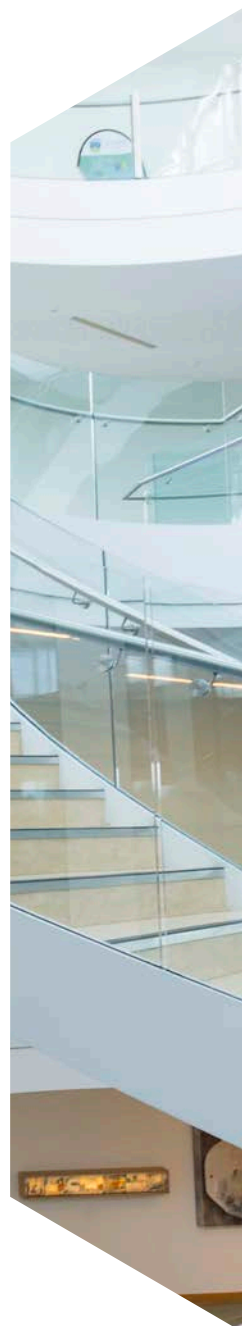




# UCD SCIENCE

**GRADUATE TAUGHT  
COURSES ENTRY 2025**



Biotechnology,  
Biomedical,  
Pharmaceutical &  
Chemical Sciences

Geoscience, Natural  
Resources, Climate,  
Environment &  
Sustainability

Mathematics, Actuarial  
Science, Finance & Data  
Analytics

Physics, Space Science,  
Nanotechnology,  
Biological & Medical  
Physics

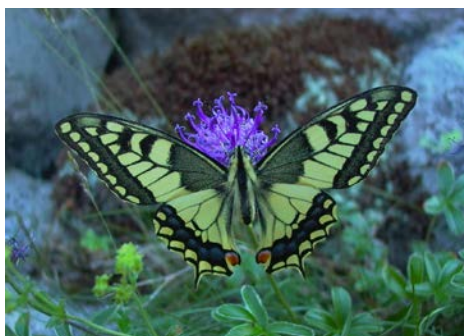
Computer Science &  
Data Science

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## Physics, Space Science, Nanotechnology, Biological & Medical Physics

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This booklet (Version 3 Entry 2025, published on 26 November 2024.) 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 programmes are subject to continuing development and the university reserves the right to make changes at any time, before or after a student's admission.

Version 2 Entry 2025: The MSc and Professional Diploma in Data Analytics were replaced by the MSc and Professional Diploma in Data Science on 13 November 2024. Course information is on page 20.

Version 3 Entry 2025: The MS in Advanced Artificial Intelligence were added on 27 November 2024. Course information is on page 37.





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"UCD boasts the most innovative and diverse Science programme in the country, providing knowledge in disciplines encompassing biology, chemistry, physics, earth sciences, mathematics and computer science."

# 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.

UCD boasts the most innovative and diverse Science programme in the country, providing knowledge in disciplines encompassing biology, chemistry, physics, earth sciences, mathematics and computer science. Our academic staff are expert teachers and are highly reputed world-class researchers, and indeed our research interests and strengths inform our undergraduate and postgraduate degree courses.

UCD Science graduates are in great demand in Science and Science-related jobs both in Ireland and overseas, and an undergraduate degree in science lays strong foundations for a wide variety of careers.

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



LÁRIONAD EOLAÍOCHTA UÍ BH  
O'BRIEN CENTRE FOR SCIE



# CALENDAR OF EVENTS

For EU and Non-EU Applicants and Offer Holders



**August 2024 -  
June 2025**

## **Global Graduate Events & Fairs**

Meet us at a range of International Events and Fairs. For more details visit [www.ucd.ie/science/study/global](http://www.ucd.ie/science/study/global)



**2 October  
2024**

**gradIreland Graduate Careers Fair**  
Ireland: RDS, Dublin



**25 - 28 November  
2024**

**UCD Masters Week**  
Virtual: EU and Non-EU



**21 January  
2025**

**UCD Science Graduate Taught Courses Webinar**  
Virtual: EU and Non-EU



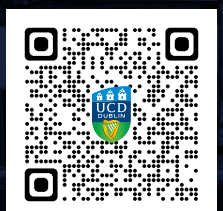
**February  
2025**

**UCD Postgraduate Open Day**  
Ireland: University College Dublin, Dublin

**24 April  
2025**

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

Register for the events at  
[www.ucd.ie/science/newsevents/events](http://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 10 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, Assay Genie.

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

## 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.

Prospective employers include 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.

## 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.



### Enquiries

EU [✉ biotech@ucd.ie](mailto:biotech@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

### Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-biotechnology](http://www.ucd.ie/courses/msc-biotechnology)

### Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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 10 global biopharmaceutical companies. The MSc Biotechnology & Business is an exciting programme 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 programme 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

<b>90 CREDITS</b> Taught Masters	=	<b>70 CREDITS</b> Taught Modules	+	<b>20 CREDITS</b> 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
- Environment Biotechnology

## 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.

## 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.



## Enquiries

- EU [✉ biotech@ucd.ie](mailto:biotech@ucd.ie)  
Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-biotechnology-and-business](http://www.ucd.ie/courses/msc-biotechnology-and-business)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)



# 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.

## 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.

## 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

## 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.

Prospective employers include Novartis, GSK, Eli Lilly and Co., Johnson & Johnson Ltd., Pfizer, Janssen Biologics, AstraZeneca, MSD, Bristol Myers Squibb, Abbott and Sanofi.

## Enquiries

EU [✉ biotech@ucd.ie](mailto:biotech@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-biotherapeutics](http://www.ucd.ie/courses/msc-biotherapeutics)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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.

## 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.

## 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

## 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.

Prospective employers include 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.

## Enquiries

EU  [biotech@ucd.ie](mailto:biotech@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/biotherapeutics-business](http://www.ucd.ie/courses/biotherapeutics-business)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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
- Plant Development
- Programmed Cell Death in Plants
- Plant Phenotyping
- Insect-Plant Interactions
- 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.

## Career Opportunities

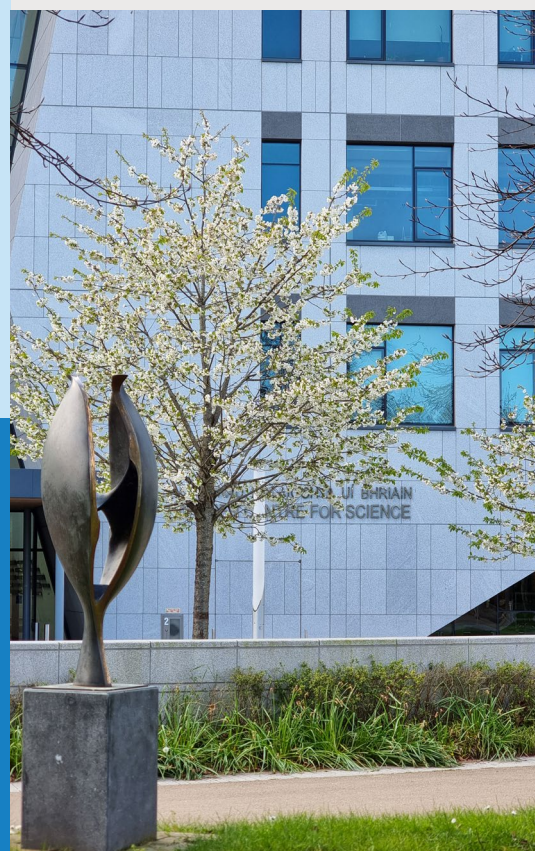
Graduates will have a distinct advantage when applying for PhD studentships or other more advanced graduate training in the area of plant biology and biotechnology. This MSc is ideal for graduates interested in pursuing scientific careers in academia, agriculture and plant science-based or biotechnology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

## 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.



### Enquiries

- EU [✉ futurecrops@ucd.ie](mailto:futurecrops@ucd.ie)  
Non-EU [✉ internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-plant-biology-biotech](http://www.ucd.ie/courses/msc-plant-biology-biotech)



# 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 programme 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 programme 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) including techniques such as RT-PCR, western blotting and advanced fluorescent imaging.
- **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.

## Career Opportunities

This programme 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 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  guerrino.macori@ucd.ie
- Non-EU  internationalenquiries@ucd.ie

### Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-biological-biomolecular-science](http://www.ucd.ie/courses/msc-biological-biomolecular-science)

## Course Highlights

- This MSc in Biological and Biomolecular Science is the first of its kind offered in Ireland by Negotiated Learning.

## 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.



### Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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 programme. 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.*

## Career Opportunities

This focused MSc programme 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.

## 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.



## Enquiries

EU  biotech@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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-toxicology-reg-affairs](http://www.ucd.ie/courses/msc-toxicology-reg-affairs)



# MSc Chemistry

Negotiated Learning

1 Year Full Time | 2 Years Part Time

Course Code: F042



The MSc Chemistry (Negotiated Learning) is a flexible programme which offers a diverse array of modules in a variety of chemistry topics. The programme 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.*

## 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 programme is an attractive route for some students into a PhD programme.

## 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.



### Enquiries

EU  [declan.gilheany@ucd.ie](mailto:declan.gilheany@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

### Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-chemistry](http://www.ucd.ie/courses/msc-chemistry)

### Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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 programme 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.*

## 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.

## 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.



### Enquiries

EU  [chemistry@ucd.ie](mailto:chemistry@ucd.ie)  
[paul.evans@ucd.ie](mailto:paul.evans@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

### Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-synthetic-chemistry](http://www.ucd.ie/courses/msc-synthetic-chemistry)

### Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)

# MSc Applied Environmental Science

1 Year Full Time | 2 Years Part Time

Course Code: X062



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.

## 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, Golder Associates and Dublin Urban Rivers Life Project.

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

## 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.

## 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.



## Enquiries

EU [✉ tancredi.caruso@ucd.ie](mailto:tancredi.caruso@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-environmental-science](http://www.ucd.ie/courses/msc-environmental-science)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)



# MSc Global Change: Ecosystem Science & Policy

16 Months Full Time

Joint International Degree

Course Code: F038



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.

## 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, IAIA: International Atomic Agency (Vienna), Center for International Forestry Research, Forschungsinstitut fürbiologischen 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*

## 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).

## Course Highlights

- Graduates receive a joint international degree from two well-established universities, which have combined their complementary and multidisciplinary research profiles and cutting-edge expertise. The course includes a professional work placement (up to 10 weeks) in highly recognised international institutions and a 4-month research project position.

## Graduate Testimonial

Conor Ó Beoláin

I chose this MSc in Global Change programme because it offered the best of both the world of global change science as well as the associated governance and policy implications. Personally, I found the internship period as well as the semester at JLU in Gießen to be the most rewarding experiences, but the whole course duration was made infinitely better by the care and expertise provided by all the module instructors in UCD and JLU.



## Enquiries

EU [✉ globalchange@ucd.ie](mailto:globalchange@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

[www.MasterGlobalChange.org](http://www.MasterGlobalChange.org)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-global-change-ecosystem](http://www.ucd.ie/courses/msc-global-change-ecosystem)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)



# MSc Environmental Sustainability

Negotiated Learning | Online

2 Year Full Time | 4 Year 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 is 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	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.					
30 CREDITS Graduate Certificate	=	30 CREDITS Taught Modules						

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

- Sustainable Energy and Environment
  - Green Technology Project
  - Energy Systems and Climate
  - Technical Communications
  - People Information and Communication
  - Managing the Interface between Science and Policy
  - Water Quality Assessment, Protection and Management
  - Water Resource Engineering
  - Nature Based Water Infrastructure
- Air Pollution
  - Environmental Geoscience
  - Soil Resources
  - Peatlands and Global Change
  - Ecology and its Application
  - Genetics for Environmental Scientists
  - Applied Ecotoxicology
  - Impact Assessment Procedures
  - Environmental Legislation and Regulation
  - Management of Sustainable Fisheries
- Wildlife Management/Conservation
  - Bioinvasions: Impact to Management
  - Natural Heritage Conservation
  - Data Analysis and Interpretation
  - GIS for Environmental Investigations
  - Practicum (Research: lab/field)
  - Practicum (Desk Study)

## 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.

## 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.



## Enquiries

EU/Non-EU [✉ sustainabilityonline@ucd.ie](mailto:sustainabilityonline@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

## Applying to UCD

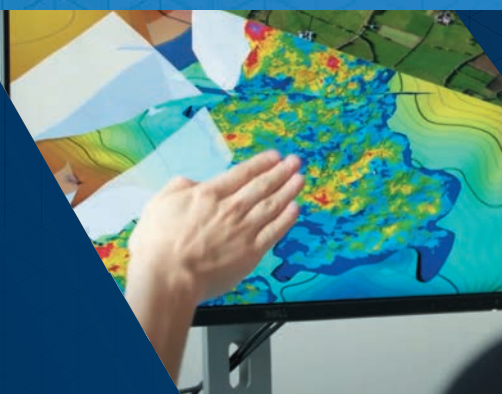
This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-environmental-sustainability](http://www.ucd.ie/courses/msc-environmental-sustainability)

# MSc Subsurface Characterisation & Geomodelling

1 Year Full Time

Course Code: F181



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

- Applied Geoscience
- 3D Mapping and Modelling
- Stratigraphic Prediction
- Rock Engineering
- Applied Structural Geology
- Geophysical Methods
- Geostatistics
- Geomodelling
- Geocomputation
- Drilling and Well Logging
- Geofluids and Geomechanics
- Quaternary Geology
- Remote Sensing
- Fractured Rock Characterisation
- Team-Based Modelling Exercises
- Geological Field Skills

## 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.

## 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.

## 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 Pretel 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.



## Enquiries

EU [✉ tom.manzocchi@ucd.ie](mailto:tom.manzocchi@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-subsurface-characterisation-geomodelling](http://www.ucd.ie/courses/msc-subsurface-characterisation-geomodelling)



# 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 programme. 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 programme 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 programme 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 Practicals 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 trimesters 1 and 2 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.*

## 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.

## Graduate Testimonial

**Jiawen Li**

I ultimately chose to pursue the MSc in Actuarial Science because the programme 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.



## Enquiries

EU [✉ smspostgrads@ucd.ie](mailto:smspostgrads@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-actuarial-science](http://www.ucd.ie/courses/msc-actuarial-science)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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. All other assessments will be completed online.

## Course Content and Structure

<b>90 CREDITS</b> Taught Masters	=	<b>55 CREDITS</b> Taught Modules	+	<b>35 CREDITS</b> Projects
<b>20 CREDITS</b> Professional Diploma	=	<b>20 CREDITS</b> Taught Modules		

The first two trimesters of both programmes 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 & 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 & 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 [✉ dataanalyticsonline@ucd.ie](mailto:dataanalyticsonline@ucd.ie)  
Non-EU [✉ internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-data-science](http://www.ucd.ie/courses/msc-data-science)



# 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 the 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.

## Graduate Testimonial

**Cian O'Callaghan**  
Paddy Power

I would thoroughly recommend the MSc Data & Computational Science to students interested in pursuing a career/further studies in data science. The lecturers and tutors are both extremely knowledgeable and approachable. The course strikes a balance between understanding the theory behind computational and machine learning algorithms and applying this theory to real-world problems.

## Course Content and Structure

<b>RESEARCH Stream</b>	=	<b>60 TAUGHT CREDITS</b> Autumn/Spring Trimester	+	<b>30 CREDITS</b> Research Project Summer Trimester
<b>TAUGHT Stream</b>	=	<b>90 TAUGHT CREDITS</b> 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
- Predictive Analytics
- Multivariate Analysis
- Bayesian Analysis

### Optional Modules:

- Machine Learning and AI
- Scientific Computing
- High-performance Computing
- Numerical Algorithms
- Monte Carlo Inference
- Statistical Machine Learning

## 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 programme 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**    [✉ dataandcomp@ucd.ie](mailto:dataandcomp@ucd.ie)
- Non-EU**    [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-data-computational](http://www.ucd.ie/courses/msc-data-computational)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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 programme 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 programme, 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

- Stochastic Calculus
- 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
- Introduction to Relational

Databases and SQL Programming

- PDEs in Financial Maths
- Big Data Programming
- Advanced Econometrics: Time Series
- Behavioural Economics
- Energy Economics and Policy

### 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) and Grant Thornton Advisory, Quantitative Risk.

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

## 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.

## 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.



## Enquiries

EU [✉ smspostgrads@ucd.ie](mailto:smspostgrads@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-financial-mathematics](http://www.ucd.ie/courses/msc-financial-mathematics)



# 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 programme 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 an individual project that addresses a present-day statistical problem.

## 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.

## 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

## 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  [smspostgrads@ucd.ie](mailto:smspostgrads@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-statistical-data-science](http://www.ucd.ie/courses/msc-statistical-data-science)

# 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 Statistics or the Graduate Certificate Statistics. 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 an individual project that addresses a present-day statistical problem. The programme 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 programme, 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 programme 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 programme 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

## 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.

## 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.



## Enquiries

EU  [smspostgrads@ucd.ie](mailto:smspostgrads@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/ma-statistical-data-science](http://www.ucd.ie/courses/ma-statistical-data-science)



# 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.

## 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.

## 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)

### Programme 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 programme theme.

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

## Career Opportunities

This programme 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

EU  [brian.rodriquez@ucd.ie](mailto:brian.rodriquez@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

### Entry Requirements

Entry requirements are listed on the course web page.

### Applying to UCD

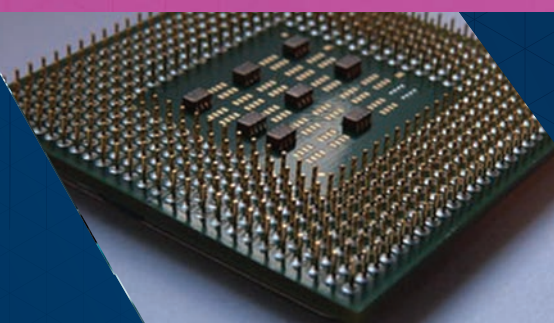
This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-physics-negotiated-learning](http://www.ucd.ie/courses/msc-physics-negotiated-learning)

# 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 Programme 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 programme theme.

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

## Career Opportunities

The programme 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.

## 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.



### Enquiries

EU  [james.rice@ucd.ie](mailto:james.rice@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-nanotechnology](http://www.ucd.ie/courses/msc-nanotechnology)



# MSc NanoBio Science

1 Year Full Time

Course Code: T149



This MSc programme 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.

## 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.

## 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 programme theme.

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

## Career Opportunities

The programme 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

EU  [brian.vohnsen@ucd.ie](mailto:brian.vohnsen@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

### Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-nanobio-science](http://www.ucd.ie/courses/msc-nanobio-science)

### Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)

# MSc Space Science & Technology

1 Year Full Time

Course Code: F060

This programme 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 have 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 contains payloads developed in UCD. The spacecraft is being 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
- 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.*

## Career Opportunities

The programme 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 [✉ lorraine.hanlon@ucd.ie](mailto:lorraine.hanlon@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

[www.ucd.ie/physics/spacescience](http://www.ucd.ie/physics/spacescience)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-space-science-technology](http://www.ucd.ie/courses/msc-space-science-technology)

## 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. I use my project management skills in my secondary role managing the development of procedures and other projects.



## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)

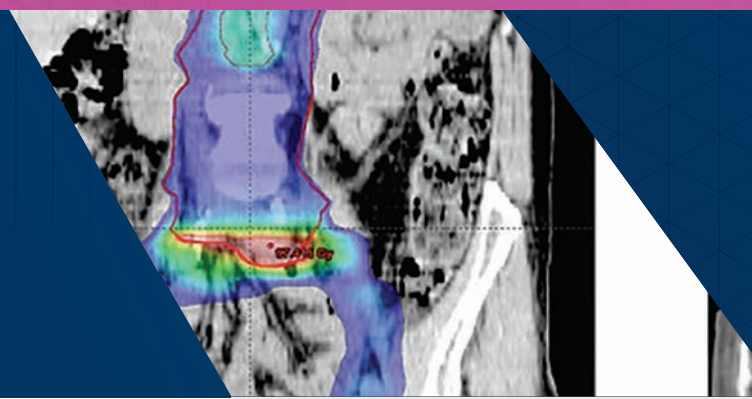


# MSc Medical Physics

1 Year Full Time | 2 Years Part Time

Course Code: T342

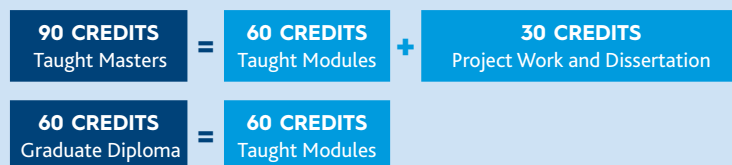
Also Available: Graduate Diploma



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 programme, 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



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

The taught modules offered as part of the MSc/Graduate Diploma programme 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.

## Career Opportunities

The programme 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.

## 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 programme 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.



## Enquiries

- EU [✉ s.cournane@ucd.ie](mailto:s.cournane@ucd.ie)
- Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/medical-physics](http://www.ucd.ie/courses/medical-physics)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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 programme 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 Programme 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 programme theme.

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

## Career Opportunities

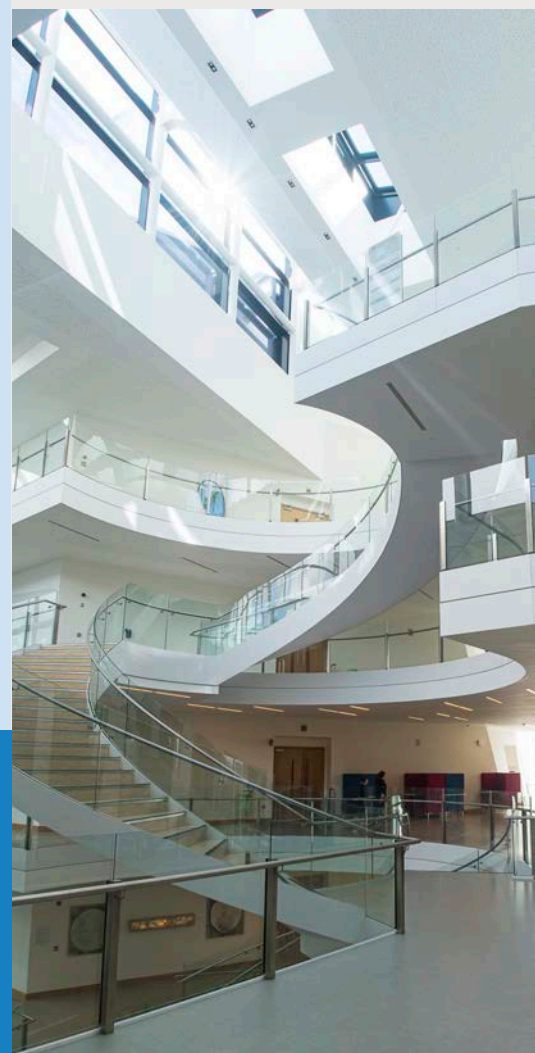
The programme prepares you for a career in industry or for further PhD research. Career opportunities are broad, including the bio-pharmaceutical, telecommunications, data mining and analysis, IT consulting and green technologies industry sectors, both in Ireland and internationally. It is also a stepping 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.

## 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.



## Enquiries

EU [✉ nicolae-viorel.buchete@ucd.ie](mailto:nicolae-viorel.buchete@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

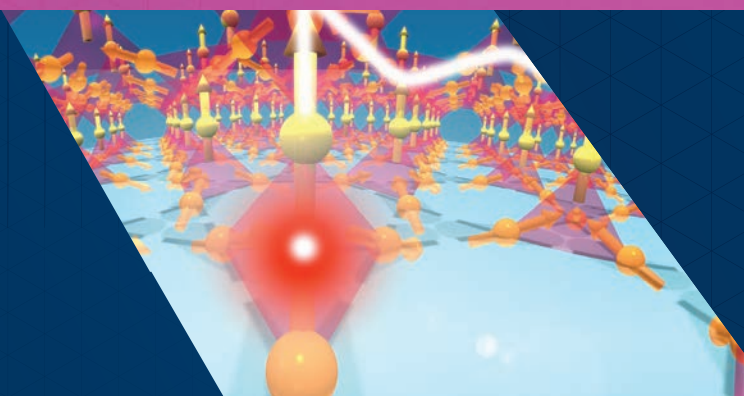
[www.ucd.ie/courses/msc-computational-physics](http://www.ucd.ie/courses/msc-computational-physics)



# 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 programme 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 programme 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 Programme 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 programme theme.

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

## Career Opportunities

The programme 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.

## 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).



## Enquiries

EU [✉ vladimir.lobaskin@ucd.ie](mailto:vladimir.lobaskin@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-appliedmaths-theoreticalphysics](http://www.ucd.ie/courses/msc-appliedmaths-theoreticalphysics)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://www.ucd.ie/apply)

# MSc Computer Science (Conversion)

16 Months Full Time

Course Code: T195



UCD offers a skills conversion graduate programme 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 programme provides a thorough foundation in modern Computer Science in a practically oriented learning environment.

On completion of the programme 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) programme.

## Course Highlight

- This programme 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.

## 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.

## 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 Semester)

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

### Year 1

(Spring Semester)

- 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.*

## 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 [✉ cs\\_conversion@ucd.ie](mailto:cs_conversion@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto: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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-computer-science-conversion](http://www.ucd.ie/courses/msc-computer-science-conversion)



# 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 programme. 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 programme 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 programme.

## 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 programme 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 programme. The following internships are examples of past placements: Amazon, SAP, Dell, Ericsson, HubSpot, Geowox, FoodMarble, HealthBeacon, Autodesk, Microsoft, Equifax, Groupon, Workday, Honeywell, Intel, Shutterstock.

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

## Career Opportunities

Previous graduates are in demand and among their recent career destinations are employers like Google, SAP, Intel, PayPal, Deloitte, Microsoft, Symantec, HMM, 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.

## 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 programme was a huge step forward in my career. After the completion of the programme, 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.



## Enquiries

EU [✉ travis.grotewold@ucd.ie](mailto:travis.grotewold@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-computer-science-negotiated-learning](http://www.ucd.ie/courses/msc-computer-science-negotiated-learning)

## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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.

## 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 programme to international students as you get to meet people from all different countries.

## 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
- Interdisciplinary Challenges
- Connectionism and Dynamical Systems
- Embodied and Enactive Approaches to Cognition
- Embodied and Social Cognitive Neuroscience
- Cognitive Psychology

### 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.

## 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 programme towards a clinical degree, and it has minimal neuroscientific content.



### Enquiries

EU  [fred.cummins@ucd.ie](mailto:fred.cummins@ucd.ie)  
[keith.a.wilson@ucd.ie](mailto:keith.a.wilson@ucd.ie)

Non-EU  [internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

### Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-cognitive-science](http://www.ucd.ie/courses/msc-cognitive-science)

### Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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

## 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  [jacqueline.jago-stafford@ucd.ie](mailto:jacqueline.jago-stafford@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/msc-cybersecurity](http://www.ucd.ie/courses/msc-cybersecurity)

## 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 programme is practical and hands on and provided me with multiple projects and coursework that I could speak about in interviews which ultimately helped me get my first cybersecurity role as a Cybersecurity Analyst. The course's multiple discipline approach to modules and guest lecturers from industry in areas ranging from incident response, cyber law, cyber risk and secure programming allowed me to get experience and skills in a broad range of different cybersecurity areas which I could apply immediately to my day-to-day work.



## Applying to UCD

This course receives significant interest so please apply early online at [www.ucd.ie/apply](http://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 programme 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).

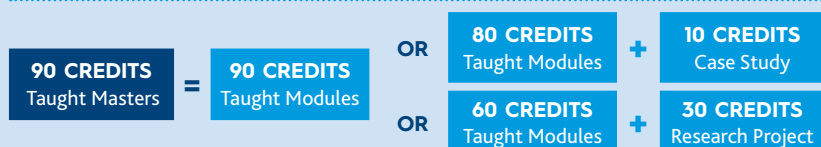
## Graduate Testimonial

**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.

## Course Content and Structure



### 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

## 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 ✉ [emily.delaney@ucd.ie](mailto:emily.delaney@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](http://www.ucd.ie/apply)

[www.ucd.ie/courses/msc-forensic-computing-cybercrime](http://www.ucd.ie/courses/msc-forensic-computing-cybercrime)



# MSc Advanced Artificial Intelligence

1 Year Full Time

Course Code: T413

Our new one-year MSc in Advanced Artificial Intelligence (AI) is designed for individuals with a basic understanding of AI who are eager to delve into cutting-edge topics. This programme offers an excellent opportunity to explore the latest advancements in machine learning, including deep learning, generative AI, large language models and optimisation. You will learn to use your AI skills ethically and responsibly. You will also learn to apply your knowledge to real-world challenges in computer vision, healthcare, speech/audio, time series and recommender systems. You will learn from world-class faculty renowned for their groundbreaking AI research, and immerse yourself 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 one of Ireland's leading hubs 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

- Advanced Machine Learning
- Deep Learning
- AI for Computer Vision
- Trustworthy and Responsible AI
- Optimisation

##### Option modules

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

#### Spring Trimester

##### Core modules

- Generative AI: Language Models
- Artificial Intelligence Ethics
- Machine Learning System Deployment

##### Option modules

- AI for Time Series
- AI for Health
- Speech and Audio
- Recommender Systems
- Maths of Machine Learning
- Quantum Machine Learning

- Optimisation in ML
- Information Visualisation

#### 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 programme 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

EU [✉ advancedai@ucd.ie](mailto:advancedai@ucd.ie)

Non-EU [✉ internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie)

## Entry Requirements

Entry requirements are listed on the course web page.

[www.ucd.ie/courses/AdvancedAI](http://www.ucd.ie/courses/AdvancedAI)

## Applying to UCD

This course will receive significant interest so please apply early online at [www.ucd.ie/apply](http://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+

Global financial institutions have established operations in Ireland, located in Dublin's International Financial Services Centre.

## 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.

### 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.

### THE TOP 10



World's biopharmaceutical companies have operations in Ireland.

Accenture

Airbnb

Apple

Dell

eBay

Meta

Google

HP

IBM

Intel

LinkedIn

Microsoft

Salesforce

Stripe

X

Allianz

AIG

Bank of America

Barclays

Citco

Citi

HSBC

J.P. Morgan

PayPal

Zurich

Abbott

AbbVie

Allergan

Amgen

GSK

Johnson & Johnson

Eli Lilly and Co.

Medtronic

MSD

Novartis

Pfizer

Roche

Sanofi



# 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 programmes.

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





# 112

Graduate students completed internships in 2024.



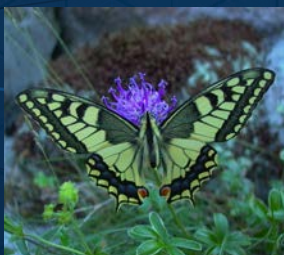
# 160

Companies and research institutes partnered with in 2024.

## SCIENCE, TECHNOLOGY AND FINANCIAL SERVICES SECTORS



**Biotechnology, Biomedical, Pharmaceutical & 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**

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

AstraZeneca

Alexion

Bristol Myers Squibb

IRLCA Ltd.

APC Ltd.

Pfizer

MSD

Biosensia

Teva Pharmaceutical Industries Ltd.

PBC Biomed

Beauparc

Enviroguide

Uisce Éireann

Emerald Park

Dublin Zoo

RPS Group

Marine Institute

National Parks & Wildlife Service

Teagasc

Hydro-Environmental Services

Ernst & Young

SIG plc.

Flutter Entertainment plc.

KPMG

Zurich Life

Grant Thornton

Deloitte

Aviva

Stats Perform

Met Éireann

European Space Agency

Cosine (Netherlands)

Réaltra Space Systems Engineering

Mindseed

Ubotica Technologies

TechWorks Marine

Spire Global UK

Curtiss-Wright

CeADAR

Compass Informatics

Bank of America

Dell

Workday

HubSpot

Spanish Point Technologies Ltd.

Rakuten Kobo

SAP

Canada Life

Ericsson

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,  
Pharmaceutical &  
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

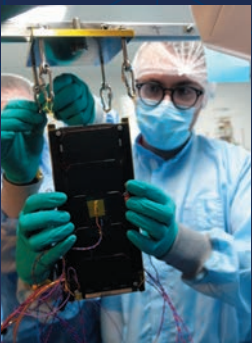
“ The MSc coursework paired with my six-week placement at Dublin City Council prepared me for a career in the environmental sector and gave me proficiency in the collection, processing, analyses, and interpretation of environmental data. The well-rounded curriculum, hands-on field work, and supportive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



**Mathematics,  
Actuarial Science,  
Finance & Data  
Analytics**

**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.





# MEET OUR GRADUATES

A diverse range of careers are available to UCD Science and Computer Science graduates. Depending on your chosen course, you will learn practical skills which can be transferred to industry and research ranging from biotechnology, conservation, natural resources and wildlife to business, space science, technology, financial services and insurance.



**COURTNEY GREENE**  
MSc BIOTECHNOLOGY  
& BUSINESS

**"The MSc Biotechnology & Business course was crucial for my future success"**

As I wanted to work in regulatory management and approval of drugs, the MSc Biotechnology & Business course was crucial for my future success in the pharmaceutical and biotechnology industry. During the Summer Trimester, we had the opportunity to work with a real biotechnology start-up and essentially create a business plan for a molecule, drug or medical device that they were working to bring to market. We presented the business plan to real investors to see if they would be willing to invest hypothetically had this been a real-world scenario. After graduation, I worked as a Clinical Research Coordinator in paediatric clinical trials across Children's Health Ireland at Crumlin and Temple Street Hospital. This role was part of a multidisciplinary team of researchers, consultants and investigators on both clinical trials and investigator led research studies in cystic fibrosis.



**YANA BERSUNUKAYEVA**  
MSc GLOBAL CHANGE:  
ECOSYSTEM SCIENCE & POLICY

**"This course was an ideal solution to fill in my knowledge gap in environmental policy and law"**

Having completed my undergraduate degree in Environmental Science I gained an invaluable practical approach to the subject. However, I wanted to gain knowledge in the policy aspect of environment. This course was an ideal solution to fill in my knowledge gap in environmental policy and law while also providing me with an opportunity to study abroad in Giessen, Germany. Additionally, as part of the course, I chose to undertake my 2-month internship as an environmental scientist with RPS Group, an engineering consultancy firm. The internship provided me with a working knowledge of carrying out Environmental Impact Assessment Reports (EIARs) and introduced me to an environmental consulting environment. The internship position enabled me to secure a position of Graduate Environmental Scientist upon completion of the course.



# MEET OUR GRADUATES

**TROY TYSON**  
MSC ACTUARIAL SCIENCE

**"It gave me an insight into the typical day of an actuary working in the life insurance sector"**

This course gave me the opportunity to acquire exemptions from the professional examinations of the Institute and Faculty of Actuaries, which are mandatory to become a fully qualified actuary. The research placement portion of the year for me was extremely beneficial with regards to my career as an actuary. It gave me an insight into the typical day of an actuary working in the life insurance sector. I would highly recommend the UCD MSc in Actuarial Science to those in search of a challenging yet rewarding year and looking for the perfect launching pad to their career as an actuary.

**HANNAH CURRIVAN**  
MSC SPACE SCIENCE  
& TECHNOLOGY

**"The technical writing skills was the biggest benefit from the course"**

After a placement on the build of Ireland first radio telescope "I-LOFAR", I wanted to continue my career in the area of space. The core modules that I most enjoyed were Satellite Subsystems, Space Sector Professional Skills, and the Space Sector Internship. These modules have helped a lot working in the space industry. For the Space Sector Internship module, I completed a placement with Réaltra Space Systems Engineering. This is where I wrote my master's thesis on "The Reliability Model of the European Space Agency (ESA) PLATO (PLANetary Transits and Oscillations of stars) mission PLIU (Payload Interface Unit) test breadboard." The technical writing skills was the biggest benefit from the course. Besides carrying out experiments and design of new products, writing highly technical documents is a really important part of working in the space industry. I currently work for InnaLabs Ltd as a Space Reliability Engineer working on multiple space products for customers such as ESA, Airbus, Thales, and OHB SE.

**YASH KARLE**  
MSC COMPUTER SCIENCE  
(NEGOTIATED LEARNING)

**"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."**

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 dash-boards 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.

**NIAMH CROWLEY**  
MSC COMPUTER SCIENCE  
(CONVERSION)

**"In the space of 16 busy months, you are taken from the basics to being industry ready"**

I have always had an interest in computers and problem solving but with an undergraduate degree in Primary teaching, I had very little knowledge or experience in the world of technology. I chose the conversion course in UCD for two main reasons: the course didn't focus on one specific area of Computer Science but covered a wide range of topics, and it required no prior understanding of any of these topics and promised to start from the basics. This was important to me as it allowed me to gain experience in many areas such as programming, software engineering, and data analytics. I gained so much experience and confidence from completing this course. In the space of 16 busy months, you are taken from the basics to being industry ready. The content is organised so each module builds on the last and come the Research Practicum in the Summer Trimester, you are ready to tackle a real-world engineering problem with all the knowledge you have accumulated during the course. Upon graduating, I joined the software engineering graduate programme with Accenture and am now working as a software engineer with one of their clients.



# APPLYING TO A UCD GRADUATE COURSE

## How do I apply?

UCD's Graduate Taught courses can be applied for online at [www.ucd.ie/apply](http://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](http://www.ucd.ie/graduateadmissions)

## When are offers of places made?

UCD has a rolling admissions policy for graduate taught courses, 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. Applicants should visit the UCD Graduate Admissions website at [www.ucd.ie/graduateadmissions/feesfundingscholarships](http://www.ucd.ie/graduateadmissions/feesfundingscholarships) for information.

## Where can I find information on fees and accommodation?

Information is available from the following:

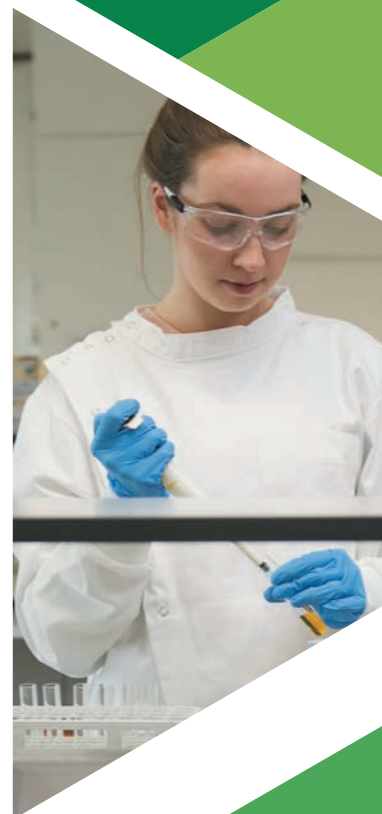
- The Fees & Grants website at [www.ucd.ie/students/fees](http://www.ucd.ie/students/fees) has answers to many frequently asked questions.
- The UCD Residences website at [www.ucd.ie/residences](http://www.ucd.ie/residences) has information and advice about the accommodation process.

## How do I get in contact for more information?

You can contact us in the following ways:

- All applicants are welcome to email the academic or staff member associated with each course. Contact information for each course is at the end of the course pages.
- International applicants can email [internationalenquiries@ucd.ie](mailto:internationalenquiries@ucd.ie) to speak to UCD Global staff for advice on general admissions queries, fees, visas, accommodation and course information.





University College Dublin  
An Coláiste Ollscoile, Baile Átha Cliath

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[www.ucd.ie/science](http://www.ucd.ie/science)

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