Course Code: F060

This course is ideal for graduates of Physics, Engineering and closely related disciplines, who want to transfer their expertise to the fast-growing global space sector. Ireland is a member of the European Space Agency (ESA) and dozens of Irish companies and researchers are involved in major international space missions.

UCD students and staff built Ireland's first satellite, EIRSAT-1, a 2U CubeSat that launched on a Falcon 9 rocket on 1 December 2023. EIRSAT-1 was developed within ESA's 'Fly Your Satellite' programme and contained payloads developed in UCD. The spacecraft was operated from UCD.

Course Content and Structure

90 CREDITS Taught Masters = **60 CREDITS** Taught Modules + **30 CREDITS** Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

Core Modules

- The Space Environment and Spacecraft
- Applications of Space Science
- Space Sector Professional Skills
- Spacecraft Operations
- Space Detector Laboratory
- Satellite Subsystems Laboratory
- Space Mission Design Field Trip
- Space Sector Internship

Option Modules

- Planetary Geomorphology
- Remote Sensing
- Stellar Astrophysics
- Galaxies and Observational Cosmology
- Data Science in Python

Internship Opportunities*

A 3-month 30 credit internship provides relevant training for industry or research and can lead to employment. Students have completed internships at the European Space Agency (ESA), European Astronaut Centre (EAC), Cosine (Netherlands), German Aerospace Center, NASA-Ames, ENBIO, InnaLabs, Skytek, Mindseed, Eblana Photonics, ICEYE, Arralis Ltd, ispace, Mindseed and Réaltra Space Systems Engineering.

Placements are secured through a competitive process and are not guaranteed.

Course Highlight

Course highlights include a hands-on CubeSat lab, payload development and satellite systems engineering of a high-altitude balloon experiment and participation in an international mission design team project.

Graduate Testimonial

Megan Lundy
Mission Operations Engineer at Goonhilly Earth Station

I have an academic background in astrophysics and knew I wanted to have a career in the space industry, but was not sure how to get my foot in the door. The MSc Space Science & Technology course at UCD gave me the opportunity to learn about the different sectors of the space industry and how many different kinds of jobs there are. In my position as Mission Operations Engineer at Goonhilly, I work as part of a team that operates GHY-6, a 32-meter deep space antenna, to track satellites for NASA and ESA missions such as Mars Express and Artemis 1.

Career Opportunities

The course is space industry focused, while also preparing graduates to pursue careers in related sectors, and in research. Satellite operator, test engineer, mission specialist, payload scientist and systems engineer are all roles that are in demand globally. Earth observation and environmental monitoring (especially to meet sustainable development goals), navigation, telecommunications and meteorology are application areas that rely heavily on graduates with satellite expertise.

Prospective employers include Spire, ESA, DLR, ISISPACE, EUMETSAT, Réaltra, Ericsson, InnaLabs, Icon Group, Mindseed, Skytek, Eire Composites etc. The MSc can act as a stepping stone to PhD research in areas such as atmospheric physics, space physics, aeronautics, propulsion and astrophysics, and to traineeships at European Space Agency establishments.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

www.ucd.ie/physics/spacescience

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**
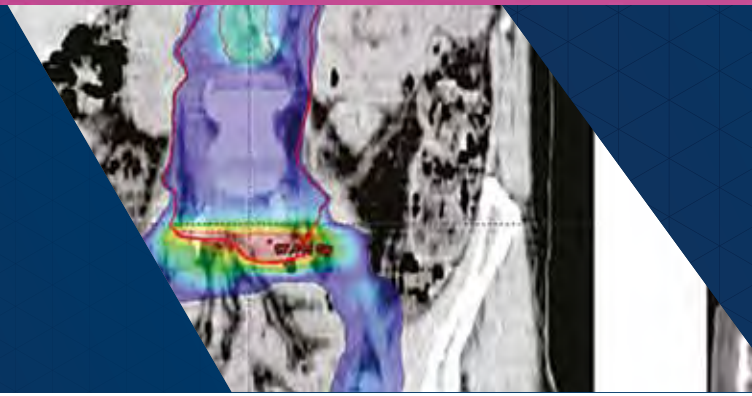
MSc Medical Physics

1 Year Full Time | 2 Years Part Time
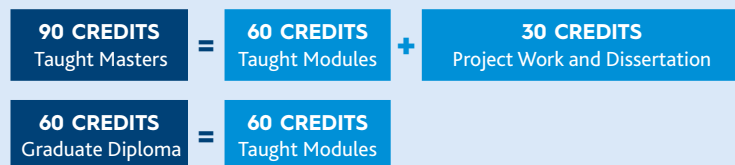
Course Code: T342

Also Available: Graduate Diploma

Medical Physics is the branch of Physics that applies the concepts and principles of physics to the diagnosis and treatment of human disease. The MSc in Medical Physics is designed for students who wish to pursue a career in Medical Physics, either in a clinical environment or in research.

The course, which is accredited by the Commission on Accreditation of Medical Physics Education Programmes (CAMPEP), provides a strong foundation in diagnostic imaging physics, nuclear medicine, radiation oncology physics and radiation protection, as well as the essential anatomy and physiology knowledge required to understand a patient's anatomical structure and physiological processes.

Course Content and Structure

90 CREDITS Taught Masters	=	**60 CREDITS** Taught Modules	+	**30 CREDITS** Project Work and Dissertation
60 CREDITS Graduate Diploma	=	**60 CREDITS** Taught Modules		

Modules and Topics (Subject to change and are not guaranteed by UCD)

The taught modules offered as part of the MSc/Graduate Diploma course include the following:

- Radiological Physics
- Diagnostic Imaging Physics
- Detectors and Dosimetry
- Radiation Oncology Physics
- Radiobiology and Ethics
- Radiation Protection and Safety
- Anatomy and Physiology
- Cross-sectional Imaging
- Statistics
- Data Science

Research Project

There are opportunities to apply for a research project in an academic or clinical workplace relevant to the medical physics sector. The projects may be experimental and/or theoretical in nature, as devised by the academic/clinical supervisor, and may be offered in areas such as diagnostic imaging, nuclear medicine, radiation protection, radiation oncology physics, detectors and dosimetry, and radiobiology.

Graduate Testimonial

Sarah Meaney
Medical Physicist at St. Vincent's University Hospital

UCD's CAMPEP accredited MSc in Medical Physics provided me with excellent knowledge and skills to launch my career in the medical physics field. The course is mainly taught by clinical scientists. Medical physics allows you to bring a human aspect to being a scientist. A trimester of clinical research helped me to become familiar with the clinical environment and the day-to-day requirements, complementing the knowledge gained in the classroom. I believe this course is truly a fantastic stepping stone into a rewarding career helping others through physics applications.

Career Opportunities

The course provides an accepted route to enter a career in Medical Physics. It is also a stepping stone to PhD research in areas such as diagnostic imaging, radiation oncology physics, nuclear medicine, radiation protection and radiobiology. CAMPEP accreditation allows graduates to apply for CAMPEP residency programmes in Ireland and internationally.

Prospective employers include Medical Physics Departments in hospitals and clinicals across Ireland and abroad, medical device manufacturers and regulatory bodies.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Computational Physics

1 Year Full Time
Course Code: F120

Computational Physics is a basic specialisation that offers broad opportunities for future employment in research, development, data analytics and informatics-related industry sectors. The MSc Computational Physics is developed in close connection with the more applied NanoBio and NanoTechnology specialties, offering you both a solid training in computational methods and a direct access to laboratory-based research projects.

The course is aimed at students with a strong background in Physics or related Natural Sciences, who wish to learn how to convert a mathematical model of a physical system into accurate and robust computer programmes that can capture quantitatively its behaviour.

Course Content and Structure

| 90 CREDITS Taught Masters | = | 45/60 CREDITS Taught Modules | + | 45/30 CREDITS Research Project/Internship |

Modules and Topics (Subject to change and are not guaranteed by UCD)

Modules will be decided upon agreement with the Course Director. Indicative modules available include:

- Applied Quantum Mechanics
- Computational Biophysics and Nanoscale Simulations
- Nanofluidics and Biosimulation
- Bio-inspired Technologies
- Data Science using Python
- Advanced Statistical Physics
- Numerical Weather Prediction
- Numerical Algorithms
- Stochastic Models
- Time Series Analysis
- Data Science using Python

Research Project/Internship Opportunities*

There are opportunities to apply for an internship in an academic or industry workplace. The internship comprises a research project, the theme of which is chosen by the student in agreement with the supervisor and MSc Course Director. The project may include experimental research, modelling/simulations research, and/or other research appropriate to the MSc course theme.

Placements are secured through a competitive process and are not guaranteed.

Faculty Profile

Associate Professor Nicolae-Viorel Buchete
UCD School of Physics

Ongoing research projects in Associate Professor Buchete's group at UCD are concerned with statistical mechanics and conformational dynamics of biomolecular systems, protein folding, amyloid aggregation, structural aspects of systems biology and bioinformatics, and with multiscale modelling of biomolecules and complex fluids.

Career Opportunities

The course prepares you for a career in industry or for further PhD research. Career opportunities are broad, including the bio-pharmaceutical, telecommunications, data mining and analysis, IT consulting and green technologies industry sectors, both in Ireland and internationally. It is also a stepping stone to PhD research in the areas of theoretical and computational physics, biological and medical physics, nanotechnology and nanoscience. Recent and prospective employers include Deloitte, Murex Inc., Intel, Pfizer, MSD, Philips, Tullow Oil, the University of Edinburgh, Imperial College London, and the National Institutes of Health, USA.

Enquiries

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Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.
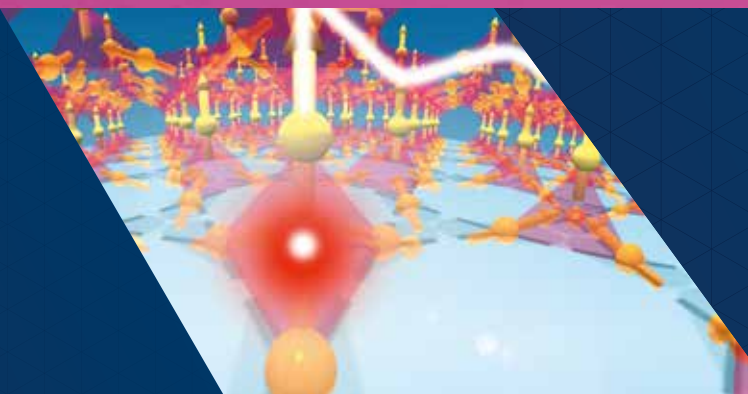
Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Applied Mathematics & Theoretical Physics

1 Year Full Time

Course Code: F124

The MSc Applied Mathematics & Theoretical Physics offers broad opportunities for future employment in research, development, predictive modelling and risk assessment, and informatics related industry sectors. At UCD, this MSc course is developed in close connection with the Simulation Science and Computational Physics specialties, offering students both a robust training in computational methods on top of the solid theoretical and mathematical foundation.

The course is aimed at students with a strong background in Physics, Mathematics or a related Natural Science, who wish to learn state-of-the-art mathematical models and methods, applied to quantitative analysis of a broad range of physical phenomena.

Course Content and Structure

90 CREDITS Taught Masters	=	45/60 CREDITS Taught Modules	+	45/30 CREDITS Research Project/Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

Modules will be decided upon agreement with the Course Director. Indicative modules available include:

- General Relativity and Cosmology
- Quantum Theory of Condensed Matter
- Theoretical Astrophysics
- Advanced Statistical Physics
- Quantum Field Theory
- High Energy Particle Physics
- General Relativity and Black Holes
- Numerical Algorithms
- Dynamical Systems
- Electrodynamics and Gauge Theory
- Relativistic Quantum Mechanics
- Environmental Fluids
- Differential Geometry
- Data Science using Python

Research Project/Internship Opportunities*

There are opportunities to apply for an internship in an academic or industry workplace. The internship comprises a research project, the theme of which is chosen by the student in agreement with the supervisor and MSc Course Director. The project may include experimental research, modelling/simulations research, and/or other research appropriate to the MSc course theme.

Placements are secured through a competitive process and are not guaranteed.

Faculty Profiles

Associate Professor Vladimir Lobaskin
UCD School of Physics

Associate Professor Lobaskin's main scientific contributions are related to structure and interactions in charged colloidal dispersions, colloidal dynamics, mechanics of biomolecules, and flocking of active particles.

Professor Adrian Ottewill
UCD School of Mathematics and Statistics

Professor Adrian Ottewill's research interests are in general relativity (gravitational entropy, detection of gravitational radiation) and quantum field theory in curved space-time (Hawking evaporation of black holes, quantum mechanical origin of structure in the universe).

Career Opportunities

The course prepares you for a career in industry or for further PhD research. Career opportunities are broad, including the financial, predictive modelling and risk assessment, telecommunications, data mining and analysis, IT consulting and green technologies industry sectors, both in Ireland and internationally. It is also a stepping stone to PhD research in the areas of theoretical and computational physics, nanotechnology and nanoscience.

Recent and prospective employers include Deloitte, Murex, Intel, Pfizer, MSD, Philips, Tullow Oil, the University of Edinburgh, Imperial College London, Los Alamos National Laboratory, and the National Institutes of Health, USA.

Enquiries

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Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Computer Science (Conversion)

16 Months Full Time
Course Code: T195

UCD offers a skills conversion graduate course for individuals who hold a primary degree in another discipline (e.g., Arts, Commerce, Engineering), and would like to enter an IT-related career. This course provides a thorough foundation in modern Computer Science in a practically oriented learning environment. This course has been specifically designed for graduate students of disciplines other than Computer Science. No prior knowledge of programming is assumed. During the first year, students take modules with learning outcomes aimed at providing fundamental skills required by modern technology companies.

On completion of the course you will be able to demonstrate an integrated knowledge and understanding of the scientific principles of Computer Science; demonstrate competence and specialist knowledge in areas such as Programming, Data Science, Software Engineering, Web Application Development, Database Design, Cloud and Distributed Computing, Artificial Intelligence and Cognitive Science; undertake independent innovative research and development projects; and work with confidence both autonomously and as part of a team on projects related to real-world computer science applications.

A research practicum allows students to apply the skills learned in the taught modules in a more significant project and to see where these skills can play a role in industry. In the final trimester, students choose 30 credits of taught modules from the MSc Computer Science (Negotiated Learning) course.

Course Content and Structure

120 CREDITS Taught Masters = **60 CREDITS** Taught Modules + **30 CREDITS** Research Practicum + **30 CREDITS** Taught Modules

Modules and Topics (Subject to change and are not guaranteed by UCD)

Year 1 (Autumn Trimester)

- Python Programming
- Object Oriented Programming
- Computational Thinking
- Relational Databases and Information Systems
- Operating Systems
- Web Application Development

Year 1 (Spring Trimester)

- Java Programming
- Data Structures and Algorithms
- Data Analytics
- Software Engineering
- Computer Architecture
- Networks and Internet Systems

Year 1 (Summer Trimester)

- Research Practicum

Year 2 (Autumn Trimester)

Choose modules such as*:

- Data Science
- Software Engineering
- Artificial Intelligence and Cognitive Science

Note that there may be some limitations on choice due to pre-requisites and timetabling.

Graduate Testimonial

John O'Meara
PhD Student in Artificial intelligence at UCD School of Computer Science

The individual specialisations offered after the first year allowed me to explore and focus on my interests, ultimately graduating with a solid understanding of my chosen field. I've since decided to continue my learning journey with UCD after being accepted to a fully funded PhD in Artificial Intelligence.

I cannot overstate how much I have gained in pursuing the MSc Conversion in Computer Science in UCD.

Career Opportunities

Some of the roles graduates have worked in include: Software Engineer, IT Project Analyst, Data Scientist, Python Developer, Web Applications Developer, Data Analyst, Business Analyst, Technical Analyst and Technical Consultant. Companies that have employed graduates include IBM, Dell, Accenture, SAP, Workday, Ericsson, Deloitte Ireland, First Derivatives, BearingPoint, Tableau Software, AIB, Web Summit and Zalando SE.

Enquiries

EU ✉ askscience@ucd.ie

Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Computer Science

Negotiated Learning

1 Year Full Time | 2 Years Part Time

Course Code: T150

The MSc Computer Science (Negotiated Learning) is a uniquely flexible and innovative course. It offers a negotiated learning model for students with an ICT background that allows you to customise your learning path and to tailor what you learn to your own specific needs and career aspirations. Module choices include several programming languages, cloud computing, bioinformatics, data mining, machine learning and information visualisation.

Once you are accepted onto the course we will guide you through a student needs assessment to establish your prior experience, personal knowledge gaps and your career plans. You have the option to select modules with a very specific thematic focus or you may select modules from one of the pre-defined themes covered by the course.

Course Content and Structure

90 CREDITS Taught Masters	=	60 CREDITS Taught Modules	+	30 CREDITS Project/Dissertation/Internship

Modules and Topics (Subject to change and are not guaranteed by UCD)

While the course offers some modules that are taught online, these options are limited, and it is not normally possible to complete this degree without substantial regular attendance at day-time lectures and practicals on campus in UCD.

Sample Themes

- Artificial Intelligence and Cognitive Science
- Computer Engineering
- Data Manipulation and Visualisation
- Prediction and Learning with Data
- Data Science Programming
- Distributed Computing
- Mathematics and Statistics
- Software Engineering
- Advanced Software Engineering
- Computers and Society

Internship Opportunities*

Students are offered the opportunity to undertake an internship during the course. The following internships are examples of past placements: Amazon, SAP, Dell, Ericsson, HubSpot, HealthBeacon, Autodesk, Microsoft, Equifax, Workday, Honeywell, Intel, Shutterstock, Intercom, Canada Life, Murex.

Placements are secured through a competitive process and are not guaranteed.

Course Highlights

- Currently there are approximately 80 module options offered in conjunction with other UCD Schools and Units including Business, Physics, Mathematics and Statistics, Psychology, Law and NovaUCD.

Graduate Testimonial

Ahmed Yawer
Programmer at Equifax Technology

The course was a huge step forward in my career. After the completion of the course, I secured a full-time job as a programmer at Equifax Technology. The MSc Computer Science (Negotiated Learning) course gave me the freedom to pick the modules I wanted to study, so I was able to study what I loved and what I needed.

Career Opportunities

Previous graduates are in demand and among their recent career destinations are employers like Google, SAP, Intel, PayPal, Deloitte, Microsoft, Symantec, HMH, Vilicom, Murex, NYSE Technologies, Realex Payments, Version 1, Salesforce, Pfizer, Ericsson, and Intune Networks.

Recent graduates have secured roles in areas including: Artificial intelligence, software engineering and QA, data programming and analysis, commercialisation of technology, teaching and training, security and forensics consultancy, and bioinformatics R&D.

Enquiries

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Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Cognitive Science

1 Year Full Time | 2 Years Part Time
Course Code: T023

The MSc Cognitive Science suits those interested in issues relating to the rich questions about the human mind from philosophical, psychological, and computational perspectives. Advanced computational skills are not a prerequisite. The course is designed as a suitable preparation for those wishing to progress to research, e.g. at PhD level.

You will have the opportunity to be familiar with the problems arising in the description of minds, brains, and behaviour and the theoretical approaches to them, know the principal 20th Century philosophical approaches to mind, brain and body, understand the concepts employed in cognitive psychology, along with their limitations, and develop an interdisciplinary perspective that links and integrates insights from multiple specialised domains.

Course Content and Structure

90 CREDITS Taught Masters = **60 CREDITS** Taught Modules + **30 CREDITS** Research Project

Modules and Topics (Subject to change and are not guaranteed by UCD)

Typical Modules

- Graduate Introduction to Cognitive Science
- Topics in Mind and Cognition
- Foundations of Cognitive Neuropsychology
- Connectionism and Dynamical Systems
- Embodied and Enactive Approaches to Cognition
- Cognitive Psychology
- The Cultural Mind
- Philosophy of Language

Research Opportunities

An intensive research project, done in conjunction with a principal supervisor as part of the course. This project is started in the first trimester and continues until mid August.

Graduate Testimonial

Eileen Wahl

I felt that I really grew as a scientist by being able to critique other people's papers and to think about those issues when I am doing my own science work. I would certainly recommend this course to international students as you get to meet people from all different countries.

Career Opportunities

This is not a vocational course. Over one year we cover a very broad range of material, thus greatly increasing the breadth of academic exposure of our students. Historically, about half of the students go on to do PhD studies, and many others look for work in research. This course will not make a psychologist out of a non-psychologist, or an IT specialist out of someone who is not an IT specialist upon entry. It will enable students to tackle research issues they might not have been able to before, and to do PhDs in areas that would not have been possible before. Many students pursue this course because of a passionate interest in our scientific understanding of what it is to be human. Please note that a cognitive science degree is not part of an accredited course towards a clinical degree, and it has minimal neuroscientific content.

Enquiries

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Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Cybersecurity

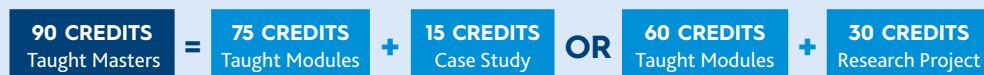2 Years Part Time | Blended Learning

Course Code: T380

Also Available: Graduate Diploma/Graduate Certificate

This course is designed to prepare IT professionals for a managerial or technical career in cybersecurity. It will help companies, government and state institutions, defence forces and others to upskill their staff to fill new roles in cybersecurity so that they can protect their organisations, their customers and the public. It facilitates professional learners through flexible blended study options. Lectures are delivered online and complemented by occasional full-day workshops on campus, with a remote option for those who cannot attend in person. The combination of mainly distance but with some on-campus days allows flexible learning but with face-to-face interactions.

In developing the course we have collaborated with industry and law enforcement practitioners to ensure that the course meets the needs of professional learners.

Course Content and Structure

90 CREDITS Taught Masters **=** **75 CREDITS** Taught Modules **+** **15 CREDITS** Case Study **OR** **60 CREDITS** Taught Modules **+** **30 CREDITS** Research Project

Modules and Topics (Subject to change and are not guaranteed by UCD)

Core Modules
- Information Security
- Leadership In Security
- Risk Assessment and Standards
- Cybersecurity Law and Regulation
- Secure Software Engineering
- Applied Cryptography
- Network Security
- Incident Response

Option Modules
- Malware Analysis
- Security Research Trends
- Ethical Hacking
- Case Study
- Professional Project
- Research Project

Course Highlights

- Curriculum aligned with the ACM/IEEE/AIS SIGSEC/IFIP Cybersecurity Curricular Guidelines preparing students to take a variety of cyber security roles
- Modules for professionals seeking to take a managerial role in security

Graduate Testimonial

Eoin Reid
Cybersecurity Analyst

The course was practical and hands on, with projects and coursework I used in interviews to secure my first role as a Cybersecurity Analyst. Its multidisciplinary modules and industry lecturers gave me immediately applicable cybersecurity skills.

Career Opportunities

The course will prepare professionals for a rewarding career in cybersecurity; for example, to take a role as a security manager, security engineer, security analyst, or IT security specialist. Career development possibilities are excellent. Organisations of all sizes in all sectors, including both Irish and foreign owned companies, are looking for people with these skills. Many global companies have a base in Ireland, including security software and cyber security companies with a security operations centre (SOC). There is a growing cyber security market globally as cyber security is recognized as critical for national security and the smooth functioning of society.

This holistic and well-rounded course will be of interest to executives and professional/technical staff who:
- need to acquire knowledge and skills to equip themselves better for their current role
- want to gain a promotion
- want to open up new career opportunities for themselves in cyber security related roles
- are interested in doing some research in this field, perhaps in relation to a current work problem
- want to gain a qualification to add to their standing and credibility within their professional life

Enquiries

EU/Non-EU ✉ askscience@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Forensic Computing & Cybercrime Investigation
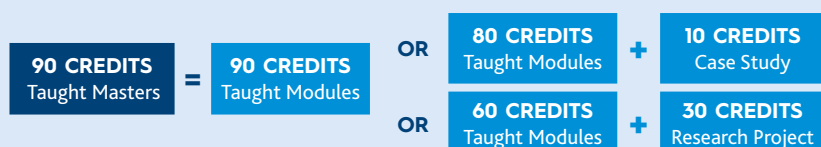
1 Year Full Time | 2 Years Part Time
Distance Learning
Course Code: T146
Also Available: Graduate Diploma/Graduate Certificate

This is a course for law enforcement. It aims to provide high quality forensic computing and cybercrime investigation training and formal education. It is also designed to deliver cutting-edge, up-to-date cybercrime investigation techniques, strategies and tactics that allow students to understand and tackle emerging trends in cybercrime. Over the past 17 years, we have brought in specialists from around the world to review and advise on the content considering the needs of digital forensic investigators and computer crime specialists. The UCD School of Computer Science (CS) and UCD Centre for Cybersecurity and Cybercrime Investigation (CCI) are working closely with law enforcement agencies and industry practitioners in seeking solutions to technologies-related crime. CS and CCI staff also collaborate with the scientists from European Cybercrime Training and Educational Group at Europol (ECTEG).

Course Content and Structure

90 CREDITS Taught Masters **=** **90 CREDITS** Taught Modules

OR **80 CREDITS** Taught Modules **+** **10 CREDITS** Case Study

OR **60 CREDITS** Taught Modules **+** **30 CREDITS** Research Project

Modules and Topics (Subject to change and are not guaranteed by UCD)

Lectures are pre-recorded and provided online via a virtual online learning environment, allowing you to participate from your home or office and attend UCD only for examinations each year in Dublin, the Netherlands or the USA.

Core Modules

MSc candidates are encouraged to take the following modules in their first year:

- Computer Forensics
- Network Investigations

Option Modules

- Financial Investigation Techniques – Following the Money
- Programming for Investigators
- Malware Investigations
- Mobile Device Investigations
- Live Data Forensics
- Linux for Investigators
- VoIP and Wireless Investigations
- OSINT Collection and Analysis
- Online Child Abuse Investigations
- Advanced Computer Forensics
- Data and Database Forensics
- Advanced Malware Analysis and Threat Intelligence
- Case Study
- Research Project

Graduate Testimonial

Michael Lenasolon
Investigations Officer at Kenya Revenue Authority

Studying in UCD has been a lifetime experience for me. The skills in law enforcement and digital forensics that I have acquired and enhanced, will go a long way to improving my professional skills. The course has been hands-on and I am confident that I am well placed for most challenges in the future that touch on law enforcement, digital forensics investigation and cybercrime.

Career Opportunities

For law enforcement officers, having this qualification has the additional advantage of adding credibility to their testimony as expert witnesses. Career development possibilities in this field are excellent.

Graduates include senior staff at Europol and INTERPOL, members of national and regional police forces and police training colleges, government ministries and agencies with Law Enforcement (LE) powers, defence forces, specialist cybercrime agencies, revenue, customs and border protection.

Enquiries

EU/Non-EU ✉ askscience@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course receives significant interest so please apply early online at **www.ucd.ie/apply**

MSc Advanced Artificial Intelligence

1 Year Full Time

Course Code: T413

This course is designed for individuals with a basic understanding of AI who are eager to delve into cutting-edge topics. It offers an excellent opportunity to explore the latest advancements in machine learning, including deep learning, generative AI, large language models and optimisation. Students will learn to use their AI skills ethically and responsibly. Students on this course will also be taught to apply their knowledge to real-world challenges in computer vision, healthcare, speech/audio, time series and recommender systems. They will learn from world-class faculty renowned for their groundbreaking AI research and immerse themselves in a vibrant community of like-minded peers.

The UCD School of Computer Science boasts over 20 faculty members actively engaged in AI research. In collaboration with our esteemed research and innovation centres—Insight, ML-Labs, and CeADAR—we form Ireland's leading hub for AI research. We are poised to provide cutting-edge AI education, empowering students to assume leadership roles in this transformative field.

Course Content and Structure

90 CREDITS Taught Masters = **60 CREDITS** Taught Modules + **30 CREDITS** Research Project, Internship or Dissertation

Modules and Topics (Subject to change and are not guaranteed by UCD)

Autumn Trimester

Core modules
- Foundations of Deep Learning
- Applied AI in Vision and Imaging
- Responsible Artificial Intelligence
- Optimisation
- Advanced Machine Learning

Option modules
- Artificial/Human Intelligence
- Human-Centered AI
- Introduction to Quantum Computing

Spring Trimester

Core modules
- AI and Ethics
- Advanced Generative AI and LLMs
- ML System Deployment

Option modules
- AI for Health
- AI for Time Series
- Speech and Audio
- Recommender Systems
- Information Visualisation (Blended Delivery)
- Quantum Machine Learning
- Optimization Algorithms

Summer Trimester

In their final trimester, students will do one of 3 options:
- Internship
- Dissertation
- Machine Learning Project

Faculty Profile

Dr. Deepak Ajwani
UCD School of Computer Science

My research focuses on leveraging machine learning techniques for solving combinatorial optimisation problems. My research group has developed a number of solutions that integrate algorithmic insights and learning techniques to effectively solve large and complex instances of optimisation problems. For instance, we developed a solution to improve generalisation abilities of deep reinforcement learning approaches and graph neural networks for solving various vehicle routing problems.

Career Opportunities

Ireland's vibrant tech industry, coupled with the growing demand for AI expertise, offers exciting career prospects for our MSc in Advanced AI graduates. From cutting-edge research roles in academia to high-demand industry positions, there is a wide range of possibilities.

AI careers are highly sought-after with intellectually stimulating work and ample opportunities for advancement. Our MSc course equips graduates to excel in diverse roles, including data science, data analysis, business intelligence, machine learning engineering, AI ethics, and AI product management. This course is also a stepping stone for PhD research.

Enquiries

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Non-EU ✉ internationalenquiries@ucd.ie

Entry Requirements

Entry requirements are listed on the course web page.

Applying to UCD

This course will receive significant interest so please apply early online at **www.ucd.ie/apply**

THE BUSINESS OF
SCIENCE & IT IN IRELAND

Ireland is home to many of the world's top companies and businesses

430+
Financial services companies operate in Ireland.

16 OF THE TOP 20
Global technology companies are based in Ireland.

6 OF THE TOP 10
Worldwide cybersecurity software companies are located in Ireland.

1,800+ MULTINATIONAL CORPORATIONS
have chosen Ireland as their strategic European base.

22 OF THE TOP 25
Global institutions for the financial sector are based in Ireland.

9 OF THE TOP 10
World's pharmaceutical companies have operations in Ireland.

Accenture	Allianz	Abbvie
Airbnb	AON	Baxter
Dell	Aviva	Bristol Myers Squibb
Google	Bank of China	Gilead
Intel	Barclays	Johnson & Johnson
LinkedIn	Credit Suisse	Lilly
Meta	Citi	MSD
Microsoft	Deutsche Bank	Novartis
Qualtrics	HSBC	Pfizer
Salesforce	JP Morgan	Regeneration
TikTok	Mastercard	Sanofi
Zendesk	PayPal	Zoetis

SOURCE: IDA Ireland, 2025

INTERNSHIPS AND PROFESSIONAL EXPERIENCE

Internships in industry or in academia are an opportunity to develop your skills and give a valuable insight into the careers available. They also provide an opportunity to build your network and learn about graduate courses.

The **UCD Careers Network** provides resources and help for students interested in an internship. In addition, there are internship fairs held throughout the academic year and a number of CV clinics.

Within the **UCD College of Science**, there are dedicated internship managers who provide support on the application process.

You can read more about the internships available on the relevant course pages. Applying for an internship is similar to applying for a job. It is a competitive process and is not guaranteed.

What is the process to apply for an internship?

A: The application process begins in September and student applications are submitted to companies. Companies shortlist students and start interviews. Once an offer has been made contracts and agreements will be finalised and signed by UCD and the company. The internship takes place from May to August.

Can I arrange my own internship?

A: Students have the option to find their own internship but it must be approved by the Science Internship Managers and the Module Coordinator to ensure that it meets all the requirements for an industry placement.

If a student has secured their own internship, independent from the College, they will need to submit a form and provide all details of the internship. Students will need to provide proof of offer either via an email or offer letter from the employer.

Tips: Applying for an Internship

I recommend that students:

1 Be prepared – Prepare an up-to-date CV. Tailor your CV and cover letter for your applications.

2 Research your target companies and organisations.

3 Be Proactive and Network – Attend careers fairs and employer presentations on campus.

4 Seek advice from your internship manager, careers adviser or module coordinator.

5 Practise your interview skills.

6 Be persistent and patient – you may need to submit multiple applications before you are successful.

Rachel McEvoy
UCD College of Science Internship Manager

156
Graduate students completed internships in 2025.

170
Companies and research institutes partnered with in 2025.

SCIENCE, TECHNOLOGY AND FINANCIAL SERVICES SECTORS

Biotechnology, Biomedical, Biomolecular & Chemical Sciences

Geoscience, Natural Resources, Climate, Environment & Sustainability

Mathematics, Actuarial Science, Finance & Data Science

Physics, Space Science, Nanotechnology, Biological & Medical Physics

Computer Science & Data Science

Examples of companies where students have completed internships in the past.*

Biotechnology, Biomedical, Biomolecular & Chemical Sciences	Geoscience, Natural Resources, Climate, Environment & Sustainability	Mathematics, Actuarial Science, Finance & Data Science	Physics, Space Science, Nanotechnology, Biological & Medical Physics	Computer Science & Data Science
AstraZeneca	Beauparc	Ernst & Young	European Space Agency	Bank of America
Alexion	Enviroguide	SIG plc.	Cosine (Netherlands)	Dell
Bristol Myers Squibb	Uisce Éireann	Flutter Entertainment plc.	Réaltra Space Systems Engineering	Workday
IRLCA Ltd.	Emerald Park	KPMG	Mindseed	HubSpot
APC Ltd.	Dublin Zoo	Zurich Life	Ubotica Technologies	Spanish Point Technologies Ltd.
Pfizer	RPS Group	Grant Thornton	TechWorks Marine	Rakuten Kobo
MSD	Marine Institute	Deloitte	Spire Global UK	SAP
Biosensia	National Parks & Wildlife Service	Aviva	Curtiss-Wright	Canada Life
Teva Pharmaceutical Industries Ltd.	Teagasc	Stats Perform	CeADAR	Ericsson
PBC Biomed	Hydro-Environmental Services	Met Éireann	Compass Informatics	Yahoo Inc

The internships listed are examples of past placements and are a guide only. Placements are secured through a competitive process and are not guaranteed. The companies and institutes we work with annually are subject to change.

INTERNSHIP EXPERIENCES

Biotechnology, Biomedical, Biomolecular & Chemical Sciences

Stephanie Earl
MSc Regulatory Affairs & Toxicology

"I was afforded the opportunity to work as a Toxicology and Regulatory Affairs Consultant and Researcher in the European Parliament Environment, Public Health & Food Safety Committee. This experience proved to be an invaluable one as it played a large part in my success in getting employed shortly after completing the course.

Geoscience, Natural Resources, Climate, Environment & Sustainability

Betsy Townsend
MSc Applied Environmental Science

"The MSc coursework paired with my six-week placement at Dublin City Council prepared me for a career in the environmental sector and gave me proficiency in the collection, processing, analyses, and interpretation of environmental data. The well-rounded curriculum, hands-on field work, and supportive professors at UCD ensured I was well equipped for the competitive job market.

Mathematics, Actuarial Science, Finance & Data Science

Shannon McDonnell
MSc Actuarial Science

"Interning at the Central Bank of Ireland was a perfect internship. By working at the regulatory agency, I had the unique opportunity to see a wide variety of actuarial work and, as a result, gain a very broad range of practical actuarial experience. Through my internship with the Central Bank, I have gained the preparation to be successful in my future career as an actuary.

Physics, Space Science, Nanotechnology, Biological & Medical Physics

Aaron O'Grady
MSc Space Science & Technology

"I had an internship with Réaltra Space Systems Engineering. I now have a full-time position as a systems engineer. I develop test apparatus for equipment on launchers, deep space missions and for use on the International Space Station. The skills and experiences from the UCD Masters have proven invaluable and have carried me further than I ever thought possible.

Computer Science & Data Science

Yash Karle
MSc Computer Science (Negotiated Learning)

"The experience at Oliver Wyman Labs has been extremely satisfying thanks to my mentors who are experts in their field. The team that I am a part of has a mix of people from different countries, cultures and varied technical backgrounds and years of experience. I am currently working on designing and developing intelligent crew dashboards for some of Europe's leading airline companies. This experience is the perfect platform to apply what I learnt in the classroom and see how the end project will have an impact in the aviation industry.

APPLYING TO A UCD TAUGHT MASTERS

How do I apply?	UCD's taught masters courses can be applied for online at **www.ucd.ie/apply**. Courses open for application on 1 October each year and generally remain open for applications until all places are filled. A summary of the process is on the UCD Graduate Admissions website at **www.ucd.ie/graduateadmissions**
When are offers of places made?	UCD has a rolling admissions policy for taught masters, with decisions issued as soon as possible after a complete application is received. An application is incomplete until you provide all required items on the checklist (including the application fee, if applicable). Generally, courses will remain open to applications until all places are filled.
Are there any scholarships available?	Student excellence and achievement are recognised in UCD, through a variety of scholarships and awards: • EU applicants can visit **www.ucd.ie/graduateadmissions/ feesfundingscholarships** for further information. • Non-EU applicants can visit **www.ucd.ie/global/scholarships** for further information.
Where can I find information on fees and accommodation?	Information is available from the following: • The Fees & Grants website at **www.ucd.ie/students/fees** has answers to many frequently asked questions. • The UCD Residences website at **www.ucd.ie/residences** has information and advice about the accommodation process.
Where can I find information about Admissions?	• EU applicants can visit UCD Graduate Admissions website for more information. • Non-EU applicants can visit the UCD Global website for more information on the application process, fees, visa information etc.