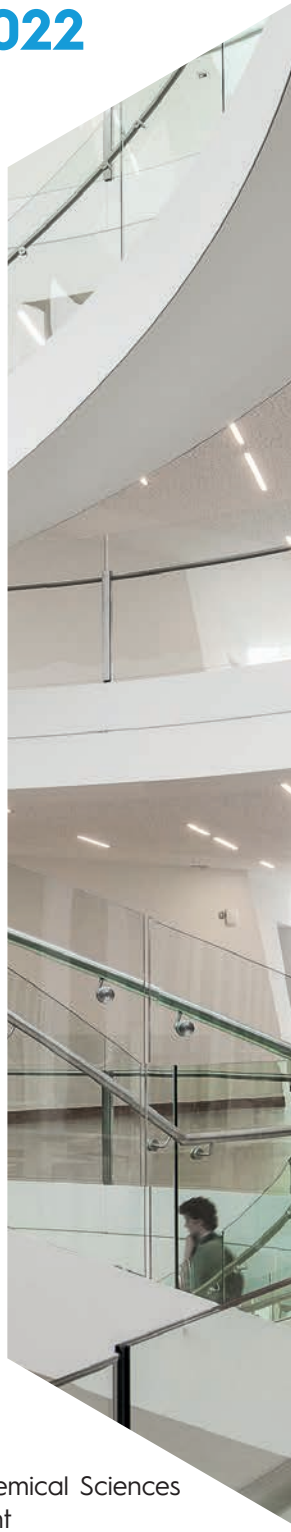
UCD SCIENCE

GRADUATE TAUGHT COURSES ENTRY 2022



Biotechnology, Biomedical, Pharmaceutical & Chemical Sciences
Energy, Natural Resources, Climate & Environment
Mathematics, Actuarial Science & Finance
Physics & Nanotechnology
Computer Science

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This booklet (Version 1 Entry 2022) 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.

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. 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/applytoucd/.

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/ 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 has answers to many frequently asked questions.
- The UCD Residences website at 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 to speak to UCD Global staff for advice on general admissions queries, fees, visas, accommodation and course information.

Jargon Buster

Academic Terms

MSc
Master of Science

Graduate Taught Courses
Graduate taught courses, such as Graduate Certificates, Graduate Diplomas or taught MA or MSc courses are usually taken by students who hold an undergraduate degree. The majority of the course will involve taking taught modules.

Research Degrees
A research degree such as a Masters by Research or PhD involves the sustained and in-depth study of a specific subject, which is then written up as a thesis for examination. Research degrees involve students carrying out their own research and academic study under the one-to-one supervision of an academic supervisor. Masters by Research are typically 1-2 years in duration whereas a PhD is 4 years.

Negotiated Learning (NL)
Courses using the negotiated learning (NL) format allow students a high degree of flexibility in terms of module choices allowing "customisation" of the degree. Students meet with an academic to discuss their background and goals to create their academic plan which is customised to the individual student needs and their prior learning experiences.

Trimester
The academic year is divided into trimesters – Autumn, Spring and Summer.

Information on Classes

Module
A self-contained unit of teaching and learning, which is usually studied within one trimester. Modules are usually 5 credits. A standard 5-credit UCD module represents 100-125 hours of student effort including time spent in class, studying and assessment.

Practicals
Practicals (or laboratory) classes involve carrying out selected experiments, examining scientific material and getting hands-on experience of practical subjects. They generally take place in the afternoons and typically are of two-to-three hours' duration.

Tutorials
Tutorials generally take place in a classroom with a smaller group size than lectures. They provide an opportunity to explore and apply the concepts, skills and competencies in a manner that is not usually possible in larger classroom environments.

Credit
This is a standard way of representing the amount of student effort, the achievement of learning outcomes and educational activity associated with a module. UCD utilises the European Credit Transfer System (ECTS). The ECTS was developed to facilitate educational mobility for students and inter-institutional cooperation amongst higher education institutions within the European Union.

Internships and Professional Experience at a Glance

Each section includes the main areas that students have gained experience in through internships or professional experience and reflect the main sectors that graduates work in.

**Professional placement/internship*
***Negotiated Learning*

Pharmaceuticals, Biotechnology, Medical Devices, Clinical Trials & Chemical Industry

Degrees

- MSc Biotechnology*
- MSc Biotechnology & Business
- MSc Biotherapeutics
- MSc Biotherapeutics & Business
- MSc Chemistry (NL)**
- MSc Synthetic Chemistry for the Pharmaceutical & Fine Chemicals Industry
- MSc Regulatory Affairs & Toxicology*
- MSc Biological & Biomolecular Science (NL)**
- MSc Plant Biology & Biotechnology
- MSc Medical Physics

Examples of Internships/Professional Experience

The internships listed are examples of past placements and are a guide only. Placements are secured through a competitive process and are not guaranteed.

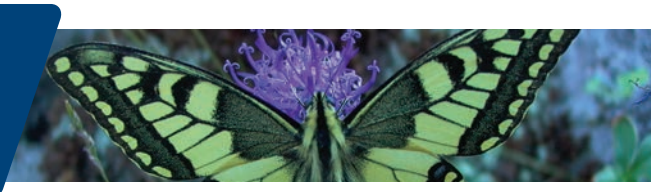
MSc Biotechnology*

Alexion
Bristol Myres Squibb
AstraZeneca
BD
MSD
Pfizer
Biosensia
Jazz Pharmaceuticals
Alltech

MSc Regulatory Affairs and Toxicology*

Novartis
Health Products Regulatory Authority
Perigord Life Science Solutions
Food Safety Authority of Ireland
Medical Bureau of Road Safety
Forensic Science Ireland
Pfizer
Alexion
Deenamic
Aspen Pharma
Life Scientific

Energy, Natural Resources, Climate & Environment



Degrees

- MSc Applied Environmental Science*
- MSc Environmental Sustainability (Online)
- MSc Global Change: Ecosystem Science & Policy*
- MSc Plant Biology & Biotechnology
- MSc Subsurface Characterisation and Geomodelling

Examples of Internships/Professional Experience

The internships listed are examples of past placements and are a guide only. Placements are secured through a competitive process and are not guaranteed.

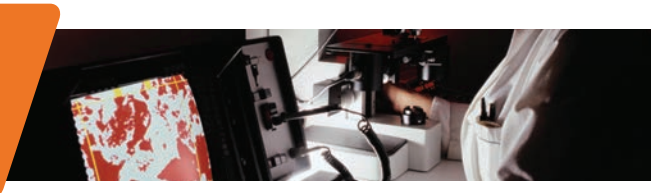
MSc Applied Environmental Science

RPS Group
Dublin City Council
Minerex
Department of Agriculture, Food and the Marine
Golder Asscoiates
Dublin Urban Rivers Life Project

Global Change: Ecosystem Science & Policy

Biorbic
Kildare County Council
Sonairte
An Taisce
RISE Foundation

Semiconductor, Nanotechnology, Meteorology & Space Industry



Degrees

- MSc Space Science & Technology*
- MSc Computational Physics
- MSc Applied Mathematics & Theoretical Physics
- MSc Nanotechnology
- MSc NanoBio Science
- MSc Nanomaterials Chemistry
- MSc Physics (NL)**
- MSc Medical Physics

Examples of Internships/Professional Experience

The internships listed are examples of past placements and are a guide only. Placements are secured through a competitive process and are not guaranteed.

MSc Space Science & Technology

European Space Agency
European Astronaut Centre
Cosine (Netherlands)
German Space Agency (DLR)
Réaltra Space Systems Engineering
ICEYE
Skytek
Eblana Photonics
Arralis

Computing, Risk, Finance & Analytics

Degrees

- MSc Computer Science (NL)**
- MSc Computer Science (Conversion)
- MSc Forensic Computing & Cybercrime Investigation
- MSc Actuarial Science*
- MSc Statistics
- MSc Computational Physics
- MSc Applied Mathematics & Theoretical Physics
- MSc Data Analytics (Online)
- MSc Data & Computational Science
- MSc Financial Mathematics

Examples of Internships/Professional Experience

The internships listed are examples of past placements and are a guide only. Placements are secured through a competitive process and are not guaranteed.

MSc Computer Science (NL)

Amazon
SAP
Dell
Ericsson
Hubspot
Geowox
Evocco
Foodmarble
Health Beacon
Salesforce
Autodesk
Microsoft

MSc Actuarial Science

Allianz
AIG
Canada Life
Central Bank
Irish Life
Mercer
New Ireland
Liberty
Greenval Insurance

Further Education & Research

Degrees

- MSc degrees can lead to a variety of PhD programmes as well as conversion courses

Depending on the degree, examples of roles include:

- PhD Scientist working in industry
- Postdoctoral Researcher working in academia

My Internship Experience

Msc Regulatory Affairs & Toxicology

Stephanie Earl

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.

MSc Biotechnology

Kara O'Connor

The course provided me with the opportunity to work as a Bulk Drug Substance Technical Services intern with Alexion Pharmaceuticals. The technical and cultural experience I gained during the 6-month internship was indispensable in shaping my career path and being successfully rehired after completing my course.

MSc Applied Environmental Science

Betsy Townsend

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.

MSc Global Change: Ecosystem Science & Policy

Yana Bersunukayeva

I undertook an internship as an Environmental Scientist with RPS, an engineering consultancy firm. The internship provided me with a working knowledge of carrying out Environmental Impact Assessment Reports and introduced me to an environmental consulting environment. The position enabled me to secure a position as a Graduate Environmental Scientist upon completion of the Master's degree.

MSc Space Science & Technology

Meadhbh Griffin

During my internship in the Flight Software Systems section at ESTEC I designed and tested control software for CHIMERA, a payload of RADCUBE, a Hungarian CubeSat launched in July 2021. I developed software to detect radiation-induced memory upsets and to test communication between two ultra-wideband radio modules. Following my internship, I was accepted into ESA's Young Graduate Trainee programme, returning to the Flight Software Systems section.

MSc Space Science & Technology

Rabin Stephen Francis

My internship at Innalabs Ltd., a world-leading inertial sensors manufacturer, was an amazing learning opportunity that offered me a valuable industrial experience, complementing the knowledge gained in classrooms. Following my internship, I've been hired by Innalabs as a software engineer to continue to work on its lineup of exciting space projects with ESA and many other customers.

MSc Actuarial Science

Shannon McDonnell

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.

MSc Computer Science (Negotiated Learning)

Yash Karle

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.

The Business of Science and IT in Ireland

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

Over 1000 Overseas companies have chosen Ireland as their strategic location in Europe.

5 of the top 10

Companies on Forbes' list of The World's Most Innovative Companies have Irish operations according to IDA Ireland

More than 250

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

Top Global financial institutions

Bank of America, HSBC, citi, AIG, Zurich, CITCO, Allianz

9 of the top 10 global pharmaceutical companies are located in Ireland.

Amgen, Lilly, Johnson & Johnson, Allergan, abbvie, Medtronic, Pfizer, Abbott, MSD INVENTING FOR LIFE, Novartis, Sanofi, gsk, Roche

Ireland is home to operations by some of the world's leading pharmaceutical, biotechnology and medical devices companies making some of the world's blockbuster medicines.

6 OF THE TOP 10 worldwide security software companies are located in Ireland

The Top Ten

"Born on the Internet" companies are based in Ireland

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.

MSc Biotechnology & Business

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. I'm currently working as a Clinical Research Coordinator in paediatric clinical trials across Children's Health Ireland at Crumlin and Temple Street Hospital. I work as part of a multidisciplinary team of researchers, consultants and investigators on both clinical trials and investigator led research studies in cystic fibrosis.

Courtney Greene

MSc Global Change: Ecosystem Science & Policy

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, 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.

Yana Bersunukayeva

MSc Actuarial Science

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.

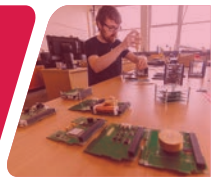
Troy Tyson

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 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.

Yash Karle

MSc Space Science & Technology



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.

Hannah Currivan

MSc Computer Science (Conversion)

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.

Niamh Crowley

University College Dublin
Ireland's Global University

COURSE CODE: X439

MSc Biotechnology

(1 Year Full Time)

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 9 of the top 10 global pharmaceutical 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 biotech 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. 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.

Images © UCD Research

Course Content and Structure

90 credits taught masters	=	**60 credits** taught modules	+	**30 credits** individual research project or internship

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

- Biological Imaging
- Multicellular Systems
- Pharmacology and Drug Development
- Medical Device Technology
- Biomedical Diagnostics
- Recombinant DNA Technology
- Microbial and Animal Cell Culture
- Food Biotechnology
- 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.

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

This advanced 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; GlaxoSmithKline; Icon Clinical Research; Johnson & Johnson Ltd.; Kerry Group Plc.; Merck Sharp & Dohme; Quintiles; Sandoz; Serology Ltd.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- Candidates are expected to have an upper second class honours grade, or international equivalent, in a biology or chemistry primary degree with a significant laboratory component. This includes a BSc in Biotechnology, Biochemistry, Microbiology, Genetics, Neuroscience, Pharmacology, Physiology, Medicinal Chemistry or an equivalent qualification. Graduates with equivalent qualifications in related areas of science and technology or with proven relevant industrial experience will be considered for places.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Graduate Profile

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.

EU ENQUIRIES Professor Cormac Murphy ✉: biotech@ucd.ie
www.ucd.ie/courses/msc-biotechnology
NON-EU ENQUIRIES ✉: internationalenquiries@ucd.ie
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UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

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University College Dublin
Ireland's Global University

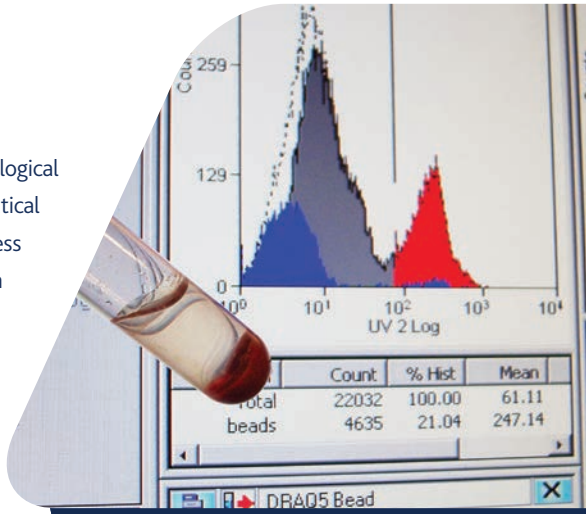
COURSE CODE: X447

MSc Biotechnology & Business

(1 Year Full Time)

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 9 of the top 10 global pharmaceutical 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.



Images © UCD Research

Course Content and Structure

90 credits taught masters = **70 credits** taught modules + **20 credits** group business plan research project

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

- Drug Discovery
- Medical Device Technology
- Biomedical Diagnostics
- Regulatory Affairs
- Bioprocessing
- Biotechnology Case Study
- Marketing Management
- Corporate Finance
- Entrepreneurship
- Business Plan Development
- Business Strategy
- Organisational Behaviour

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a BSc in a biology- or chemistry-related discipline. An upper second class honours or international equivalent is required.
- Graduates with equivalent qualifications in related areas of science and technology or with proven relevant industrial experience will be considered for places.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Career Opportunities

This advanced graduate degree in Biotechnology and 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.

Prospective employers include: Abbott; Allergan; Alpha Technologies; Amgen; Avonmore Foods; Baxter Healthcare; Beckman Coulter; Biotrin International Ltd.; Boston Scientific; Elan Corporation; Eli Lilly and Co.; Celltech; GlaxoSmithKline; Icon Clinical Research; ImmunoGen Inc.; Janssen Pharmaceutical Ltd.; Johnson & Johnson Ltd.; Kerry Group Plc.; Medtronic; Merck Sharp & Dohme; Olympus Diagnostica; Quintiles; Quest International; Sandoz.; Seroba Kernel; Serology Ltd.

Graduate Profile

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 UCD Nova start-up company. I am currently working as an Investment Analyst in a life sciences venture capital firm.

EU ENQUIRIES Dr Antonio Garzon-Vico : biotech@ucd.ie
www.ucd.ie/courses/msc-biotechnology-and-business
NON-EU ENQUIRIES : internationalenquiries@ucd.ie
www.ucd.ie/global
UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

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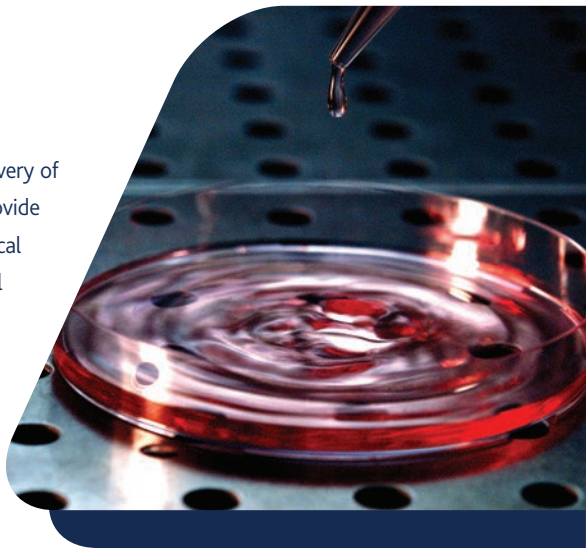
University College Dublin
Ireland's Global University

COURSE CODE: F102

MSc Biotherapeutics

(1 Year Full Time)



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

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

Course Content and Structure

90 credits taught masters = **45 credits** taught modules + **45 credits** project

The structure of the programme is as follows:

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

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

This advanced 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, GlaxoSmithKline, Eli Lilly and Co., Johnson & Johnson Ltd., Pfizer, Janssen Biologics, AstraZeneca, MSD, Bristol Myers Squibb, Abbott, Sanofi.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who have an upper second class honours degree, or the international equivalent, in a biological or chemical science.
- This includes a BSc in Biotechnology, Biochemistry, Microbiology, Genetics, Neuroscience, Physiology, Pharmacology, Medicinal Chemistry or an equivalent qualification.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Faculty Profile

Associate Professor David O'Connell, Lecturer in Biochemistry & Pharmacology

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.

EU ENQUIRIES Associate Professor David O'Connell ✉: biotech@ucd.ie
www.ucd.ie/courses/msc-biotherapeutics
UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

NON-EU ENQUIRIES ✉: internationalenquiries@ucd.ie
www.ucd.ie/global

V1 2022 F102

University College Dublin
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COURSE CODE: F103

MSc Biotherapeutics & Business

(1 Year Full Time)

The MSc in Biotherapeutics and 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.

Images © UCD Research

Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** project modules

The structure of the programme is as follows:

Autumn Trimester
- Professional Career Development
- Marketing Management
- Corporate Accounting and Finance
- Business of Biotechnology and Science
- Biotherapeutic Pipeline I
- Recombinant DNA Technology
- Biomedical Diagnostics
- Pharmacology and Drug Development

Spring Trimester
- Professional Career Development
- Biotherapeutic Pipeline II
- Systems Biology in Drug Development
- Bioprocessing Laboratory
- Emerging Issues in Biotechnology
- Regulatory Affairs
- Microbial and Animal Cell Products
- High Content Screening Microscopy
- Business Strategy
- Organizational Behaviour

Summer Trimester
- Business Planning
- Biotherapeutics Case Study

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

This advanced graduate degree in Biotherapeutics and 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; GlaxoSmithKline; Icon Clinical Research; ImmunoGen Inc.; Janssen Pharmaceutical Ltd.; Johnson & Johnson Ltd.; Merck Sharp & Dohme; Quintiles; Quest International; Sandoz; Seroba Kernel.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who have an upper second class honours degree, or the international equivalent, in a biological or chemical science.
- This includes a BSc in Biotechnology, Biochemistry, Microbiology, Genetics, Neuroscience, Physiology, Pharmacology, Medicinal Chemistry or an equivalent qualification.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Faculty Profile

Associate Professor David O'Connell, Lecturer in Biochemistry & Pharmacology

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.

EU ENQUIRIES Associate Professor David O'Connell : biotech@ucd.ie
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V1 2022 F103

University College Dublin
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COURSE CODE: F080

MSc Plant Biology & Biotechnology

(1 Year Full Time)

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 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

Modules and topics shown are subject to change and are not guaranteed by UCD.

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.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a BSc in an appropriate life science discipline. An upper second class honours or international equivalent is required. However, in certain cases/circumstances, applicants with lower second class honours will also be considered.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Faculty Profile

Dr Rainer Melzer, UCD School of Biology and Environmental Science

Dr Melzer is mainly interested in flower and fruit development. He is working on a diversity of crops, including barley, wheat, and hemp. His team uses genomics, molecular genetics, and morphological methods to identify the genetic and environmental mechanisms underlying flowering time control, flower development and evolution.

Dr Melzer is internationally well connected and is associate editor for the Journal of Experimental Botany and secretary of the European Society for Evolutionary Developmental Biology.

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BIOTECHNOLOGY, BIOMEDICAL, PHARMACEUTICAL & CHEMICAL SCIENCES

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COURSE CODE: F104

MSc Biological & Biomolecular Science

(Negotiated Learning) (1 Year Full Time)

The MSc in Biological and Biomolecular Science by 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 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.

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

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Course Content and Structure

90 credits taught masters = **30 credits** core laboratory skills + **20 credits** core professional skills + **40 credits** taught modules

Course divided into:

Core Laboratory Research Skills (30 credits) including techniques such as RT-PCR, western blotting and Advanced Fluorescence 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) involves selecting one of the following specialisations and selecting specific modules within these that meet the student's learning objectives.

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, host-pathogen 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.

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

This programme will enable you to choose from a wide range of careers and areas of postgraduate study. This multi-disciplinary 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.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who have at least an upper second class honours degree, or the international equivalent, in a life science or chemical science. Examples of an appropriate BSc subject include, but are not restricted to, Biotechnology, Biology, Biochemistry, Microbiology, Genetics, Neuroscience, Physiology, Pharmacology, Immunology, Pharmaceutical Chemistry and Medicinal Chemistry.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Faculty Profile

Dr Joanna Kacprzyk, Lecturer in Cell Biology & Genetics, UCD School of Biology and Environmental Science

My research is focused on the mechanisms governing cell fate decisions between programmed cell death and survival pathways. Using both plant and mammalian cell culture systems I use fluorescence microscopy, enzymatic assays and RT-PCR to characterise the cellular responses to stress stimuli.

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www.ucd.ie/courses/msc-biological-biomedical-science
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UCD School of Biology and Environmental Science, UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

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COURSE CODE: F167

MSc Regulatory Affairs & Toxicology

(1 Year Full Time)

PD/CPD Toxicology

(Part Time and Full Time options available)

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.

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Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** Internship / Research Project

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

These modules are delivered by staff of international renown in toxicology and regulatory science. The courses have been developed in close collaboration with the Irish Register of Toxicologists (IRT) and are pre-approved for accreditation towards becoming a registered toxicologist. The core programme team are European Registered Toxicologists (ERT). Across our modules guest lecturers, who are practicing regulatory toxicologists and regulatory affairs specialists, contribute state-of-the-art seminars from a range of sectors including pharmaceuticals, biopharmaceuticals, medical devices, food safety, cosmetics and environmental protection. All students are offered the opportunity to undertake an internship during the programme. Study days and e-learning are utilised to maximise flexibility in how students manage their study time.

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is a graduate programme and applicants must possess a minimum of an upper second class honours undergraduate degree or relevant experience in the area of toxicology/pharmacology.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Career Opportunities

This programme provides a comprehensive overview of toxicology, and current toxicological assessments, highlighting current issues in toxicology. Graduates will gain the required level of professional ability to operate as independent toxicologists by developing a sophisticated level of data interpretation, communication skills, excellence in problem solving, and ability to critically evaluate and form judgements on complex toxicological problems.
Currently practising toxicologists will also benefit from undertaking individual modules for continuing professional development (CPD).

Faculty Profile

Dr Craig Slattery, UCD School of Biomolecular and Biomedical Science

I am a Lecturer in Toxicology & Regulatory Affairs in the UCD School of Biomolecular and Biomedical Sciences. Previously, I worked as an assessor in Human Medicines at the Health Products Regulatory Authority. I am a Registered Toxicologist and I act as an external assessor for national regulatory bodies, and an external advisor for pharmaceutical and biotechnology companies.

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BIOTECHNOLOGY, BIOMEDICAL, PHARMACEUTICAL & CHEMICAL SCIENCES

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COURSE CODE: F042

MSc Chemistry (Negotiated Learning)

(1 Year Full Time/2 Years Part Time)

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, through the 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

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.

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a Chemistry degree, or a degree with a significant component of chemistry. An upper second class honours undergraduate degree or international equivalent is required.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

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.

Faculty Profile

Dr Xiangming Zhu, UCD School of Chemistry

This MSc Chemistry (Negotiated Learning) trains students to a high level of knowledge and proficiency in a specialised area of chemistry such as medicinal chemistry, chemical biology, pharmaceutical chemistry, energy and sustainable chemistry, biophysical chemistry or nanotechnology.

EU ENQUIRIES Associate Professor James Sullivan : james.sullivan@ucd.ie
www.ucd.ie/courses/msc-chemistry
UCD School of Chemistry, University College Dublin, Belfield, Dublin 4.

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V1 2022 F042

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.

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COURSE CODE: F105

MSc Synthetic Chemistry for the Pharmaceutical & Fine Chemicals Industry

(1 Year Full Time/2 Years Part Time)

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 operations by 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.

X-ray crystal structure of all cis hexaphenylcyclohexane, isolated from the BIRCH reduction of hexaphenylbenzene.
Images © UCD Research

Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** research project

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

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a Chemistry degree, or a degree with a significant component of chemistry. An upper second class honours undergraduate degree or international equivalent is required.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Career Opportunities

The MSc Synthetic Chemistry course 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.

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.

Faculty Profile

Associate Professor Paul Evans, UCD School of Chemistry

I am an organic chemist, contributing to teaching and also leading research in the UCD School of Chemistry. My main research interest is in the area of developing new synthetic methods to prepare biologically active small molecules. Targets include fatty acid metabolites and saturated N-heterocycles, and we have prepared both natural products and structural analogues.

EU ENQUIRIES Associate Professor Paul Evans
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COURSE CODE: X062

MSc Applied Environmental Science

(1 Year Full Time)

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.

Images © UCD Research

Course Content and Structure

90 credits taught masters = **65 credits** taught modules + **5 credits** placement/internship + **20 credits** research project/task

Samples of modules include:

- 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
- Geographic Information Systems (GIS) and Data Analyses
- Remote Sensing
- Ecological Modelling
- Integrated Municipal Solid Waste Management
- Water, Waste and Environmental Modelling

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, including an internship for at least a 6-week period in the environmental sector (including consultancies, government agencies and industry) over the Summer Trimester.

Modules and topics shown are subject to change and are not guaranteed by UCD.

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.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a primary degree in science, engineering, geography, architecture or a related subject. An upper second class honours or international equivalent is required.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Graduate Profiles

Hannah Fearon, RPS Environmental, Ireland

Overall, the course was an eye-opening experience with a great mixture of lab sessions, field work and lectures. The highlight of this course for me was definitely 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, US EPA

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.

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JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

COURSE CODE: F038

MSc Global Change: Ecosystem Science & Policy

(Joint International Degree, 16 Months Full Time)

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

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. For more information visit: www.MasterGlobalChange.org

Samples of topics available include:

- 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

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.

Modules and topics shown are subject to change and are not guaranteed by UCD.

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).

APPLY NOW

This programme receives significant interest so please apply early online at www.ucd.ie/apply. Please note that the annual course fee covers the full 16-month period.

Entry Requirements

- This programme is intended for applicants with a degree in an appropriate life sciences discipline, such as biology, agriculture or environmental science (including zoology, ecology, biochemistry, geology and physics). A lower second class honours or international equivalent is required.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Graduate Profile

Lisa Reilly

One of the best aspects of this course was the variety of modules, from policy to hands-on practical modules which allowed me to find my own interests and build up my skills. The professional work placement gave me first-hand exposure to working in the real world and set my CV apart from other graduates. I studied in both Ireland and Germany and received funding to complete my thesis at the Centre for International Forestry in Indonesia.

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COURSE CODE: F059

MSc/Grad Cert/Grad Dip Environmental Sustainability

(Negotiated Learning) (Online)

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

Images © UCD Research

Course Content and Structure

90 credits MSc =
65 credits taught credits + **25 credits** practicum research study project
or
75 credits taught credits + **15 credits** practicum desk study

60 credits Graduate Diploma
30 credits Graduate Certificate

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. Modules include:

- 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 Resources Engineering 1 and 2
- 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)

Modules and topics shown are subject to change and are not guaranteed by UCD.

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.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a primary degree in science, engineering, or a related discipline. A lower second class honours degree or international equivalent is required. Applicants with substantial relevant work experience will also be considered.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Graduate Profile

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.

EU ENQUIRIES Dr Elke Eichelmann ✉: sustainabilityonline@ucd.ie
www.ucd.ie/courses/msc-environmental-sustainability
UCD School of Biology and Environmental Science, University College Dublin, Belfield, Dublin 4.

NON-EU ENQUIRIES ✉: internationalenquiries@ucd.ie
www.ucd.ie/global

University College Dublin
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COURSE CODE: F181

MSc Subsurface Characterisation & Geomodelling

(1 Year Full Time)

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 geoscience in our changing world. The course is taught by experts from diverse geoscience disciplines, including the minerals and hydrocarbon 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). 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.

Images © UCD Research

Course Content and Structure

90 credits taught masters	=	60 credits taught modules	+	30 credits applied research project

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

Samples of modules include:

- Overview of Industrial Geology
- 3D Mapping and Modelling
- Stratigraphic Prediction
- 'Hard rock' Characterisation
- Applied Structural Geology
- Geophysical Methods
- Geostatistics
- Geomodelling
- Geodata Manipulation
- Drilling and Well Logging
- Geofluids and Geomechanics
- Quaternary Geology
- Remote Sensing
- Fractured Rock Characterisation
- Team-Based Modelling Exercises
- Field Skills

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who have an upper second class honours or international equivalent in Earth Science or Geoscience.
- Consideration will be given to applicants with similar qualifications in cognate areas (e.g. Geophysics/Physical Geography), and to those with significant and relevant work experience but who do not meet this criterion.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent. Visit the UCD Admissions website for further details.

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.

Faculty Profile

Associate Professor Tom Manzocchi, UCD School of Earth Sciences

Understanding and predicting the movement of geological fluids in the shallow crust requires consideration of 3D geological structure over microscopic to kilometre scale-ranges. My research focuses on developing methods for representing geological structure in fluid flow models. Usually there are only very limited observational constraints about the subsurface, so the challenge is to include realistic uncertainty in the geomodel, whilst also representing the key features that influence the flow process of interest.

EU ENQUIRIES Associate Professor Tom Manzocchi : tom.manzocchi@ucd.ie
www.ucd.ie/earthsciences/study/mscsubsurface
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www.ucd.ie/global

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University College Dublin
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COURSE CODE: F034

MSc Actuarial Science

(1 Year Full Time)

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 + **20/30 credits** research project

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. There will be opportunities for some students to complete their thesis as a paid research placement with an actuarial company.

Modules and topics shown are subject to change and are not guaranteed by UCD.

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.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a degree in a quantitative area such as mathematics, statistics, computer science, engineering or economics and/or finance. An upper second class honours or international equivalent is required.
- We will, however, consider applications from prospective students who do not meet these entry requirements provided they can demonstrate an ability and commitment to study actuarial science.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Graduate Profile

Troy Tyson,
Trainee actuary in New Ireland Assurance

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 insurance sector.

EU ENQUIRIES Programme Administrator : smspostgrads@ucd.ie
www.ucd.ie/courses/msc-actuarial-science
UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

NON-EU ENQUIRIES : internationalenquiries@ucd.ie
www.ucd.ie/global

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University College Dublin
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COURSE CODE: F036

Graduate Diploma Actuarial Science

(9 Months Full Time)

The Graduate Diploma in Actuarial Science is designed for students from quantitative disciplines who ultimately wish to train as an actuary upon completion of the programme. The Graduate Diploma can help fast track your career as an actuary by supporting you through the initial examinations of the Institute and Faculty of Actuaries, UK.

The programme provides a solid foundation in mathematics, statistics, economics and finance for future actuarial studies. 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

60 credits graduate diploma = **60 credits** taught modules

There is no option to complete the Graduate Diploma on a part-time basis. Depending on your subject choices in the Autumn and Spring Trimesters, you may also undertake advanced modules in finance at the UCD Michael Smurfit Graduate Business School.
The Graduate Diploma in Actuarial Science covers the Core Principles subjects (CS1, CS2, CM1, CM2, CB1, CB2) 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)

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

Upon successfully completing the Graduate Diploma in Actuarial Science 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. Successful graduates can expect early responsibility in their chosen career and the opportunity to work in a variety of challenging roles. 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.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a degree in a quantitative area such as mathematics, statistics, computer science, engineering or economics and/or finance. An upper second class honours or international equivalent is required.
- We will, however, consider applications from prospective students who do not meet these entry requirements provided they can demonstrate an ability and commitment to study actuarial science.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Graduate Profile

Alex Clarke, Actuarial Trainee, Lloyds of London

The quality of the education was excellent, arising from the level of experience and dedication of the lecturers. Within three weeks of completing my final exam I had four job offers and chose what I felt was the most interesting area for me.

EU ENQUIRIES Programme Administrator : smspostgrads@ucd.ie
www.ucd.ie/courses/gdip-actuarial-science
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UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

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COURSE CODE:
F084/F057

MSc/Professional Diploma Data Analytics

(3 Years/9 Months Part Time) (Online)

This online course will help you analyse and understand the large data sets that are regularly being created via the huge growth in freely available online information. 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 as the courses are delivered completely online.

Students will be given videos, online demonstrations, and interactive games to enhance their learning, 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 will attend a UCD exam centre at the end of each trimester for exams.

Course Content and Structure

90 credits	**20 credits**
taught masters (online) – all taught modules	professional diploma (online) – all taught modules

The first year of both programmes is designed to introduce you to statistical and mathematical concepts in Data Analytics and Data Mining, and to start you on statistical programming with data. The second year of the MSc is split between understanding the theory behind statistical models for data via predictive analytics, and dealing with data sets at scale using multivariate techniques. The final year of the MSc covers some advanced statistical modelling methods. A provisional list of topics is as follows:

Statistics modules:
- Machine Learning and AI
- Predictive Analytics
- Multivariate Analysis
- Time Series Analysis
- Stochastic models
- Bayesian Analysis
- Network Analysis

Computing modules:
- Monte Carlo
- R
- C
- Python
- SAS

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a degree in a numerate subject. An upper second class honours or international equivalent is required.
- Those without this requirement, but with equivalent experience in industry, will also be considered on a case-by-case basis, or can apply for the Professional Certificate in Mathematics for Data Analytics and Statistics which leads directly into the Data Analytics programme.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Career Opportunities

Data 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, Facebook, Amazon, Paddy Power)
- The pharmaceutical industry (e.g., Janssen, Merck, GSK)
- The financial services industry (e.g., Bank of Ireland, AXA, EY, Accenture, Deloitte)

Graduate Profile

Fergal Kelly, Data Analyst in 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.

EU ENQUIRIES Programme Administrator : dataanalyticsonline@ucd.ie
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www.ucd.ie/global

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COURSE CODE: T306

MSc Data & Computational Science

(1 Year Full Time)

The MSc Data & Computational Science is designed for students from highly quantitative disciplines who wish to work in data analytics or computational science. Computational Science is at the crossroads between modern applied mathematics and statistics, and our programme recognises this fact by combining aspects of both in a unique set of tailored modules including scientific computing, mathematical modelling, and data analytics.

The programme will equip you to solve complex scientific problems and analyse large data sets using a range of theoretical tools, from deterministic mathematical modelling to Bayesian analysis. The intensive programming modules will allow you develop a range of sought-after skills in practical programming and data analytics, including applications in high performance computing.

Course Content and Structure

Research Stream	=	**60 taught credits** Autumn/Spring trimester	+	**30 credit** research project Summer trimester
Taught Stream	=	**90 taught credits** Autumn/Spring/Summer trimester		

The structure of the programme includes the following:

Core Modules in Computational Science and Mathematics
- Data Programming with Python
- Data Programming with R
- Mathematica for Research
- Applied Matrix Theory
- Transferable Skills

Core Modules in Statistics and Data Analytics
- Predictive Analytics
- Advanced Predictive Analytics
- Statistical Machine Learning
- Machine Learning and AI
- Bayesian Analysis

Optional Modules Include:
- Scientific Computing
- High-performance Computing
- Numerical Algorithms
- Advanced Computational Science
- Probability and Statistics
- Time Series Analysis
- Monte Carlo Inference

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

The unique combination of modules and skills offered by this programme will equip graduates to work in a range of specific sectors in data analytics, data science, quantitative modelling in finance, and computational science and engineering. Recent past graduates from this programme and other similar past programmes in the School, work in firms including ICT companies (e.g. Facebook, Google, LinkedIn, BAE Systems), the financial services industry (e.g. AIB, AXA, Citi, Deloitte, Geneva Trading, KBC, Permanent TSB, Murex), and other data-intensive businesses (e.g. Accenture, AXA, Paddy Power, SAP, ESB, LexisNexis).

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who have an upper second class honours degree or higher, or the international equivalent, in a highly quantitative subject such as Mathematics, Physics, Statistics, Engineering.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Graduate Profile

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.

EU ENQUIRIES Programme Administrator : smspostgrads@ucd.ie
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UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

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COURSE CODE: T341

MSc Financial Mathematics

(1 Year Full Time)

The MSc Financial Mathematics is designed for students who wish to gain a competitive advantage in the financial sector by acquiring the background demanded by upper-level quantitative roles. The programme will provide high-level instruction in the mathematical theory underlying finance and associated computational and statistical methods.

It features an inter-disciplinary suite of traditional and online modules that address contemporary topics in financial mathematics. It concludes with a summer work placement opportunity that enables students to apply their newfound theoretical knowledge and digital skills, and develop key professional and transversal skills.

Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** summer work placement or dissertation

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 take up 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.

Core modules
- Stochastic Calculus
- Advanced Financial Models
- Counterparty Credit Risk
- Financial Risk Measurement and Management

Optional modules include
- Computational Finance
- Statistical Machine Learning
- Time Series Analysis - Actuarial Applications
- Data Programming with Python
- Data Programming with R
- Categorical Data Analysis
- Measure Theory and Integration
- PDEs in Financial Maths
- Big Data Programming
- Scientific Programming Concepts
- Behavioural Economics
- Energy Economics and Policy

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

Graduates with training in Financial Mathematics can cover 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
- Research and academia

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a degree in Financial Mathematics, Mathematics, Applied Mathematics or Statistics. An upper second class honours or international equivalent is required.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Faculty Profile

Assistant Professor Adamaria Perrotta, UCD School of Mathematics and Statistics

I have a PhD in Mathematics and I taught Mathematical Analysis with real-world applications for 6 years, which deepened my interest in Applied Mathematics. After that I moved to the financial industry, working for 5 years as a business analyst in the Derivatives Pricing and Risk Management Department of an advisory firm. Since 2016 I have been a lecturer in Financial Mathematics and Computational Finance. My research interests are related to financial mathematical modelling and computational finance.

EU ENQUIRIES Programme Administrator : smspostgrads@ucd.ie
www.ucd.ie/courses/msc-financial-mathematics
NON-EU ENQUIRIES : internationalenquiries@ucd.ie
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UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

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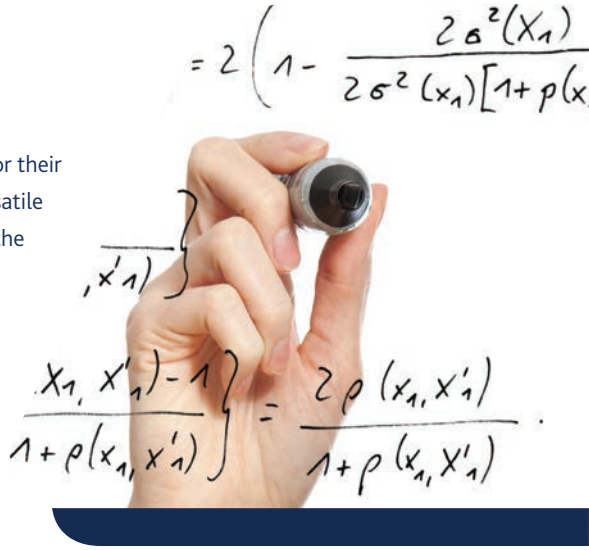
COURSE CODE: T017

MSc Mathematical Science

(1 Year Full Time)

This programme is designed for mathematics and applied mathematics graduates with a passion for their subject and a desire to upskill to a level required to embark on a career in research. It is a versatile programme, giving you the opportunity to choose from a range of modules and projects from the different disciplines of Mathematics, Applied and Computational Mathematics and Statistics.

On successful completion of the programme you will have the knowledge, experience and confidence to pursue a PhD in mathematics, applied mathematics, statistics, or a related discipline, attained an advanced and modern mathematical training, developed excellent presentation skills and have acquired a much sought after qualification that can be applied to a wide variety of careers.



Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** project work and dissertation

Below is a representative list of modules offered in previous years. Modules offered change from year to year.

- Numerical Algorithms
- Advanced Fluid Mechanics
- Introduction to C Programming
- Parallel Algorithm Design and Analysis
- Numerical Methods of PDEs
- Mathematica for Research
- Case Studies in Simulation Science
- Fractal Geometry
- Graduate Analysis
- Modular Forms
- Mathematical Theory of PDEs
- Cryptography and Elliptic Curves
- Topics in Combinatorics
- Actuarial Statistics
- Survival Models
- Monte Carlo Inference
- Stochastic Models
- Time Series
- Mathematical Statistics
- Bayesian Analysis
- Applied Statistical Modelling
- Statistical Data Mining

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

Some of the careers chosen by our graduates include working as researchers in mathematics (both in academia and industry), actuarial consultants, risk analysts, meteorologists, IT consultants, and second- and third-level teaching. Prospective employers include Aquamarine Power, Alcatel-Lucent, Bureau Veritas, Campbell Scientific, Google, IBM, IFSC, Intel, Lloyds, Marine Institute, Met Éireann, Microsoft, Nokia, Norkom, Numerica Corporation, OpenHydro, Paddy Power, Phillips, RIM, Simula Research and the Tyndall Institute.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a degree (usually a 4-year degree) in Statistics, Mathematics, Mathematical Physics, Applied Mathematics or Theoretical Physics, in a programme for which the course requirements are of comparable content and standard to that of the corresponding four-year UCD BSc degree. An upper second class honours, or international equivalent is required.
- Applicants who have been awarded an upper second class honours or higher in the Higher Diploma in Mathematical Science are eligible for the programme.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Faculty Profile

Professor Frederic Dias, UCD School of Mathematics and Statistics

We study the formation of extreme waves on the surface of the ocean. These waves can be damaging and are a threat to navigation and possibly to wave energy converters in the future when they are operational. Better forecasting of extreme waves is a key focus for my research. This area of research requires knowledge in statistics, fluid mechanics, wave motion, partial differential equations and numerical modelling.

EU ENQUIRIES Programme Administrator : smspostgrads@ucd.ie
www.ucd.ie/courses/msc-mathematical-science
NON-EU ENQUIRIES : internationalenquiries@ucd.ie
www.ucd.ie/global
UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

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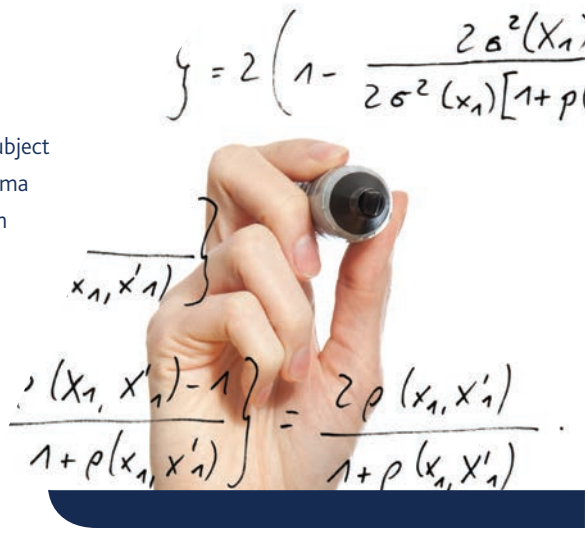
COURSE CODE: T011

Higher Diploma Mathematical Science

(1 Year Full Time)

This Higher Diploma in Mathematical Science offers the opportunity for graduates with a degree in a subject other than mathematics to achieve a more advanced mathematical training. Taking the Higher Diploma in Mathematical Science will allow you to complete the core components of a BSc Honours Degree in Mathematics or Mathematical Science. This course would equip you with the necessary background to pursue an MSc degree in Mathematics or Mathematical Sciences.

The UCD School of Mathematics and Statistics is a dynamic, multidisciplinary school spanning the disciplines of Mathematics, Applied and Computational Mathematics, Statistics and Actuarial Science. The School engages in research of international renown and teaches students across all disciplines.



Course Content and Structure

60 credits
higher diploma – all taught modules

Students in the Mathematical stream choose modules from a selection of Mathematics courses. Students in the Mathematical Sciences stream select modules within both the subjects of Mathematics and Applied and Computational Mathematics. Below is a representative list of modules available to you. Modules offered change from year to year and include:

- Mathematical Analysis
- Calculus of Several Variables
- Graphs and Networks
- Linear Algebra 2
- Functions of One Complex Variable
- Number Theory
- Groups, Rings and Fields
- Set Theory
- Group Theory
- Intro to Coding Theory
- Metric Spaces
- Galois Theory
- Measure Theory and Integration
- Intro to Topology
- Advanced Mathematical Methods
- Dynamical Systems
- Foundations of Fluid Mechanics
- Foundations of Quantum Mechanics
- Electrodynamics and Gauge Theory
- Potential Theory and Electrostatics

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

Some of the careers chosen by our graduates include working as researchers in mathematics (both in academia and industry), actuarial consultants, risk analysts, meteorologists, IT consultants, and second- and third-level teaching. Prospective employers include Aquamarine Power, Alcatel-Lucent, Bureau Veritas, Campbell Scientific, Google, IBM, IFSC, Intel, Lloyds, Marine Institute, Met Éireann, Microsoft, Nokia, Norkom, Numerica Corporation, OpenHydro, Paddy Power, Phillips, RIM, Simula Research and the Tyndall Institute.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- The mathematics stream of this programme is especially intended for applicants with a degree in mathematical studies, economics and finance, a three-year honours degree in mathematics or a cognate discipline with a high mathematical content. An upper second class honours or the international equivalent is required.
- The applied and computational mathematics stream of this programme is especially intended for science and engineering graduates who have scored highly in their mathematics, applied mathematics or mathematical physics courses. An upper second class honours or the international equivalent is required.
- Other graduates who believe that their mathematical training provides sufficient background to cope with the programme may apply for entry to the Programme Coordinator.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Graduate Profile

Dr Alison Sneyd

After completing a degree in Mathematical Studies at UCD, I decided to do the HDip in Mathematical Science because it gave me the qualification I needed to pursue a PhD in mathematics. The HDip increased my understanding of a wide variety of topics in mathematics and was very beneficial to my future studies.

EU ENQUIRIES Programme Administrator ✉: smspostgrads@ucd.ie
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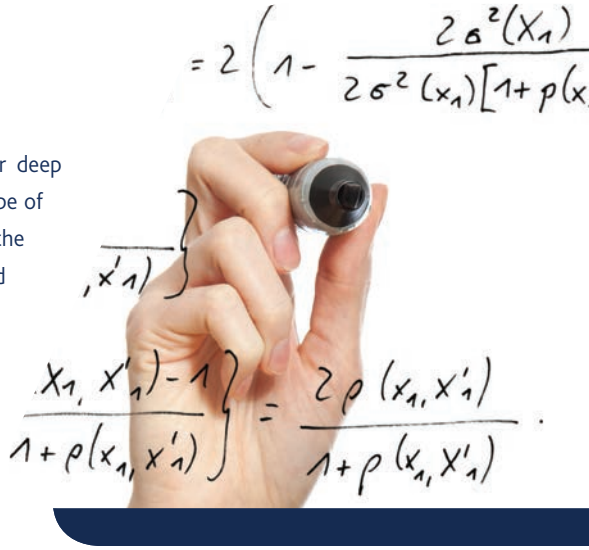
COURSE CODE: T172

Higher Diploma Mathematical Studies

(1 Year Full Time)



This programme is for you if you have a passion for mathematics, for problem solving and for deep understanding of the structures which underlie much of everyday experience. The programme may be of particular benefit to teachers or potential teachers, who would like to include mathematics among the subjects that they are eligible to teach at Leaving Certificate level. If you have already been exposed to a limited amount of University-level mathematics and would like to find a path into teaching or more advanced studies in the subject, then this programme provides the necessary bridge. After completing the Higher Diploma Mathematical Studies you will achieve a level of competence equivalent to that of a Mathematics major in a three-year honours degree.

The programme covers the mathematics necessary to qualify the student to teach mathematics to Leaving Certificate level when combined with a Professional Master of Education (PME).

Course Content and Structure

60 credits
higher diploma – all taught modules

Sample topics include:

- Calculus of Several Variables
- Mathematics Pedagogy
- Algebraic Structures
- Linear Algebra
- History of Mathematics
- Introduction to Coding and/or Cryptography
- Graphs and Networks
- Financial Mathematics
- Analysis
- Geometry
- Differential Equations
- Statistics and Data Analysis

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with an undergraduate degree with at least 10 credits of university level mathematics, including a course in calculus and a course in linear algebra, both aimed at Mathematics or Science students.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Career Opportunities

The programme covers the mathematics necessary to qualify the student to teach mathematics to Leaving Certificate level when combined with a Professional Master of Education (PME). With further study in mathematics or a related discipline a wide range of the following careers become available: Financial engineer/quantitative analyst, Meteorologist, Computer animation, Graduate entry into banking/accountancy, Systems biologist, Internet security, software, Statistician. Prospective employers include Bell Labs, Campbell Scientific, Google, IBM, Intel, IFSC, Met Éireann, Microsoft, Nokia, Norkom, Phillips, RIM and the Tyndall Institute.

Graduate Profile

Cathal Dempsey, Risk Analyst

Having completed a BComm, choosing to then study Mathematics was initially daunting and very challenging, but thankfully the design of the course and in particular the support from lecturers was excellent. The approachability of lecturers and their genuine desire to see you improve and learn was a huge help. I found the course to be so interesting and enjoyable that I decided to continue and study the UCD Higher Diploma in Mathematical Science.

EU ENQUIRIES Programme Administrator ✉: smspostgrads@ucd.ie
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COURSE CODE: T020

MSc Statistics

(1 Year Full Time)

On completion of the MSc Statistics, you will be able to demonstrate in-depth understanding of statistical concepts, apply basic statistical reasoning, techniques and models in the analysis of real data and employ technical computing skills. This programme is aimed at students who have an undergraduate degree in Statistics or a degree in a discipline related to Statistics and with numerate skills.

Compulsory modules are intended to ensure that all students have appropriate basic statistical skills, knowledge and experience, while optional modules provide depth and exposure to the diverse range of statistical applications and methods. This latter aspect provides you with the opportunity to specialise in specific areas. The major project provides you with the chance to work extensively on either theoretical or practical problems.

Course Content and Structure

90 credits taught masters	=	65 credits taught modules	+	25 credits research project/dissertation

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

- Mathematical Statistics
- Monte Carlo Inference
- Actuarial Statistics
- Survival models
- Data Mining
- Time Series
- Multivariate Analysis
- Statistical Network Analysis
- Data Programming with R
- Bayesian Analysis
- Uncertainty Quantification
- Machine Learning
- Stochastic Models
- Data Programming with Python
- Predictive Analytics I

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

Career opportunities exist in a variety of industries including pharmaceutical companies, banking, finance, government departments, risk management and the IT sector. Some past students embarked on a career in academia by proceeding to study for a PhD. Graduates are currently working for companies such as Google, Western Union, AIB, Norbrook, Ernst & Young, O2, and SPSS. Demand for graduates continues to be strong both in Ireland and abroad.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who hold a degree in Statistics or a cognate subject area. An upper second class honours or international equivalent is required.
- Those who have been awarded an upper second class honours or higher in the Higher Diploma in Statistics are eligible for the programme.
- Alternatively students may qualify for enrolment for the four trimester MA in Statistics which brings them to the same level as the MSc in Statistics.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Graduate Profile

Valda Murphy, Project Lead, Novartis

I am glad that I decided to take the MSc in Statistics in UCD. It 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.

EU ENQUIRIES Programme Administrator : smspostgrads@ucd.ie
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COURSE CODE: F043

MA Statistics

(16 Months Full Time)

The MA in Statistics will bring students to the same level as the 1-year MSc degree in Statistics. Currently, students without sufficient statistical background knowledge can attain master's level proficiency by first completing the Higher Diploma in Statistics followed by the MSc in Statistics, which takes two years. The MA in Statistics provides an alternative pathway in 16 months and there is no comparable programme in Ireland or the UK. The MA Statistics is an EMOS (European Master in Official Statistics) labelled programme, which means that some students may choose to take modules and a project on official statistics, and potentially receive the EMOS certification of their degree.

On successful completion of the programme you will be able to demonstrate in-depth understanding of statistical concepts, apply basic statistical reasoning, techniques and models in the analysis of real data, employ technical computing skills, learn from experiences gained in different contexts, and apply knowledge across discipline boundaries to solve problems.

Course Content and Structure

120 credits taught masters	=	**95 credits** taught modules	+	**25 credits** dissertation or data analytics project

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

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

- Predictive Analytics 1
- Data Mining
- Time Series
- Multivariate Analysis
- Mathematical Statistics
- Monte Carlo Inference
- Actuarial Statistics
- Survival Models
- Stochastic Models
- Bayesian Analysis
- Data Programming with R

Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

Career prospects on completion of the MA in Statistics are equivalent to those of the MSc in Statistics and graduates pursue careers in the pharmaceutical industry, banking, finance and risk management. There is increased demand for statisticians from the IT sector (e.g., Google, Intel, data mining companies). In addition, many government departments employ statisticians. Former MSc and MA students are currently working for such firms as Google, Western Union, AIB, Norbrook, Ernst & Young, O2 and SPSS. Other graduates embarked on careers in academia by proceeding to study for a PhD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a degree in mathematics, economics, finance, certain engineering degrees or similar quantitative disciplines where statistics has formed some component of the degree. An upper second class honours or international equivalent is required.
- Applicants who do not meet these requirements but can demonstrate an interest and ability in statistics may be considered.
- Alternatively students may qualify for enrolment to the Higher Diploma Statistics from which they can gain entry to the one-year MSc in Statistics.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

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.

EU ENQUIRIES Programme Administrator ✉: smspostgrads@ucd.ie
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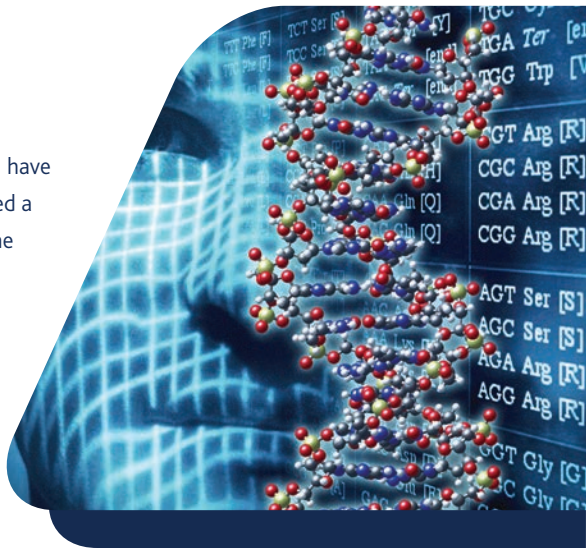
COURSE CODE: T013

Higher Diploma Statistics

(9 months Full Time)

This programme is aimed at graduates whose level of statistical or mathematical training is high and have demonstrated numerical ability, but below that of a BSc Degree in Statistics. Students who are awarded a distinction or upper second-class honours in the Higher Diploma in Statistics are qualified to enter the MSc Statistics.

On successful completion of the programme, you will reach in one year a level of statistical knowledge equivalent to that of BSc Honours graduates. You will be able to apply basic statistical reasoning, techniques and models in the analysis of real data, understand the context in which statistical work is done, select appropriate statistical models for different applications, interpret results, and demonstrate programming skills, report writing skills and presentation skills.



Course Content and Structure

60 credits
higher diploma – all taught modules

Modules available include:

- Probability Theory
- Inferential Statistics
- Monte Carlo Inference
- Bayesian Analysis
- Stochastic Models
- Data Mining
- Predictive Analytics
- Actuarial Statistics
- Time Series
- Categorical Data Analysis
- Multivariate Analysis
- Data Programming with R

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- Applicants must have a minimum of an upper second class honours degree in a numerical discipline or a cognate subject area.
- Applicants who do not meet these requirements but can demonstrate an interest and ability in statistics may be considered.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Career Opportunities

Many students pursue careers in the pharmaceutical industry, banking, finance and risk management. There is an increase in demand for statisticians from the IT sector. Many government departments employ statisticians including the Central Statistics Office. Many students embarked on the MSc Statistics, based on achieving a second-class honours grade. Prospective employers include Vodafone, Google, Intel, Irish Life, Paddy Power, the ESRI, SPSS, Bank of Ireland, Quintiles, Accenture, Tesco, eBay and Aviva.

Graduate Profile

James McBride, Director of the Irish Social Science Data Archive from 2000-2012

The material covered in the core lecture courses was underpinned by an excellent tutorial system, which further enhanced my understanding of the topics. I cannot recommend this course highly enough for anyone wishing to strengthen their statistical skills, whether to pursue a career in academic research or in the broader job market.

EU ENQUIRIES Programme Administrator : smspostgrads@ucd.ie
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COURSE CODE: F012

MSc Physics

(Negotiated Learning) (1 Year Full Time)

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 either for further research in a PhD programme, or employment directly after graduation.

Course Content and Structure

90 credits taught masters	=	**30 – 60 credits** taught modules	**or**	**30 – 60 credits** project

Modules in the programme include:

- 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

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- Entrance to this programme requires a degree in physics, chemistry, engineering, material sciences or a related discipline with a significant physics content. An upper second class honours or international equivalent is required. In special circumstances, students with a strong physics background and a lower second class honours degree may be accepted.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Career Opportunities

This relatively new 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.

Graduate Profile

Oisín Maguire, PhD Student in Plasma Spectroscopy, 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.

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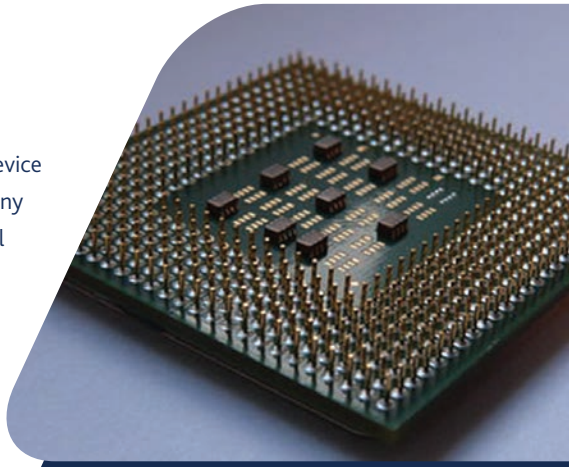
COURSE CODE: F122

MSc Nanotechnology

(1 Year Full Time)

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.



"Pentium 4 Underside Demonstrating PGA Socket" by Liam McSherry - Own work. Licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia Commons.

Course Content and Structure

90 credits taught masters = **45 credits** taught modules + **45 credits** research project

or

60 credits taught modules + **30 credits** research project

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
- Theoretical and Computational Simulation
- Bio-inspired Technologies
- Innovation

Modules and topics shown are subject to change and are not guaranteed by UCD.

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.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- Entrance to this programme requires a degree in physics, chemistry, engineering, material sciences or a related discipline with a significant physics content. An upper second class honours or international equivalent is required. In special circumstances, students with a strong physics background and lower second class honours degree may be accepted.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Faculty Profile

Associate Professor James Rice, UCD School of Physics

The research projects in Dr 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.

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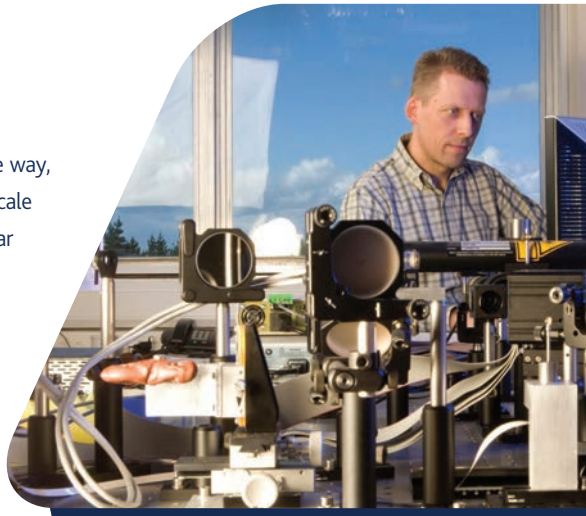
COURSE CODE: T149

MSc NanoBio Science

(1 Year Full Time)

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.



Images © UCD Research

Course Content and Structure

90 credits taught masters = **45 credits** taught modules + **45 credits** research project

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
- Bio-Fluid Mechanics
- Innovation

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a degree in Physics, Chemistry, Engineering, Material Science or a related discipline. An upper second class honours or international equivalent is required.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

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.

Graduate Profile

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.

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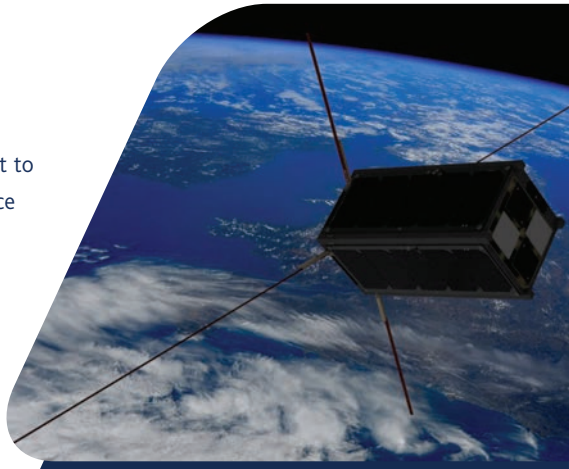
COURSE CODE: F060

MSc Space Science & Technology

(1 Year Full Time)

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 is building Ireland's first satellite, EIRSAT-1.

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. A 3-month internship provides relevant training for industry or research and can lead to employment. Students have completed internships at the European Astronaut Centre (EAC), ESA, NASA-Ames, Cosine, ENBIO, InnaLabs, Skytek, Eblana Photonics and Réaltra.



3D render of the EIRSAT-1 satellite, credit D. Murphy and J. Thompson

Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** internship

Topics available include:

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

Optional Modules includes:
- Planetary Geomorphology
- Remote Sensing
- Stellar Astrophysics
- Galaxies and Observational Cosmology
- Data Science in Python

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- An upper second class honours degree or the international equivalent in any area of Physics or Engineering is required. Entrants should have an analytical background, and a basic level of programming skills.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

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.

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.

Graduate Profile

Meadhbh Griffin

The practical aspect of the Masters aided in my professional development, refining my experience of computer engineering gained in my undergraduate to better suit the specific challenges of flight control software. I learned principles of software development, project coordination and time management which I was able to rely on during my internship at ESTEC, where I developed control software for CHIMERA, a payload of RADCUBE, to be launched on Vega flight VV19.

EU ENQUIRIES Professor Lorraine Hanlon : lorraine.hanlon@ucd.ie
www.ucd.ie/courses/msc-space-science-technology www.ucd.ie/spacescience/
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COURSE CODE: T342

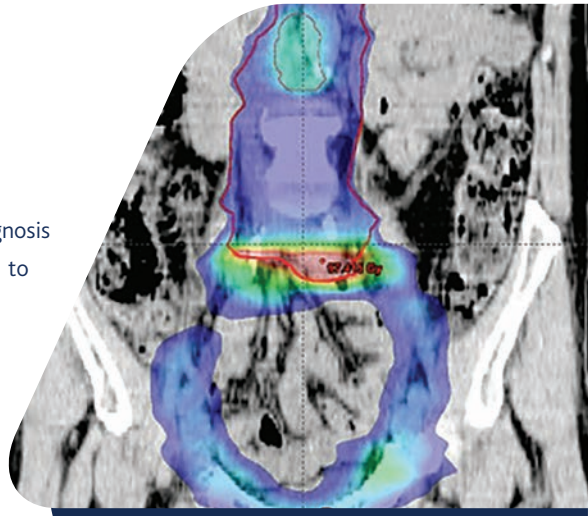
MSc/Grad Diploma Medical Physics

(1 Year Full Time/2 Years Part Time)

(Professional Certificate options available)

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 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.



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Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** project work and dissertation

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

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- Entrance to this programme requires a degree in physics or a related discipline with a significant physics content. An upper second class honours or international equivalent is required.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

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.

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

Faculty Profile

Dr Seán Cournane

Dr Seán Cournane is Director of the Centre for Physics in Health and Medicine (CPHM) and a clinical medical physicist at St Vincent's University Hospital (SVUH). He specialises in Diagnostic Imaging physics, with particular interests in nuclear medicine, ultrasound imaging and therapy, novel Positron Emission Tomography (PET) tracers and radionuclide therapy.

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UCD School of Physics, University College Dublin, Belfield, Dublin 4.

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www.ucd.ie/global

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University College Dublin
Ireland's Global University

COURSE CODE: F120

MSc Computational Physics

(1 Year Full Time)

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.

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Course Content and Structure

90 credits taught masters = **45 credits** taught modules + **45 credits** research project **or** **60 credits** taught modules + **30 credits** research project

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
- Advanced Statistical Physics
- Numerical Weather Prediction
- Numerical Algorithms
- Stochastic Models
- Time Series Analysis

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, Merck, Philips, Tullow Oil, the University of Edinburgh, Imperial College London, and the National Institutes of Health, USA.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who have a strong background in physics, chemistry, engineering, material sciences or a related discipline with a significant physics content. An upper second class honours or international equivalent is required. In special circumstances, students with a strong physics background and lower second class honours may be accepted.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. _Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Faculty Profile

Associate Professor Nicolae-Viorel Buchete, UCD School of Physics & UCD Institute for Discovery

Ongoing research projects in his 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.

EU ENQUIRIES Associate Professor Nicolae Buchete : nicolae-viorel.buchete@ucd.ie
www.ucd.ie/courses/msc-computational-physics
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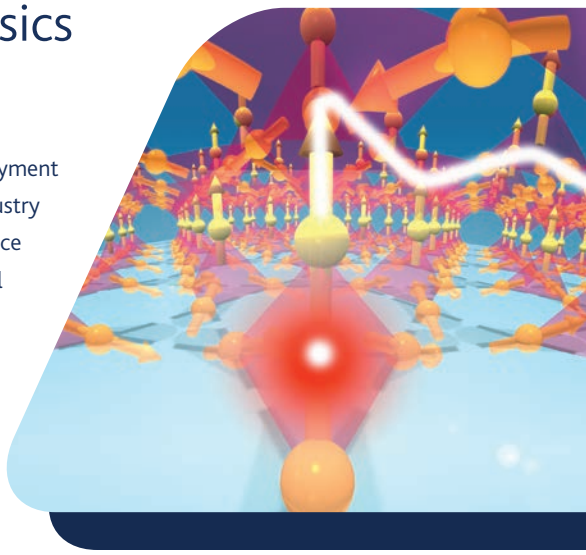
COURSE CODE: F124

MSc Applied Mathematics & Theoretical Physics

(1 Year Full Time)



The MSc Applied Mathematics and 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 credits** taught modules + **45 credits** research project **or** **60 credits** taught modules + **30 credits** research project

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

Modules and topics shown are subject to change and are not guaranteed by UCD.

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 Inc., Intel, Pfizer, Merck, Philips, Tullow Oil, the University of Edinburgh, Imperial College London, and the National Institutes of Health, USA.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who have a strong background in physics, chemistry, engineering, material sciences or a related discipline with a significant physics content. An upper second class honours or international equivalent is required. In special circumstances, students with a strong physics background and lower second class honours may be accepted.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Faculty Profiles

Associate Professor Vladimir Lobaskin

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

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).

EU ENQUIRIES Associate Professor Vladimir Lobaskin : vladimir.lobaskin@ucd.ie
www.ucd.ie/courses/msc-appliedmaths-theoreticalphysics
UCD School of Physics, University College Dublin, Belfield, Dublin 4.

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COURSE CODE: T195

MSc Computer Science (Conversion)

(16 Months Full Time)

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 & Distributed Computing, Artificial Intelligence & Cognitive Science.
- Undertake independent innovative research and development projects.
- Work with confidence both autonomously and as part of a team on projects related to real-world computer science applications.

Course Content and Structure

120 credits taught masters = **60 credits** taught modules + **30 credits** research practicum + **30 credits** taught modules

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. 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.

Year 1 (Autumn Trimester)
- Python Programming
- Object Oriented Programming
- Computational Thinking
- Relational Databases and Information Systems
- Operating Systems
- Web Application Development

Year 1 (Spring Trimester)
- Java Programming
- Data Structures and Algorithms
- Data Analytics
- Software Engineering
- Computer Architecture
- Networks and Internet Systems

Year 1 (Summer Trimester)
- Research Practicum

Year 2 (Autumn Trimester)
Choose* modules in areas 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. Modules and topics shown are subject to change and are not guaranteed by UCD.

Career Opportunities

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

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants who do not have a Computer Science or ICT background. An upper second class honours degree, or the international equivalent, in another discipline is required for entry.
- Computer Science is a mathematical subject involving logical understanding and reasoning and therefore applicants must be able to demonstrate a good knowledge of mathematics.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Graduate Profile

Jack Halpin, Software Engineer, SN Systems Ltd.

I wanted to get into web and mobile development but only had a handful of programming experience from my degree. From doing the MSc, I've learned a lot about the underlying theory of Computer Science as well as becoming proficient across a number of technologies that are relevant to today's industry. I'd highly recommend the course to anyone thinking of pursuing a career in IT or software development.

EU ENQUIRIES : cs_conversion@ucd.ie
www.ucd.ie/courses/msc-computer-science-conversion
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COURSE CODE: T150

MSc Computer Science

(Negotiated Learning) (1 Year Full Time/2 Years Part Time)

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.

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Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** internship/project/dissertation

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.

Samples of themes include:

- 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
- Forensics and Security

Currently there are approximately 100 module options offered in conjunction with other UCD Schools and Units including Business, Physics, Mathematics and Statistics, Psychology, Law and NovaUCD.

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a strong Computer Science or ICT background.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Career Opportunities

Previous graduates are in demand and among their recent career destinations are employers Google, SAP, Intel, PayPal, Deloitte, Microsoft, Symantec, HMH, Vilicom, Murex, NYSE Technologies, Realex Payments, Version 1, Salesforce, Pfizer, Ericsson, and Intune Networks. Recent graduates have secured roles in areas including: hardware design, software engineering & QA, data programming & analysis, commercialisation of technology, teaching & training, senior management & CEO roles, security & forensics consultancy, and bioinformatics R&D.

Graduate Profile

Ahmed Yawer, 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.

EU ENQUIRIES Travis Grotewold : travis.grotewold@ucd.ie
www.ucd.ie/courses/msc-computer-science-negotiated-learning
UCD School of Computer Science, University College Dublin, Belfield, Dublin 4.

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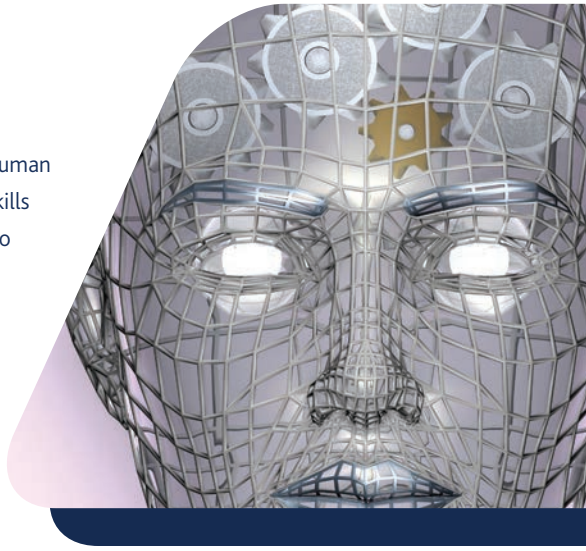
COURSE CODE: T023

MSc Cognitive Science

(1 Year Full Time/2 Years Part Time)

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 associated with minds, brains, and behaviour and the theoretical approaches to them, know the principal 20th Century philosophical approaches to mind, brain and body, understand the principal issues, models, and concepts used in cognitive psychology, and develop an interdisciplinary perspective that links and integrates insights from multiple specialised domains.



Course Content and Structure

90 credits taught masters = **60 credits** taught modules + **30 credits** research project

Modules can change from year to year but typical modules include:

- Graduate Introduction to Cognitive Science
- Philosophy of Mind
- Cognitive Psychology
- Foundations of Cognitive Neuropsychology
- Connectionism and Dynamical Systems
- Cognitive Modelling
- Readings in Visual and Social Cognition
- The Cultural Mind
- Embodied and Enactive Approaches to Cognitive Science

Modules and topics shown are subject to change and are not guaranteed by UCD.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- This programme is intended for applicants with a degree in computer science, psychology, philosophy, linguistics, neuroscience or a cognate discipline. An upper second class honours or the international equivalent is required.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

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 for 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.

Graduate Profile

Eileen Wahl, Graduate

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.

EU ENQUIRIES
Associate Professor Fred Cummins : fred.cummins@ucd.ie
Professor Maria Baghramian, UCD School of Philosophy : maria.baghremian@ucd.ie
www.ucd.ie/courses/msc-cognitive-science
UCD School of Computer Science, University College Dublin, Belfield, Dublin 4.

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: internationalenquiries@ucd.ie
www.ucd.ie/global

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COURSE CODE: T146

MSc Forensic Computing & Cybercrime Investigation

(Distance Learning) (1 Year Full Time/2 Years Part Time)

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 10 years we have brought in specialists from around the world to review and advise on the content considering the needs of digital forensic investigators and computer crime specialists. The UCD School of Computer Science (CS) and UCD Centre for Cybersecurity and Cybercrime Investigation (CCI) are working closely with law enforcement agencies and industry practitioners in seeking solutions to technologies-related crime. CS and CCI staff also collaborate with the scientists from European Cybercrime Training and Educational Group at Europol (ECTEG).

Course Content and Structure

90 credits taught masters	=	**90 credits** taught modules	**or**	**80 credits** taught modules **10 credit** case study	**or**	**60 credits** taught modules **30 credit** research project

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

Optional modules include:

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

Modules and topics shown are subject to change and are not guaranteed by UCD.

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.

APPLY NOW This programme receives significant interest so please apply early online at www.ucd.ie/apply

Entry Requirements

- All applicants must be current employees of a law enforcement organisation (LE) working in an investigative role. You do not have to be a sworn officer. LE includes any organisation that has responsibility for the enforcement of national or local legislation.
- Applicants with a primary degree in Computer Science are preferred. However, applicants working in the field of digital forensic investigations in law enforcement for more than 2 years and who have successfully completed advanced training, will be considered at the discretion of the course directors on a case-by-case basis.
- Applicants whose first language is not English must also demonstrate English language proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent, such as TOEFL (iBT) score of 90 or PTE score of 63. Visit the UCD Admissions website for further details.

Graduate Profile

Michael Lenasolon, Investigations Officer, Kenya Revenue Authority

Studying in UCD has been a lifetime experience for me. The skills in law enforcement and digital forensic that I have acquired and enhanced, will go a long way in 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.

EU ENQUIRIES Dr Nhien-An Le-Khac, ✉: an.lekhac@ucd.ie
www.ucd.ie/courses/msc-forensic-computing-cybercrime
UCD School of Computer Science, University College Dublin, Belfield, Dublin 4.

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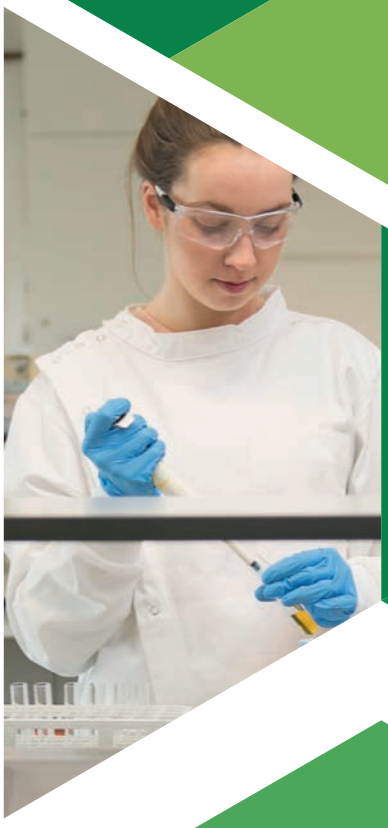

RISING TO THE FUTURE
UCD Strategy 2020-2024

UCD Science

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