UCD SCIENCE

GRADUATE TAUGHT COURSES ENTRY 2019

University College Dublin
Ireland's Global University

Contents

Biotechnology, Biomedical, Pharmaceutical & Chemical Sciences

Energy, Climate & Environment

Mathematics, Actuarial Science & Finance

Physical & Geological Sciences

Computer Science

Applying to a UCD Graduate Course

How do I apply?

To apply for a UCD graduate taught course, visit **www.ucd.ie/apply**
Places are limited on some courses so early applications are advised. Course information is at **www.ucd.ie/graduatecourses**

How are Masters courses taught?

Modules in full-time courses are taught through lectures, classroom tutorials, active learning environments and in laboratories. We also offer online and part-time courses. Assessment types vary from module to module and may include continuous assessment during the module and final exams.

Are there any scholarships available?

Yes. Information on scholarships is available at **www.ucd.ie/scholarships/**
We also post scholarship information relevant to our Science and Computer Science courses at **www.ucd.ie/science/study/graduatestudies/mscscholarships/**

What are the fees for a course?

Fees vary for each course and are online at **www.ucd.ie/fees**

How do I get in contact for more information?

You can contact us in the following ways:

- All applicants are welcome to email or phone the academic or staff member associated with each course. Contact information for each course is at the end of the course pages.
- For EU applicants, you are welcome to visit us on campus at UCD by emailing gary.dunne@ucd.ie to arrange a visit. We also attend a series of GradIreland Fairs (**www.gradireland.com**) in the RDS, Dublin throughout the year and we will have at least one on-campus evening event which will be advertised at **www.ucd.ie/science/newsevents/events/**
- For general admission enquiries, international students can email **internationaladmissions@ucd.ie** Our team of staff will be able to advise you on fees, visas and accommodation and course information.
- Our Vice Principal for International, Professor Jeremy Simpson, attends many international fairs and events. You can check when we are visiting your country on our International website at **www.ucd.ie/international**

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 Masters by Research (MRes) 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.

Conversion
Conversion programmes are for students who hold a primary degree in another discipline. For example, the MSc Computer Science (Conversion) is aimed at students who do not have a Computer Science or ICT background who wish to move into an IT-related career.

Semester
The academic year is divided into semesters. Some graduate courses run for two semesters from September to December and from January to May. Most graduate courses will also include an additional summer semester from June to August.

Information on Classes

Module
A self-contained unit of teaching and learning, which is usually studied within one semester. 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
Practical (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 within UCD Science and Computer Science Graduate Taught Courses

Many students who pursue a taught graduate course are interested in developing the skillset from their undergraduate degree to increase their employability or to develop new skills to broaden the range of companies they can work in. A key component of most of our taught graduate courses is a research project, which can be based in a UCD research group, in industry or in a business setting.

Internships

In 2018, 145 students took up placements on 8 of our graduate taught courses.

(3-months)	Number of students (2018)	Sample Companies
MSc Biotechnology	19	Pfizer, ICON-Firecrest, Oriflame, Allergan, BMS, Amgen, Abbvie, Alltech, FSAI, Nuritas
MSc Applied Environmental Science	8	EPA, RPS Group, Inland Fisheries, Marine Institute, Dublin County Council
MS Global Change: Ecosystem Science and Policy	10	European Forest Institute Barcelona, Local Governments for Sustainability Bonn, Irish Environmental Network, RISE Foundation Brussels, Irish Peatland Conservation Council
MSc Climate Change	5	UK Met Office, UNFCCC Bonn, KAUST Research Saudi Arabia, Mercer
MSc Actuarial Science	12	Allianz, AIG, Canada Life, Central Bank, Irish Life, Mercer, New Ireland, Liberty, Greenval Insurance
MSc Space Science & Technology	17	European Space Agency Madrid, European Astronaut Centre Cologne, Cosine Netherland, German Space Centre Braunschweig, Curtiss Wright, Parameter Space
MSc Computer Science	60	SAP, Amazon, Groupon, ding, Deloitte, EY, Synchronoss, Ericsson, Hubspot, Salesforce, ESB, AIB, Oracle, AOL
HDip Computer Science	14	Demonware, Zalando, Nokia Bell Labs, Murex, Gilt

Internship Programmes at a Glance

MSc Space Science & Technology
Includes lectures from invited speakers across a range of space-related industries

MSc Biotechnology
Introduces students to the bioprocessing technology of biotechnology product development as well as drug development and clinical trials

MSc Actuarial Science
Prepares students for their training as professional actuaries and includes exemptions from some of the professional exams

What Our Students Say

Shannon McDonnell, MSc Actuarial Science

Internship at the Central Bank of Ireland, Dublin
Interning at the Central Bank of Ireland was a perfect internship to gain exposure into the actuary field. 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.

Robert Hanly, MSc Biotechnology

Internship at Pfizer, Grange Castle, Dublin
Pfizer Grange Castle is one of the largest integrated biotechnology facilities in the world. The site contributes greatly to the company's overall global manufacturing network. Having the opportunity to complete my internship in Pfizer's Parenteral suite is a great first step in pursuing a career in the biotech industry.

Ireland at a Glance

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

9 OUT OF 10 GLOBAL PHARMACEUTICAL CORPORATIONS

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

TOP 5

Worldwide security software companies are located in Ireland

The 10 Top Ten

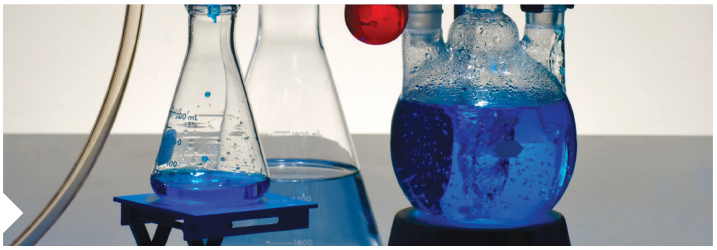
"Born on the Internet" companies are based in Ireland

Science Careers Map

This is a summary of some of the opportunities for graduates:

- Pharmaceuticals, Biotechnology, Medical Devices, Clinical Trials, Chemical Industry & Hospitals
- Energy, Climate Conservation & Environment
- Natural Resources
- Computing, Risk, Finance & Analytics
- Semiconductor, Nanotechnology, Meteorology & Space Industry
- Further Education & Research

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



Degrees

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

Careers

Depending on the degree, careers include:

- Analytical Chemist
- Microbiologist
- Clinical Research Associate
- Biochemist
- Medical Physicist

Energy, Climate Conservation & Environment

Degrees

- MSc Applied Environmental Science*
- MSc Climate Change: Science & Impacts*
- MSc Environmental Sustainability (Online)
- MSc Global Change: Ecosystem Science & Policy*
- MSc Plant Biology & Biotechnology
- MSc Biological & Biomolecular Science (NL)**

Careers

Depending on the degree, careers include:

- Environmental Consultant
- Plant Scientist
- Conservation Scientist
- Environmental Manager
- Emissions Control Manager

Natural Resources

Degrees

- MSc Petroleum Geoscience
- MSc Applied Environmental Science*
- MSc Environmental Sustainability (Online)
- MSc Climate Change: Science & Impacts*
- MSc Global Change: Ecosystem Science & Policy*

Careers

Depending on the degree, careers include:

- Hydrogeologist
- Mineral Geologist
- Environmental Consultant
- Geophysicist
- Marine Geologist
- Petroleum Geologist

Science Careers Map

The sectors and job titles below are examples only. Each MSc degree maps to different jobs, depending on the qualification and skills required for a particular job.

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

Computing, Risk, Finance & Analytics

Degrees

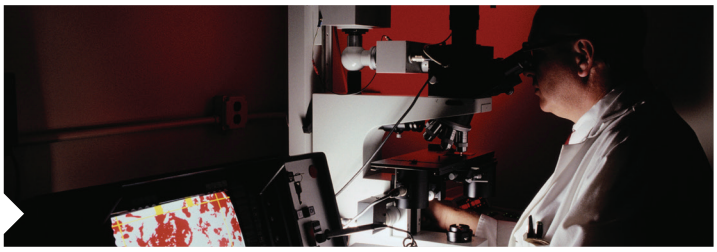
- MSc Computer Science (NL)**
- MSc Computer Science (Conversion)
- MSc Digital Investigation & Forensic Computing
- MSc Actuarial Science
- MSc Statistics
- MSc Computational Physics
- MSc Applied Mathematics & Theoretical Physics
- MSc Data Analytics (Online)
- MSc Data & Computational Science

Careers

Depending on the degree, careers include:

- Software Engineer
- Database Administrator
- Software Developer
- Trainee Actuary
- Risk Analyst
- Financial Analyst

Semiconductor, Nanotechnology, Meteorology & Space Industry



Degrees

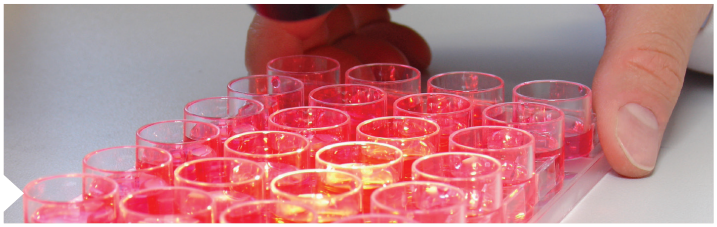
- MSc Space Science & Technology*
- MSc Computational Physics
- MSc Applied Mathematics & Theoretical Physics
- MSc Nanotechnology
- MSc NanoBio Science
- MSc Climate Change: Science & Impacts
- MSc Nanomaterials Chemistry
- MSc Physics (NL)**

Careers

Depending on the degree, careers include:

- Semiconductor Engineer
- Meteorologist
- Medical Device Engineer
- Materials Scientist
- Radiation Protection Officer
- Space Programme Manager

Further Education & Research



Degrees

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

Careers

Depending on the degree, careers include:

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

Biotechnology, Biomedical, Pharmaceutical & Chemical Sciences

■ Ireland is the second largest exporter of med-tech products in Europe with 15 of the world's top 20 medical technology companies based in Ireland.

■ 12 of the world's top selling medicines are manufactured here.

■ UCD is ranked within the top 1% of higher education institutions worldwide (2018 QS Rankings), in the top 150 for the subject area of Biological Sciences and in the top 200 for the subject area of Chemistry.

■ Prospective employers include Abbott Ireland, BioResearch Ireland, Boston Scientific, Elan Corporation, Merck Sharp & Dohme, Trinity Biotech, GlaxoSmithKline, Johnson & Johnson Ltd, Mars Confectionary, Kerry Group Plc, ImmunoGen Inc, Shaklee Corporation and Syntex.

MSc Biotechnology
MSc Biotechnology & Business
MSc Biotherapeutics
MSc Biotherapeutics & Business
MSc Chemistry (Negotiated Learning)
MSc Nanomaterials Chemistry
MSc Synthetic Chemistry for the Pharmaceutical & Fine Chemicals Industry
MSc Regulatory Affairs & Toxicology
MSc Plant Biology & Biotechnology
MSc Biological & Biomolecular Science (Negotiated Learning)

MSc Biotechnology

I carried out my 12-week work placement in Genzyme Ireland Ltd, a Biopharmaceutical company. As a pioneering and world-leading biopharmaceutical company, securing my placement in Genzyme was both an exciting and daunting time. However, it offered me invaluable industrial experience, which motivated me to make the most of my time there.

Dean Crowley
Genzyme Ireland Ltd

MSc Biotechnology & Business

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.

Jennifer McKeever
Senior Analyst at Seroba Kernel

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Energy, Climate, Natural Resources & Environment

■ Ireland is leading in the study of Energy, Climate, Natural Resources and the Environment. This is critical for establishing policies in environmental assessment, evaluating potential change in environmental quality in response to various land-use and other activities, in the development of management and conservation strategies as well as contributing to policy formulation and managing our natural resources.

■ UCD is ranked within the top 1% of higher education institutions worldwide (2018 QS Rankings), in the top 150 for the subject area of Biological Sciences and in the top 200 for the subject area of Earth and Marine Sciences.

■ Prospective employers include the Environmental Protection Agency, Governmental Departments, European Commission; European Environment Agency, International organisations (e.g. Intergovernmental Panel on Climate Change; United Nations Environment Programme; International Union for the Conservation of Nature).

MSc Applied Environmental Science
MSc Climate Change: Science and Impacts
MSc Environmental Sustainability (Online)
MSc Global Change: Ecosystem Science & Policy
MSc Plant Biology & Biotechnology
MSc Petroleum Geoscience

MSc Petroleum Geoscience

I have been a Junior Geologist with Irish oil company Providence Resources for 15 months and they supported my enrolment in the UCD Petroleum Geoscience MSc in 2013. I will return to Providence upon graduation, where I will put into practice my learnings from the course, which are wholly compatible with the aims of Providence: to find, appraise and successfully develop hydrocarbon reservoirs.

Myles Watson
Junior Geologist with Providence Resources, Ireland

MSc Applied Environmental Science

I studied environmental science and agriculture as an undergraduate. The masters degree in Applied Environmental Science at UCD was perfect as it covered a wide range of relevant topics in excellent detail. This enhanced my environmental science skills and led to my selection for a PhD in environmental science research at UCD.

Dr Rachel Wisdom
Entomologist, Department of Agriculture
Food and the Marine, Ireland

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Computing, Risk, Finance & Analytics

- Ireland has the highest concentration of ICT activity in OECD countries and is known as the internet and games capital of Europe.
- Ireland is one of the top 5 exporters of software in the world.
- UCD is ranked within the top 1% of higher education institutions worldwide (2018 QS Rankings), in the top 150 for the subject area of Computer Science and Information Systems and in the top 250 in the world for Mathematics.
- Prospective employers depending on the degree include Google, Intel, IBM, Facebook, LinkedIn, Amazon, eBay, Twitter, Aquamarine Power, Ernest & Young, Nokia, AIB and Numerica Corporation.

MSc Actuarial Science
MSc Data Analytics (Online)
MSc Data & Computational Science
MSc Mathematical Science
MSc Statistics
MSc Computational Physics
MSc Applied Mathematics & Theoretical Physics
MSc Computer Science (Negotiated Learning)
MSc Computer Science (Conversion)
MSc Digital Investigation & Forensic Computing
MSc Forensic Computing & Cybercrime Investigation

MSc Digital Investigation & Forensic Computing

Kamil studied part time over two years for his MSc whilst working at Facebook in Dublin and graduated in 2013.
"I can interact better with IT Security, understand and implement security aspects into my projects from the start and can educate my team on cyber security."

Kamil Mahajan
IT Operations Lead at Facebook, Dublin

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 gave me an insight into the typical day of an actuary working in the life insurance sector.

Troy Tyson
Trainee actuary in the Product Management department of New Ireland Assurance

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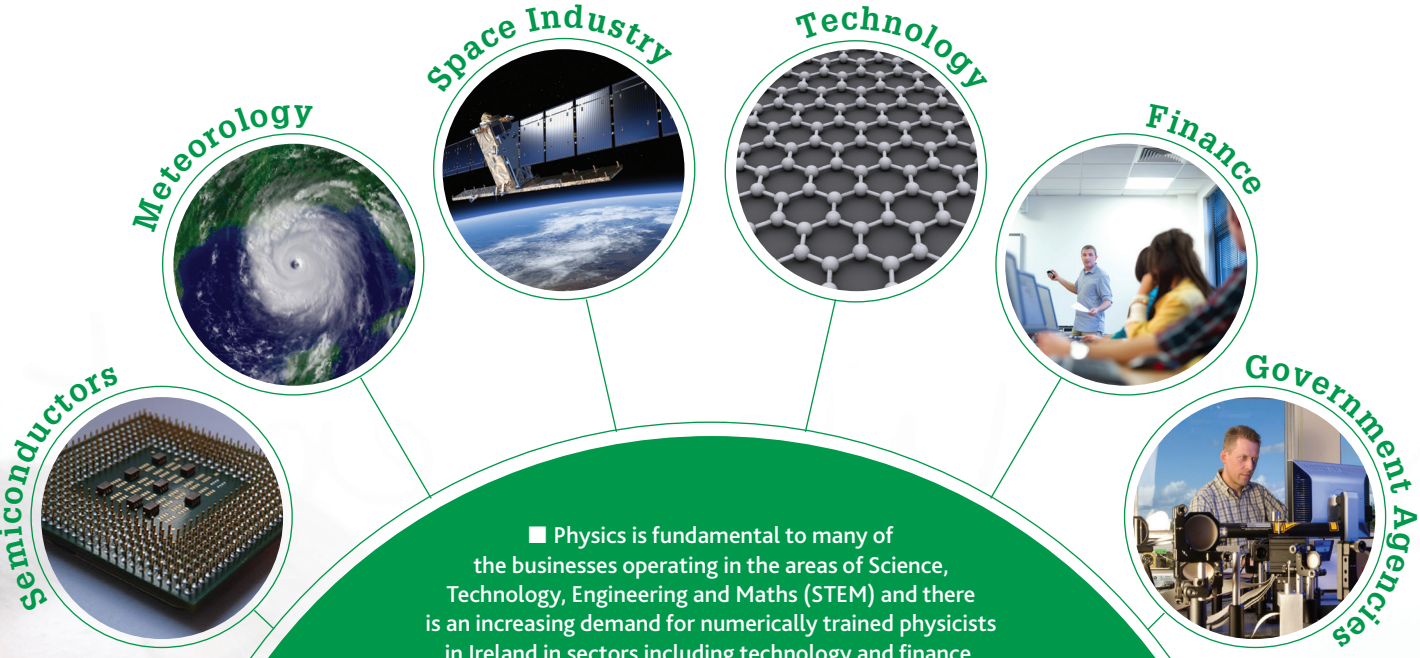
Semiconductor, Nanotechnology, Meteorology & Space Industry



■ Physics is fundamental to many of the businesses operating in the areas of Science, Technology, Engineering and Maths (STEM) and there is an increasing demand for numerically trained physicists in Ireland in sectors including technology and finance.

■ UCD is ranked within the top 1% of higher education institutions worldwide (2018 QS Rankings) and in the top 200 in the world for the subject area of Physics and Astronomy.

■ Prospective employers include Abbott, Alcon, Allergan, Bausch & Lomb, Becton Dickinson, Boston Scientific, Eblana Photonics, Intel, Pfizer, Pharma-Bio Serv, Philips, and SensL. Top European employers for Space Science graduates include Airbus, Thales, Moog, Curtiss-Wright, and the European Space Agency.

MSc Space Science & Technology
MSc Computational Physics
MSc Applied Mathematics & Theoretical Physics
MSc Physics (Negotiated Learning)
MSc Nanotechnology
MSc NanoBio Science
MSc Climate Change: Science & Impacts

MSc Space Science & Technology

"My favourite part was the Space Mission Design field trip to Tenerife. We worked in competing international teams. This was an incredible and unique experience. My industry placement was with the US multinational Curtiss-Wright, who provide data-handling for rockets such as the SpaceX Dragon capsules."
Dan is now working for UCD spin-out company Parameter Space as the software systems architect for accessing data from the European Space Agency's Gaia satellite mission.

Daniel Vagg
System Architect, Parameter Space

MSc NanoBio Science

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. Overall, I think this is a very good choice whether you're aiming for a career in research or in applied science.

JiaJun Li
Chinese Academy of Sciences, Shanghai

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MSc Biotechnology
(1 Year Full Time)

Biotechnology encompasses all aspects of the industrial application of living organisms and/or biological techniques. It is a collection of technologies that capitalise on the attributes of cells and biological molecules, such as DNA, to work for us. The primary biotechnology activity carried out in Ireland is research and development. Ireland has experienced massive growth across the biotechnology sector including food, environmental and pharmaceutical industries in the last decade.

Ireland is home to nine of the top 10 global pharmaceutical and biotechnology companies, such as GlaxoSmithKline, Pfizer, Merck, Bristol-Myers Squibb and Genzyme, with seven of the 10 world blockbuster pharmaceuticals made here. The MSc in Biotechnology is taught by leading academics in the UCD School of Biomolecular and Biomedical Science and 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 and technologies. It also provides modules on food and environmental biotechnology, as well as industrially relevant expertise in facility design, bioprocess technology, regulatory affairs and clinical trials.

Key Fact

During the third semester you will conduct research in an academic or industrial lab. Projects will be carried out within research groups of the UCD School of Biomolecular and Biomedical Science using state-of-the-art laboratory and computational facilities or in Irish and multinational biotechnology companies, across the spectrum of the dynamic biotechnology industry in Ireland.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

90 credits taught masters	**60 credits** taught modules	**30 credits** individual research project

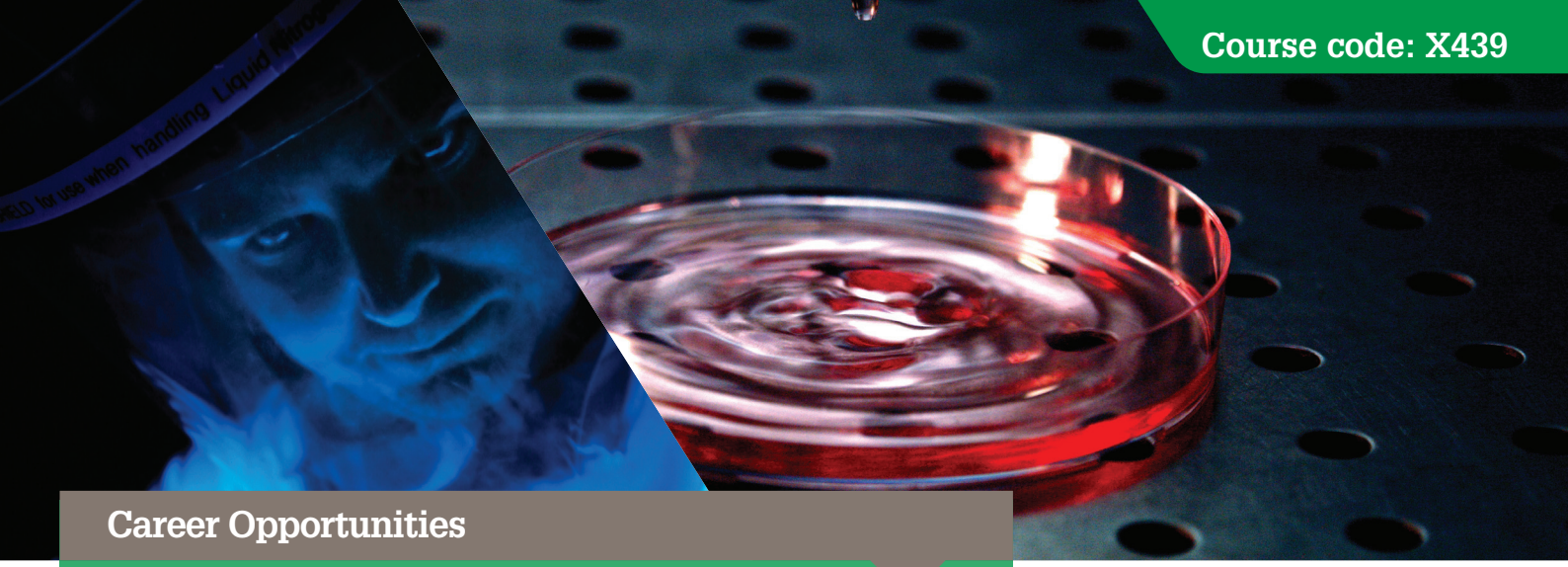
You will gain experimental and theoretical knowledge in the following topics:

- 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.

Images © UCD Research

Facilities and Resources

- The UCD School of Biomolecular and Biomedical Science is closely linked to the UCD Conway Institute of Biomolecular and Biomedical Research, which provides cutting edge core technologies including the premier Mass Spectrometry Resource in the country, NMR spectroscopy, real time PCR, electron microscopy, light microscopy, digital pathology and flow cytometry.

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.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please see www.ucd.ie/international/scholarships for further information.

Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at www.ucd.ie/residences/
For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodation-booking-support/ for further details.

Related Masters Programmes of Interest

- MSc Biotechnology & Business
- MSc Biotherapeutics
- MSc Biotherapeutics & Business
- MSc Biological & Biomolecular Science (Negotiated Learning)
- MSc Regulatory Affairs & Toxicology

Graduate Profile

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

This course was different from what I experienced in my undergraduate degree as it was more focused on the application of biotechnology as opposed to only understanding the theory behind it. I really enjoyed this as it allowed for more innovative thinking. For my summer research project I was offered the opportunity to conduct research in the Food Safety Authority of Ireland (FSAI). This gave me a great opportunity to see "science in action" and how a government agency acts on scientific reports and data. My research looked into zoonosis trends in Ireland, which all EU countries are required to monitor. This data has since been published on the FSAI website. In September, shortly after finishing my research project and waiting on graduation, I obtained my first official employment as a regulatory affairs officer with a scientific company and I believe the deciding factor in my application was my previous work experience in the FSAI which I would not have if it was not for this course.

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

Non-EU Enquiries ✉ : internationaladmissions@ucd.ie
www.ucd.ie/international

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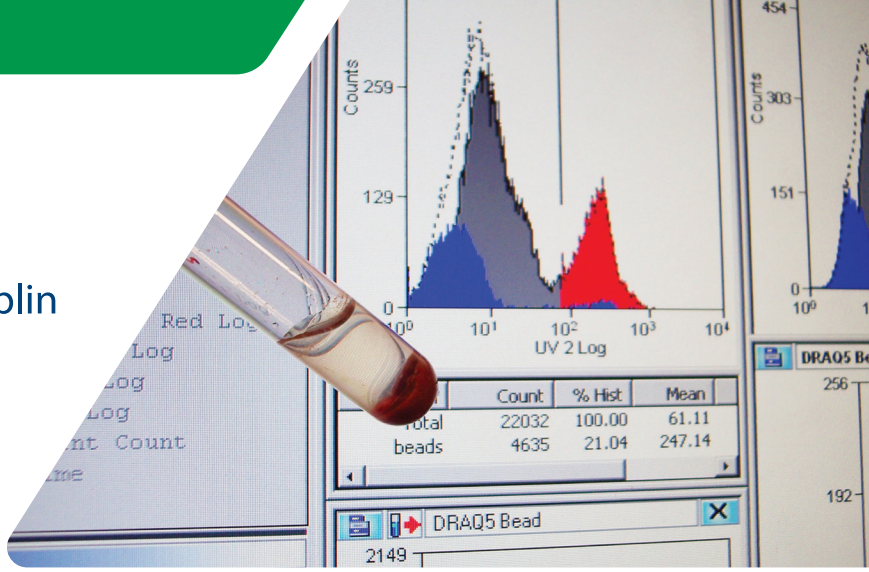

Images © UCD Research

MSc Biotechnology & Business
(1 Year Full Time)

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The MSc in Biotechnology and 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 in Biotechnology and Business provides you with a solid knowledge of techniques used in modern biotechnology including hands-on experience of bioprocessing. 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.

Key Fact

The programme is the result of a close collaboration between the UCD School of Biomolecular and Biomedical Science and the UCD Michael Smurfit Graduate School of Business, which is Ireland's leading business school.

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Global community
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Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

90 credits	70 credits	20 credits
taught masters	taught modules	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
- Marketing Management
- Corporate Finance
- Entrepreneurship
- Business plan development
- Biotechnology Case Study

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

Course code: X447

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, thereby enhancing chances of employment on graduation.

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.

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- 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.

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, which was an invaluable and pragmatic learning experience. I am currently working as an Investment Analyst in a life sciences venture capital firm. During the masters I was introduced to many industry contacts who are instrumental in shaping my career.

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Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

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Related Masters Programmes of Interest

- MSc Biotechnology
- MSc Biotherapeutics
- MSc Biotherapeutics & Business
- MSc Biological & Biomolecular Science (Negotiated Learning)
- MSc Plant Biology & Biotechnology
- MSc Regulatory Affairs & Toxicology

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EU Enquiries Professor Cormac Murphy ✉: biotech@ucd.ie
www.ucd.ie/courses/msc-biotechnology-and-business

Non-EU Enquiries ✉: internationaladmissions@ucd.ie
www.ucd.ie/international

UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

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University College Dublin
Ireland's Global University

MSc Plant Biology & Biotechnology
(1 Year Full Time)

Government and private companies are working to develop new ways to improve existing food and animal feed crops, and to develop novel crops to meet future challenges. The last decade has seen rapid developments in our understanding of plants and their significance to our wellbeing and this 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. Students will have full involvement in active research groups and access to, and experience of, a large array of state-of-the-art facilities and technologies.

Key Fact

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. They actively work with organisations such as Coillte (Forestry), the Irish Agricultural and Food Development Authority (Teagasc), the Department of Agriculture, Food and the Marine, and industry partners.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

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
- Future Crops and Sustainability
- Insect-Plant Interactions
- Biological Invasions
- Ecological Significance of Different Photosynthetic Pathways
- Plants and Stress

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

Course code: F080

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.

Images © UCD Research

Facilities and Resources

- UCD Rosemount Environmental Research Station
- Controlled plant growth facility and bioreactors
- Plant Metabolomics Technology Platform
- Plant Cell and Tissue Culture Facility

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 proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent.

Fees and Scholarships

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Related Masters Programmes of Interest

- MSc Biotechnology
- MSc Biotechnology & Business
- MSc Applied Environmental Science
- MSc Environmental Sustainability

Staff Profiles

Associate Professor Carl Ng, UCD School of Biology and Environmental Science

My research focuses on understanding the signalling processes underlying the responses of plants and crops to abiotic stresses. The aim is to understand plant cellular strategy for adapting to changing environmental conditions and how temporally dynamic gene expression systems can confer evolutionary advantages during the colonisation of land by plants.

Associate Professor Paul McCabe, UCD School of Biology and Environmental Science

The MSc students are actively engaged in our research programmes and my research group is involved in trait selection at the single cell level. For example, somatic embryogenesis is a propagation technique that can solve problems associated with tree breeding such as long reproductive cycles. Using somatic embryogenesis to improve tree breeding has the potential to dramatically increase forest productivity. We are collaborating with Coillte on research to increase the embryogenic potential of several important commercial species.

EU Enquiries Associate Professor Carl Ng : futurecrops@ucd.ie : + 353 1 716 2250 www.ucd.ie/courses/msc-plant-biology-biotech
UCD School of Biology and Enviornmental Science, University College Dublin, Belfield, Dublin 4

Non-EU Enquiries : internationaladmissions@ucd.ie www.ucd.ie/international

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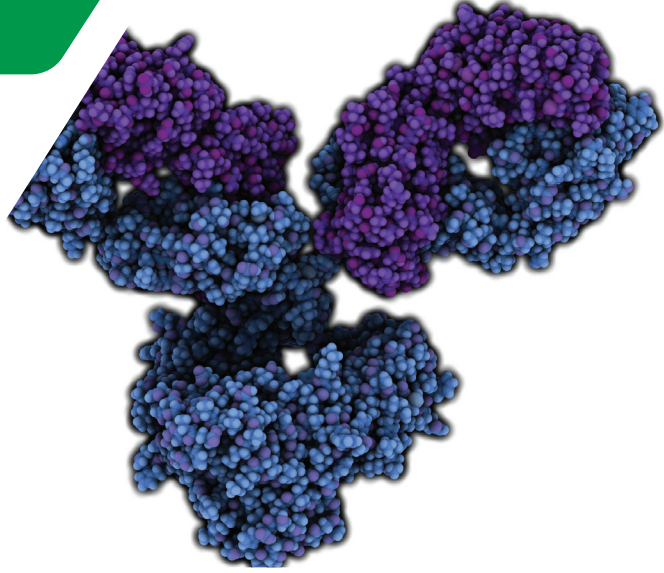


University College Dublin
Ireland's Global University

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 students 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. Mammalian cell culture and bioprocess laboratory structure will be comprehensively covered in addition to novel approaches to therapeutic development. A practical drug discovery laboratory project will form a significant component of the experience of how candidates are identified and brought through the development pipeline.

Key Fact

This programme is the culmination of close collaboration between the UCD School of Biomolecular and Biomedical Science, Systems Biology Ireland and the Biopharmaceutical industry in Ireland and across the world.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

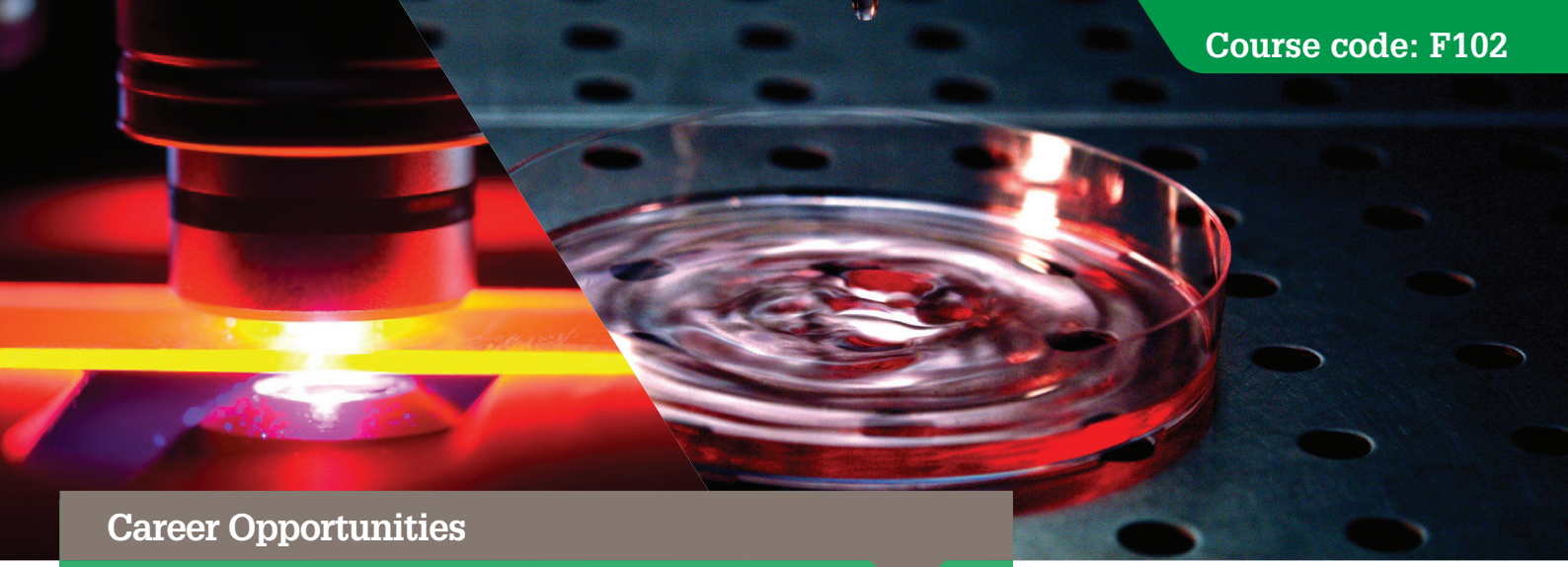
90 credits taught masters	45 credits taught modules	45 credits project

The structure of the programme is as follows:

Semester 1
- Biotherapeutic Discovery and Development I
- Professional Career Development
- Recombinant DNA Technology
- Business of Biotechnology & Science
- Biomedical Diagnostics
- High Content Screening Microscopy
- Pharmacology & Drug Development

Semesters 2 & 3
- Biotherapeutic Discovery and Development II
- Systems Biology in Drug Development
- Professional Career Development
- Bioprocessing Laboratory
- Emerging Issues in Biotechnology
- Regulatory Affairs
- Microbial & Animal Cell Products
- Project – Biotherapeutic Development

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



Course code: F102

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, Glaxo SmithKline, Eli Lilly, Johnson & Johnson, Pfizer, Janssen Biologics, AstraZeneca, MSD, Bristol Myers Squibb, Abbott, Sanofi.

Images © UCD Research

Facilities and Resources

Students on this programme will benefit from the use of a research skills laboratory in the prestigious UCD Conway Institute, as well as state-of-the-art teaching and laboratory facilities in the O'Brien Centre for Science.

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.

Staff Profile

Dr 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 and, together with Biopharma companies in the UK, Sweden and Switzerland, we are validating this technology in the industrial context and assessing the impact on the biotherapeutics discovery and development pipeline.

Fees and Scholarships

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Related Masters Programmes of Interest

- MSc Biotechnology & Business
- MSc Biotechnology
- MSc Biotherapeutics & Business
- MSc Biological & Biomolecular Science (Negotiated Learning)
- MSc Regulatory Affairs & Toxicology

EU Enquiries Dr David O'Connell
: biotech@ucd.ie : +353 1 716 6725
www.ucd.ie/courses/msc-biotherapeutics
UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

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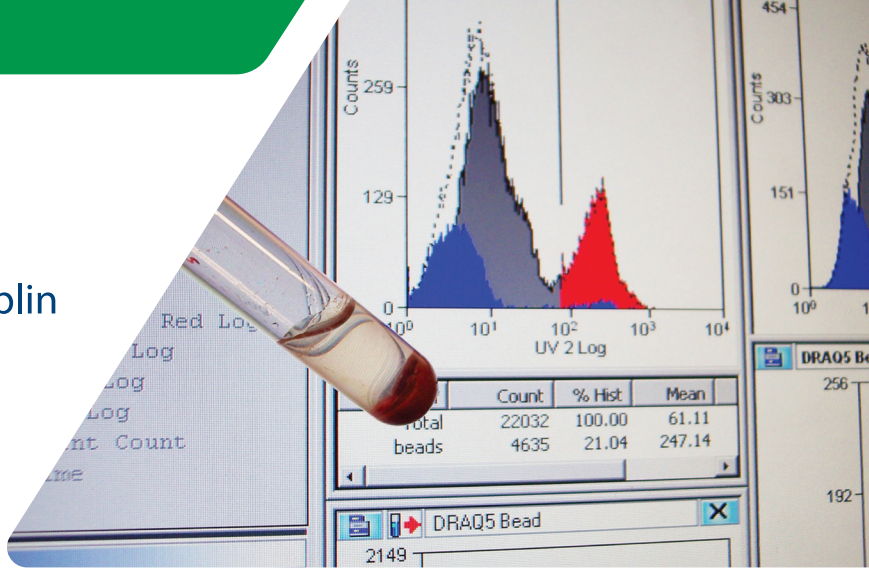

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MSc Biotherapeutics & Business
(1 Year Full Time)

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 students 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. Mammalian cell culture and bioprocess laboratory structure will be comprehensively covered in addition to novel approaches to therapeutic development. 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.

Key Fact

The programme is the result of a close collaboration between the UCD School of Biomolecular and Biomedical Science and the UCD Michael Smurfit Graduate School of Business, which is Ireland's leading business school.

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Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

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

The structure of the programme is as follows:

Semester 1
- Professional Career Development
- Management & Org. Behaviour
- Corporate Accounting & Finance
- Business of Biotechnology & Science
- Biotherapeutic Pipeline I
- Recombinant DNA Technology
- Biomedical Diagnostics
- High Content Screening Microscopy
- Pharmacology & Drug Development

Semester 2
- Professional Career Development
- Biotherapeutic Pipeline II
- Systems Biology in Drug Development
- Bioprocessing Laboratory
- Emerging Issues in Biotechnology
- Regulatory Affairs
- Microbial & Animal Cell Products

Semester 3
- Valuation and Commercialisation of Biotherapeutics
- Biotherapeutics Case Study

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

Course code: F103

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.

Facilities and Resources

Students on this programme will benefit from the use of a research skills laboratory in the prestigious UCD Conway Institute, as well as state-of-the-art teaching and laboratory facilities in the O'Brien Centre for Science.

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.
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Dr David O'Connell, Lecturer in Biochemistry & Pharmacology

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Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offer a number of postgraduate scholarships for fulltime, self-funding international students, holding an offer of a place on master's programmes. Please see www.ucd.ie/international/scholarships for further information.

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Related Masters Programmes of Interest

- MSc Biotechnology & Business
- MSc Biotherapeutics
- MSc Biological & Biomolecular Science (Negotiated Learning)
- MSc Regulatory Affairs & Toxicology

EU Enquiries Dr David O'Connell
: biotech@ucd.ie : +353 1 716 6725
www.ucd.ie/courses/biotherapeutics-business
UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

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MSc Biological & Biomolecular Science (Negotiated Learning) (1 Year Full Time)

The number of industries requiring highly skilled graduates in the biological and biomolecular sciences is rapidly expanding and remains based on the principle that employable graduates should possess a range of key skills. The MSc in Biological and Biomolecular Science by Negotiated Learning will afford students the flexibility to broaden their understanding of biological and biomolecular science against a backdrop of learning core technical, methodological and innovation skills relevant to industry and academia.
Several innovative specialisations are available from a carefully chosen range of modules from the relevant disciplines within the UCD School of Biomolecular and Biomedical Science and the UCD School of Biology and Environmental Science. These provide students with an exciting prospect of studying and researching in the interdisciplinary fields of genetics, cell biology, biochemistry, molecular biology, microbiology and biodata analysis.
This diverse offering aims to enhance and develop a student's current knowledge and skill base using a wide range of taught components and applied research skills.
Guidance from expert faculty is provided to tailor a programme that will meet the anticipated requirements of the student's objectives and career goals.

Key Fact

This MSc in Biological and Biomolecular Science is the first of its kind offered in Ireland by Negotiated Learning. This offers students a unique opportunity to combine skills and learning from several related disciplines with guidance from expert faculty staff, and to deepen their knowledge in one of our specialisations.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

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

Course divided into:

Core Laboratory Research Skills (30 credits) – including techniques such as RT-PCR, western blotting and Advanced Fluorescence Imaging.

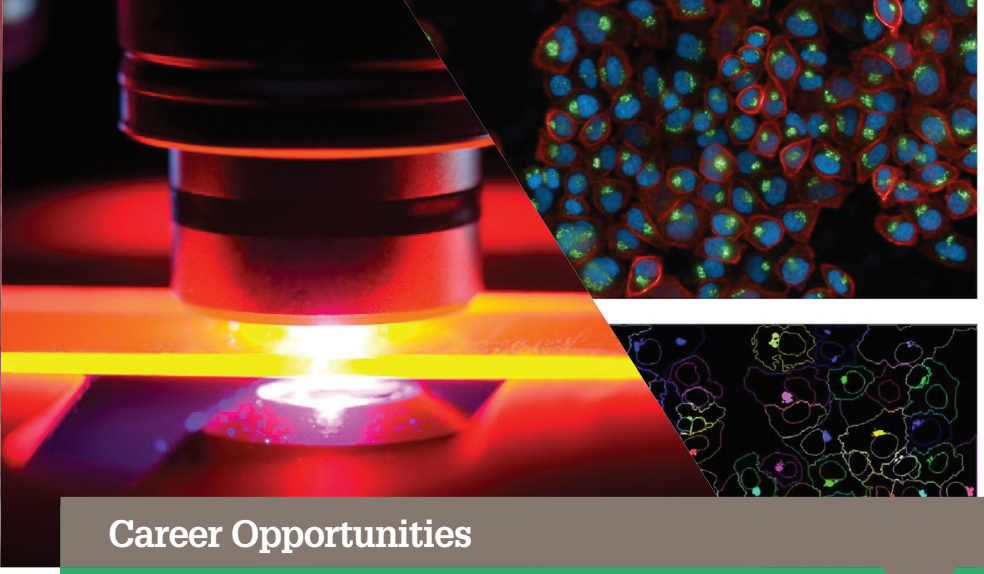
Core Professional Taught Skills Modules (20 credits) – including career development, quantitative tools, science writing and communication skills and data management.

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.



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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.

Facilities and Resources

Students on this programme will benefit from the use of a research skills laboratory in the prestigious UCD Conway Institute, as well as state-of-the-art teaching and laboratory facilities in the O'Brien Centre for Science.

Apply Now

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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.

Staff 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. I am passionate about enhancing the student educational experience and employment outcomes for our graduates. My teaching strategy is student centred, with an emphasis on active learning and the development of transferable skills at the cutting edge of biological research.

Fees and Scholarships

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Related Masters Programmes of Interest

- MSc Biotherapeutics
- MSc Plant Biology & Biotechnology
- MSc Biotechnology
- MSc Biotherapeutics & Business
- MSc Biotechnology & Business

EU Enquiries Dr Joanna Kacprzyk : Joanna.kacprzyk@ucd.ie
: +353 1 716 2675 www.ucd.ie/courses/msc-biological-biomedical-science
UCD School of Biology and Environmental Science,
UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

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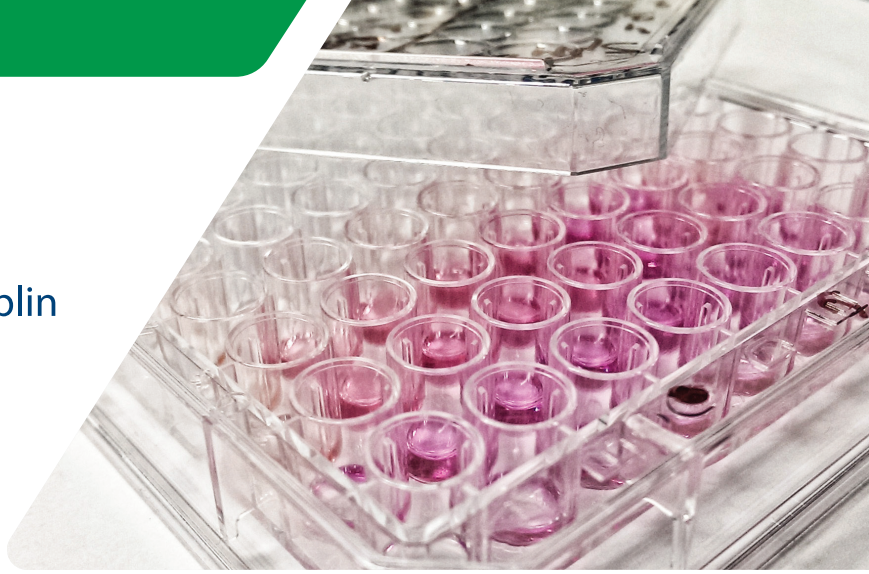

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MSc Regulatory Affairs & Toxicology
(1 Year Full Time)

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 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. The range of courses in Toxicology & Regulatory Affairs are aimed at individuals with a previous scientific qualification who wish to develop their skills and knowledge in this area and gain a recognised third-level qualification. Currently practicing toxicologists will also benefit from undertaking individual modules for continuing professional development (CPD), as all of the modules can contribute towards maintenance of professional toxicological accreditation.
Course content has been approved by the Irish Register of Toxicologists (IRT) for accreditation and CPD in this area.

Key Fact

These courses have been developed in close collaboration with the Irish Register of Toxicologists (IRT) and are also approved for accreditation towards becoming a registered toxicologist and for CPD credits towards maintaining IRT/ERT accreditation. The courses are run by European Registered Toxicologists (ERT), including guest lecturers delivering 'state-of-the-art' contributions as practising experts in a range of toxicological roles, from basic research to national and European regulatory bodies.

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Safety
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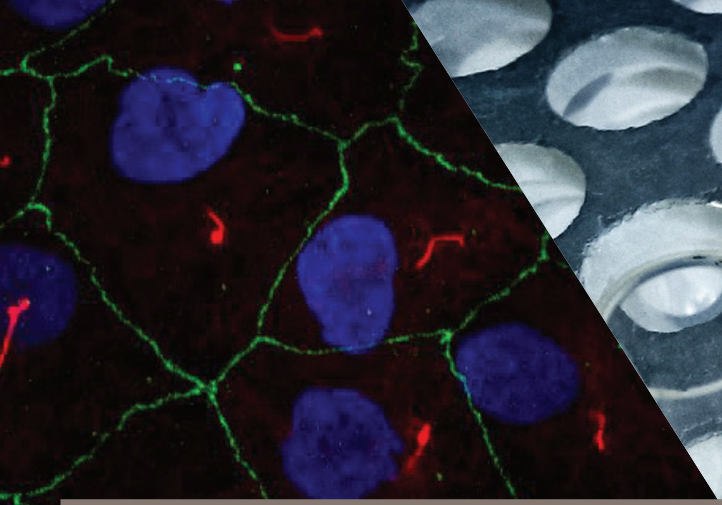
Course Content and Structure

90 credits taught masters	**60 credits** taught modules	**30 credits** individual research project

- Introduction to Regulatory Affairs
- Healthcare & Pharma Regulatory Affairs
- Business for Regulatory Affairs Professionals
- Essential Pharmacology for the Toxicologist
- Experimental Toxicology & Risk Assessment
- Medical & Forensic Toxicology
- Food & Environmental Toxicology
- Professional Skills & Career Development

Lectures are delivered by staff of international renown in their field, many of whom are practising toxicologists. 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.



Course code: F167

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.

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Facilities and Resources

The UCD School of Biomolecular and Biomedical Science is closely linked to the UCD Conway institute of Biomedical and Biomolecular research, which provides core technologies such as NMR spectroscopy, real-time PCR, electron microscopy, light microscopy, digital pathology and flow cytometry.

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.

Fees and Scholarships

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Related Programmes of Interest

- Professional Diploma in Toxicology
- Professional Certificate in Toxicology
- MSc Biotechnology
- MSc Biotechnology & Business
- MSc Biotherapeutics
- MSc Biotherapeutics & Business

Staff Profile

Dr Craig Slattery, UCD School of Biomolecular and Biomedical Science

I am a Lecturer in Toxicology & Regulatory Affairs at 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. My own research focuses on developing novel toxicology assays and systems for regulatory testing of pharmaceutical and biological medicines.

Jessica Walsh, Senior Toxicology Analyst, Medical Bureau of Road Safety

This MSc offers a detailed account of the role of a Toxicologist in a regulatory environment. The Masters introduces students to pharmacokinetics and pharmacodynamics covering various topics including pharmaceuticals, food and the environment. It shows the role of a regulator in the mentioned disciplines enhancing your knowledge around toxicology and regulatory affairs which I was able to implement in my current role as a Forensic Scientist.

EU Enquiries Dr Craig Slattery ✉ : biotech@ucd.ie
www.ucd.ie/courses/msc-toxicology-reg-affairs

Non-EU Enquiries ✉ : internationaladmissions@ucd.ie
www.ucd.ie/international

UCD School of Biomolecular and Biomedical Science, University College Dublin, Belfield, Dublin 4.

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Ireland's Global University

MSc Chemistry (Negotiated Learning) (1 Year Full Time)

Chemistry, as the central science, has links to all other scientific disciplines. Therefore, graduate level chemistry programmes span a large number of topics from the mathematical, through the physical and materials disciplines to the biological ends of the scientific spectrum.

The MSc in Chemistry by negotiated learning is a flexible programme delivered through the UCD School of Chemistry. The programme offers a diverse array of modules and is suitable for students that wish to sample different sides of the discipline. Initial academic advice in collaboration with the student ensures that module choices match career aspirations or areas of interest.
For example, students wishing to broaden their understanding of chemistry could choose a range of modules, while those who are intent on progressing to a PhD programme, or specific industries, might choose to concentrate on a specific area, e.g., chemical biology, nanochemistry, medicinal, sustainable or materials chemistry.

Key fact

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.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

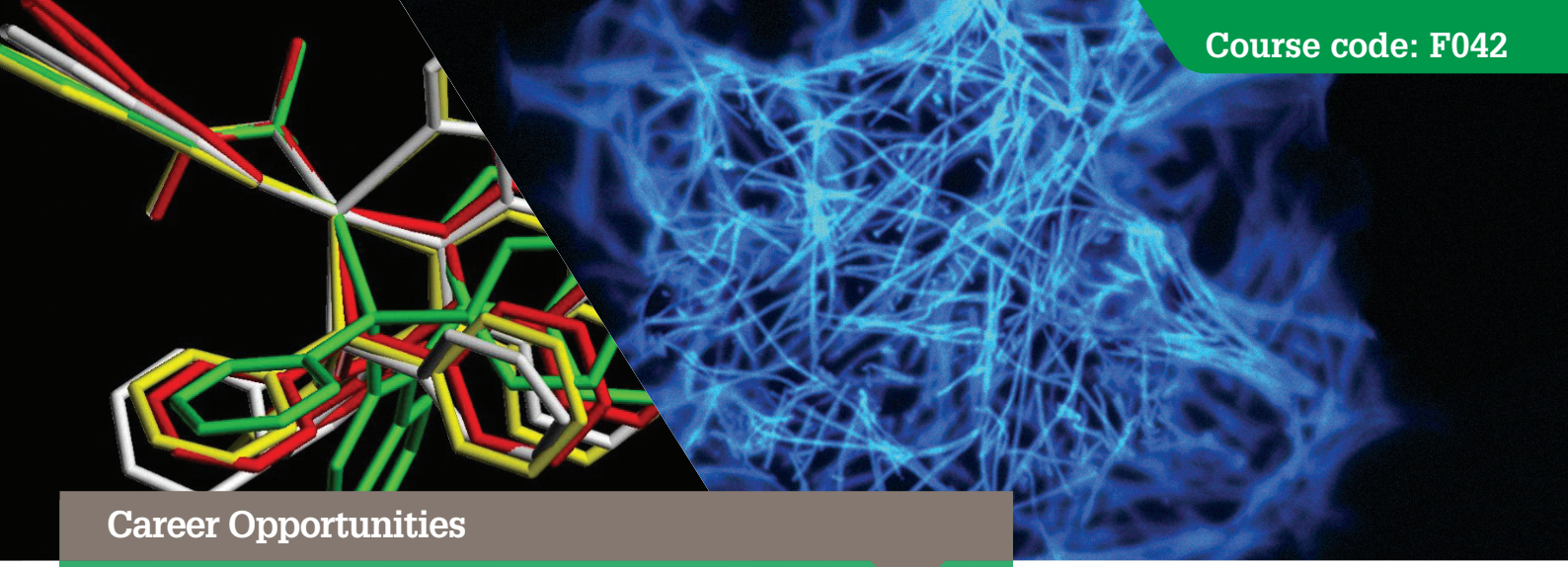
90 credits	60 credits	30 credits
taught masters	taught modules	research project

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

- Advanced synthetic organic and inorganic chemistry
- Surface science
- 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 third semester 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. The research interests of the academic staff members are at www.ucd.ie/chem/about/staff

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



Course code: F042

Career Opportunities

The MSc in Chemistry through 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.

Images © UCD Research

Facilities and Resources

The UCD School of Chemistry is located in the state-of-the-art UCD O'Brien Centre for Science with world-class facilities in technologies such as X-ray crystallography, nanoparticle characterisation, microanalysis, NMR spectroscopy and Mass Spectrometry.

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.

Staff Profile

Dr Xiangming Zhu, UCD School of Chemistry

This MSc in Chemistry by 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. Students participate in laboratory work based in our newly developed ergonomic, high specification, modern laboratories in the UCD O'Brien Centre for Science. Our core facilities are at internationally competitive levels, including NMR spectrometry, mass spectrometry/chromatography, X-ray crystallography and microanalysis.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at www.ucd.ie/residences/
For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodation-booking-support/ for further details.

Related Masters Programmes of Interest

- MSc Biotechnology
- MSc Biotechnology & Business
- MSc NanoBio Science
- MSc Biotherapeutics
- MSc Nanomaterials Chemistry
- MSc Synthetic Chemistry for the Pharmaceutical & Fine Chemicals Industry

EU Enquiries Associate Professor James Sullivan : james.sullivan@ucd.ie
: +353 1 7162135 www.ucd.ie/courses/msc-chemistry
UCD School of Chemistry, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

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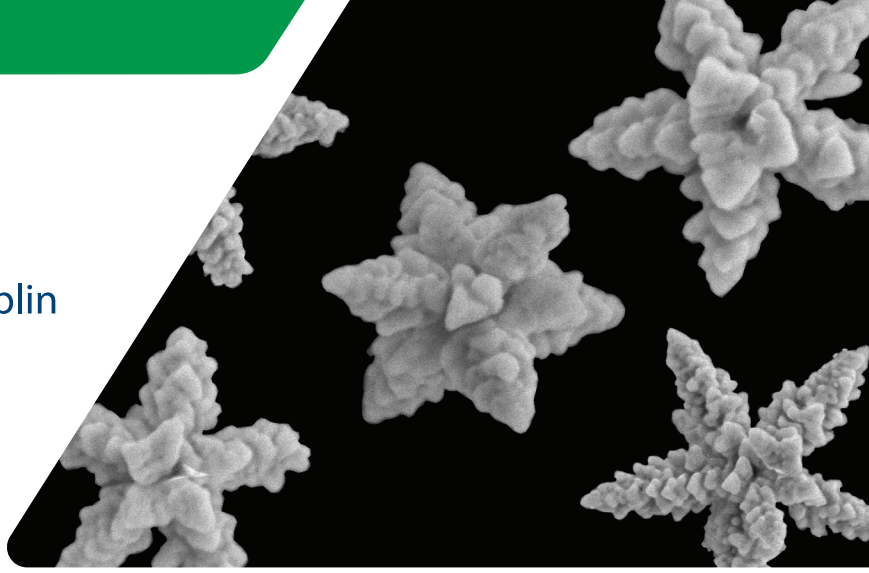

MSc Nanomaterials Chemistry
(1 Year Full Time)

This MSc in Nanomaterials Chemistry is designed for Science and Engineering graduates interested to learn about the emerging area of nanomaterials. Our goal is to equip graduates with the knowledge and skills necessary to understand and harness the potential of nanomaterials in future advanced manufacturing, ICT, chemical, biopharma, medical device (diagnostics, drug delivery, and therapeutics) and other industries with a view to future employment in these sectors. Key to learning about nanomaterials is the availability of advanced technology platforms that permit the preparation and processing of nanomaterials in synergy with quantitative materials measurement and functional assessment. In this regard, the UCD School of Chemistry is strongly positioned in hosting world-class researchers and teachers that are comprehensively supported by state-of-the-art nano research facilities.

The quality and diversity of our research environment will enrich the learning experience of Nanomaterials students and will empower them to develop the competitive skillset necessary to establish successful careers. Upon application, applicants to this MSc will be invited to apply for an Intel Ireland Scholarship to support their studies. This funding will be awarded on a merit basis. Opportunities to conduct a research project through internships will be available.

These gold nanoflowers range from 0.5 - 1 micron in size and the images were taken in UCD by scanning electron microscopy.
© UCD Research Images

Key Facts

The Centre for BioNanoInteractions, based in the UCD School of Chemistry, is Ireland's National Platform for BioNanoInteraction science, and draws together specialists from its Universities, Institutes and companies. They are one of the world's leading centres of knowledge for bionanointeractions applied to the fields of nanosafety, nanobiology and nanomedicine, and are pioneering many of the new techniques and approaches in the arena.

UCD is ranked within the top 1% of higher education institutions worldwide (2018 QS Rankings) and in the top 200 in the world for the subject area of Chemistry.

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Global community
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Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

90 credits	45 credits	45 credits
taught masters	taught modules	research project

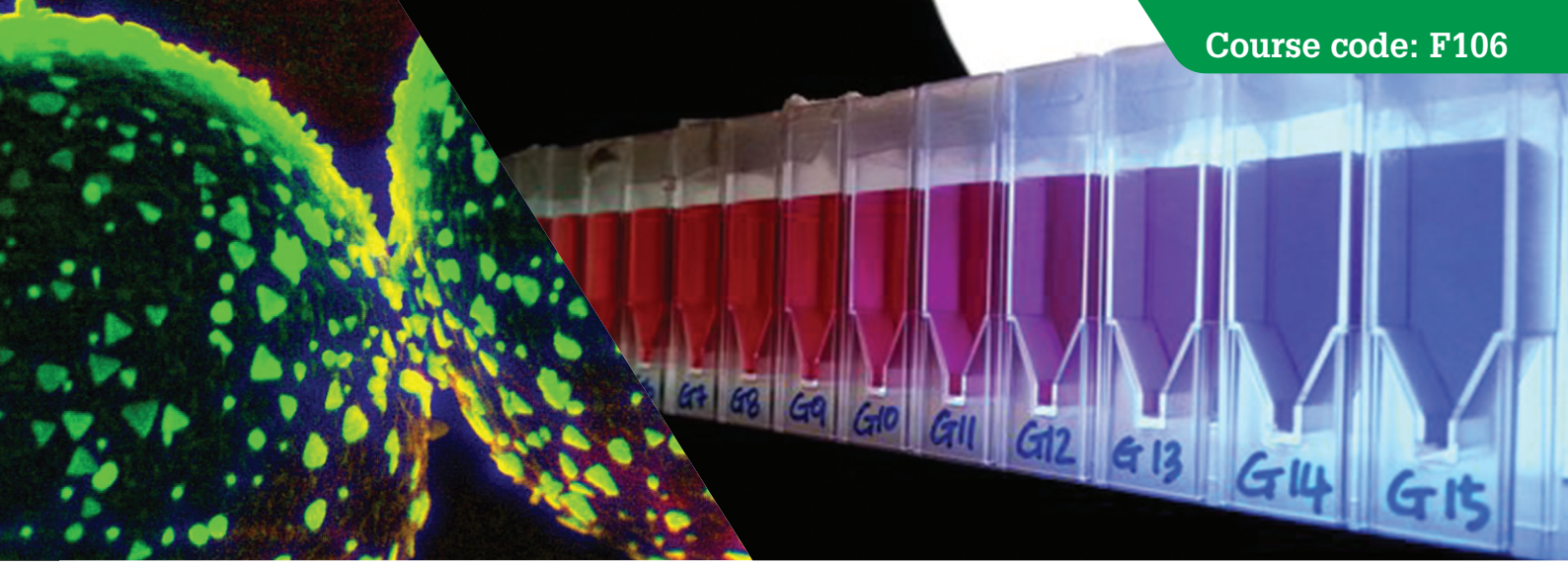
Modules in the programme include:

September - December
- Nanochemistry I: Chemistry of Engineered Materials
- Biomaterials
- Physics of Nanomaterials
- Advanced Atomic Force Microscopy for Bionanoscience
- Professional Career Development
- Nanochemistry Seminar Series

January - May
- Nanochemistry II: Biointerface Nanochemistry
- Nanomaterials
- Nanochemistry Techniques Lab
- Advanced Characterisation Techniques
- Biomimicry - Learning from Nature
- Biophysics at the Nanoscale/ Nanodevices

May - August
- Research Project

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



This false colour image shows latex microspheres decorated with silver nanoprisms. These particles have potential applications in catalysis, cellular imaging, Surface Enhanced Raman Spectroscopy (SERS) and plasmonics. © UCD Research Images

Nanosized materials exhibit different optical and electronic properties than the bulk scale. These properties can be harnessed for a range of applications from imaging to catalysis. In this picture the beautiful colours of gold nanoparticles ranging in size from red 20nm to blue 130nm can be seen. © UCD Research Images

Career Opportunities

The MSc in Nanomaterials Chemistry provides a basis for graduates to enter the chemical, pharmaceutical, biopharma, advanced manufacturing and materials industries, including the burgeoning 3D printing and medical device sectors. Analytical services, environmental protection, and primary and secondary school teaching present other possibilities. This course is also a route for students into a PhD programme.

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 Science or Engineering, whereby the applicant has sufficient background in chemistry including some practical experience in the chemistry laboratory. 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.

Staff Profile

Professor Kenneth A. Dawson, UCD School of Chemistry

Professor Kenneth A. Dawson is Director of the Centre for BioNano Interactions (CBNI) and Chair of Physical Chemistry at University College Dublin. He has several years of experience of leading international research teams to understand how nanoparticles interact with living systems. This fundamental work also has applications in novel medicines and diagnostics, as well as assuring the general safety of nanomaterial products. He has developed the science of the interface between nanomaterials and a biological environment, and introduced the concept of the biomolecule corona that surround nanoparticles in biological milieu and how this mediates nanoparticle interaction with living systems. The work is illustrated in the 2012 review paper by his group, which described how nanoparticles can gather a cloak of molecules onto themselves in the human body. This review paper was featured on the front cover of *Nature Nanotechnology*.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships Intel Ireland scholarship funding will be awarded on a merit basis to selected applicants.

Accommodation

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Related Masters Programmes of Interest

- MSc Chemistry (Negotiated Learning)
- MSc Synthetic Chemistry for the Pharmaceutical & Fine Chemicals Industry
- MSc NanoBio Science

EU Enquiries Dr Susan Kelleher
: susan.kelleher@ucd.ie : +353 1 716 2839
http://www.ucd.ie/courses/msc-nanomaterials-chemistry
UCD School of Chemistry, University College Dublin, Belfield, Dublin 4.

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www.ucd.ie/international

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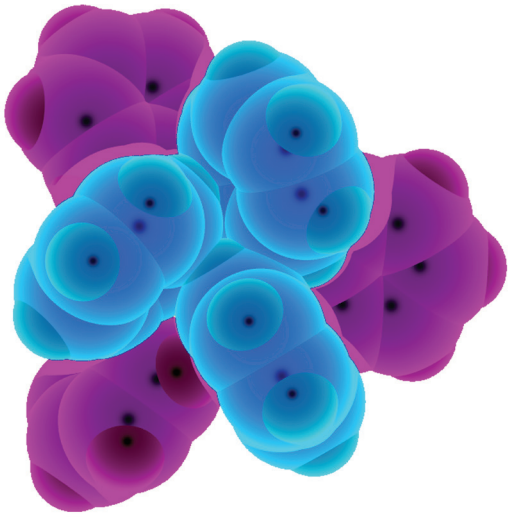

X-ray crystal structure of all cis hexaphenylcyclohexane, isolated from the BIRCH reduction of hexaphenylbenzene.

MSc Synthetic Chemistry for the Pharmaceutical & Fine Chemicals Industry
(1 Year Full Time)

Ireland is home to nine of the top 10 world pharmaceutical and biotechnology companies, with seven of the 10 top blockbuster pharmaceuticals made in Ireland. This MSc in Synthetic Chemistry 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 chemicals or pharmaceutical industry.

The course draws on the expertise from researchers in the UCD School of Chemistry who specialise in the following areas:

- Catalysis and new transformations research is directed towards design and discovery of new methodologies for metal-mediated and organic bond making and breaking processes to provide new techniques for building up molecular complexity (cascade processes) and to facilitate challenging reactions under mild conditions. Areas of application are multifaceted, including for example natural product synthesis, energy storage (hydrogen fuel economy, greenhouse gas fixation, water splitting), and greener processes.
- Carbohydrate chemistry research focuses on developing new synthetic methodologies towards carbohydrates, C- and S-glycosides, and towards oligosaccharides and glycoconjugates, and also includes the evaluation of the biological activity, specifically as antibiotics, vaccines, and antitumour agents.
- New materials for magnetic, medicinal and electronic applications research encompass the fabrication and application of complexes and assemblies for spin crossover (magnetic switches) and as electrochemical sensors. Substantial work is also directed towards the synthesis and application of metal-based drugs for anticancer and antimicrobial application.

Key Facts

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.
UCD is ranked within the top 1% of higher education institutions worldwide (2018 QS Rankings) and in the top 200 in the world for the subject area of Chemistry.

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Global community
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Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

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

The structure of the programme is as follows:

September - December
- Organic Synthesis
- Metals in Biology
- Topics in Medicinal Chemistry
- Spectroscopic Techniques
- Masterclass in Carbohydrate Chemistry

January - May
- Organic Synthesis 2
- Modern Methods & Catalysis
- Chemistry Lab to commercialisation
- Catalytic Asymmetric Synthesis
- Advanced NMR & MS
- Advanced Organic Synthesis & Drug Discovery

May - August
- Research Project

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

Course code: F105

Clofazimine, the Irish anti-leprosy drug, is being researched for new medical uses. © UCD Research Images

Pictured is a superconducting magnet, part of the 600MHz Nuclear Magnetic Resonance (NMR) Spectrometer system, which is used to study (bio)chemically important molecules. © UCD Research Images

Career Opportunities

The MSc in Synthetic Chemistry 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.

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 who first language is not English must also demonstrate English languate proficiency of IELTS 6.5 (no band less than 6.0 in each element), or equivalent.

Staff Profile

Associate Professor Paul Evans, UCD School of Chemistry

I am an organic chemist, both 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 with a view to assessing their anti-microbial and inflammatory properties, in addition to their cytotoxicity. To do this we are using reactions reported in the literature in new ways, which serve to prepare the targets in as efficient means as possible.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships

Accommodation

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Related Masters Programmes of Interest

- MSc Chemistry (Negotiated Learning)
- MSc Nanomaterials Chemistry
- MSc NanoBio Science

EU Enquiries Associate Professor Mike Casey
: mike.casey@ucd.ie : +353 1 716 2881
http://www.ucd.ie/courses/msc-synthetic-chemistry
UCD School of Chemistry, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

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MSc Applied Environmental Science
(1 Year Full Time)

Several agencies at a national and international level are required to manage our environment sustainably by implementing policy and legislation. 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 programme provides graduates with a thorough knowledge of Environmental Science and there is 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, to make this an exceptionally practical multidisciplinary programme.

Key Fact

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.

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Global careers
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Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

90 credits taught masters	**70 credits** taught modules	**20 credits** individual 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 & Resources Management
- Marine/Coastal Ecology
- Soil Ecology
- Environmental Geology
- Ecotoxicology & Air Quality Monitoring
- Vegetation Ecology
- Geographic Information Systems (GIS) and Data Analyses
- Remote Sensing
- Ecological Modelling
- Integrated Municipal Solid Waste Management
- Water, Waste & 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 and includes an internship for at least a 6-week period in the environmental sector (including consultancies, government agencies and industry).

The course gives due consideration to key legislative requirements and policy developments.

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

Images © UCD Research

Career Opportunities

Our graduates are building successful varied careers in environmental resources assessment, management and protection. A considerable number have been employed in consultancy positions and some are also with the Inland Fisheries Ireland, the Department of the Environment 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.

Facilities and Resources

The School of Biology and Environmental Science has 14 state-of the-art research laboratories that are equipped to support a very wide range of research activities at the cellular or whole organism level. The UCD Rosemount Environmental Research Station can also support glasshouse or field-based experiments.

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.

Graduate Profiles

Dr Gustavo Becerra Jurado, Research Officer, Inland Fisheries Ireland

I had a very positive experience the year I was a student of the MSc Environmental Science programme at UCD. I really enjoyed the lectures and I had the support of my project supervisor. This course equipped me with many invaluable skills that are needed in the current job market.

Dr Rachel Wisdom, Entomologist, Department of Agriculture, Food and the Marine, Ireland.

I studied environmental science and agriculture as an undergraduate. The masters degree in Applied Environmental Science at UCD was perfect as it covered a wide range of relevant topics in excellent detail. This enhanced my environmental science skills and led to my selection for a PhD in environmental science research at UCD.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

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Additional Course Delivery Options

- MSc Applied Environmental Science 2 Years Part Time

Related Masters Programmes of Interest

- MSc Environmental Sustainability (Negotiated Learning) (Online)
- MSc Environmental Policy
- MSc Environmental Technology
- MSc Global Change: Ecosystem Science & Policy

EU Enquiries Dr Jan-Robert Baars : mscenvsci@ucd.ie : + 353 1 716 2395 **Non-EU Enquiries** : internationaladmissions@ucd.ie
www.ucd.ie/courses/msc-environmental-science www.ucd.ie/international
UCD School of Biology and Environmental Science, University College Dublin, Belfield, Dublin 4.

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JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

MSc Global Change: Ecosystem Science & Policy (Joint International Degree, 16 months full time)

The current environmental changes affect both natural ecosystems and civil societies. 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 joint international MSc course between the UCD School of Biology and Environmental Science and Justus-Liebig University (JLU) Giessen, Germany is the response to these global change challenges and will suit skilled motivated science graduates wishing to develop a scientific career in ecosystem research as well as those aiming to contribute to evidence-based environmental policy.

You will be involved in active research groups in both countries, contributing to their ongoing ecosystem studies in order to experience the process of creating scientific knowledge in ecosystem science. In addition to acquiring skills in measuring, analysing and understanding what is behind scientific data you will have the opportunity to develop your analytical, presentation and communication skills to enable you to participate in the policy making process.

Key Fact

Graduates will receive a joint international degree from two well-established universities: University College Dublin and Justus Liebig University; combining their complementary and multidisciplinary research profiles and cutting-edge expertise.

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Safety
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Course Content and Structure

120 credits	70 credits	30 credits	20 credits
taught masters	taught modules	individual research project	work placement

The first semester is based at UCD, followed by a 6-week minimum internship in a company or institution of your choice. The second taught semester is based in JLU, Giessen, Germany. The last semester is devoted entirely to a research project (minor thesis) which can be undertaken in either UCD, JLU or another host institution.

Samples of topics available include:

- Global Change impacts on soil, air and water: methodological knowledge and advanced techniques
- Plant-soil-atmosphere interactions
- Science and policy interface
- Environmental law and policy
- Data analysis and interpretation
- Policy consultancy
- Global governance
- Human health impact of climate change

For more information visit http://globalchange.ucd.ie/

JLU Campus, Giessen, Germany.

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

Images © UCD Research

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).

Facilities and Resources

- A climate change station at JLU hosts one of the world-wide longest-running Free Air Carbon dioxide Experiments (FACE).
- The Program for Experimental Atmospheres and Climate (PEAC) at UCD is a state-of-the art plant growth room facility to investigate past and future climatic scenarios.
- The UCD Earth Institute is a centre for resource and environment research aimed at leading Ireland's response to climate change and the global energy crisis.

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 an appropriate life sciences discipline, such as biology, agriculture or environmental science (including zoology, ecology, biochemistry, geology and physics). A lower second class honours (GPA 2.48 and above) 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.

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Related Masters Programmes of Interest

- MSc Applied Environmental Science
- MSc Environmental Sustainability (Online)

Graduate Profile

Silvia Garcia

During my first job, I became interested in the environmental side of my projects and decided to complete the MSc Global Change to get a deeper understanding of current environmental challenges and how to address them. The programme helped me understand the relationship between science and policy and the importance of efficient communication between the two. I am currently working as a senior project scientist in Fehily Timoney & Co in Cork involved in the project management of planning applications and the analysis of environmental impacts of renewable energy developments.

Graduate Profile

Lisa Reilly

One of the best aspects of this course was that the variety of modules, from policy to hands-on practical modules, 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 sets 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 to investigate peatland restoration efforts. Since completing my master's degree, I have been working at Gesellschaft für Internationale Zusammenarbeit (GIZ) as part of the biodiversity and conservation team in Ethiopia.

EU Enquiries Dr Florence Renou-Wilson
: globalchange@ucd.ie : + 353 1 716 2395
www.ucd.ie/courses/msc-global-change-ecosystem
http://www.uni-giessen.de/study/courses/master/globalchange
http://globalchange.ucd.ie/
UCD School of Biology and Environmental Science, University College Dublin, Belfield, Dublin 4.

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www.ucd.ie/international

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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.

The Environmental Sustainability course is taken online in your own time and at your own pace. 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, resource management, environmental regulation and policy. You will be challenged to apply your scientific and technical knowledge to develop solutions to local and global problems and needs. Through discussion and research work you will learn to handle complex issues, analyse, interpret and apply scientific data and information, use your judgement and also communicate your findings and ideas.

Key Fact

This course allows the flexibility to tailor your module selection to meet your training needs or career goals. All students undergo a Training Needs Assessment with the assistance of UCD academic staff before commencing their studies, to provide the most suitable, customised course content for each applicant.

Why study at UCD?

Tradition

Established 1854, with 160 years of teaching & research excellence

Global profile

UCD is ranked in the top 1% of higher education institutions worldwide

Global community

Over 6,000 international students from over 120 countries study at UCD

Global careers

Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety

Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

The MSc, Diploma and Certificate will provide you with the theoretical background, practical training and ancillary workplace skills needed for a successful career in your chosen field. The course will develop your capacity for self-directed learning, within a supportive framework facilitated by online fora, discussion boards and virtual tutorial/classroom sessions. For the MSc degree you will be required to undertake a research or desk-based project. You can take any combination of the following modules, depending on your specific interests and career needs. Modules available include:

- Sustainable Energy & Environment
- Green Technology Project
- Energy Systems & Climate Change
- Technical Communications
- People Information & Communication
- Managing the Interface between Science & Policy
- Water Quality Assessment, Protection & Management
- Water Resources Engineering 1 and 2
- Air Pollution
- Environmental Geoscience
- Soil Resources
- Peatlands & Global Change
- Ecology & its Application
- Genetics for Environmental Scientists
- Applied Ecotoxicology
- Impact Assessment Procedures
- Environmental Legislation & Regulation
- Management of Sustainable Fisheries
- Wildlife Management/Conservation
- Bioinvasions: Impact to Management
- Management Plan
- Natural Heritage Conservation
- Cultural Heritage Conservation
- World Heritage Legislation
- Data Analysis & Interpretation
- GIS for Environmental Investigations
- Practicum (Research; lab/field)
- Practicum (Desk Study)
- Creative Thinking and Innovation
- Career Zone – non-credit bearing, free additional module

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

Course code: F059

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.

Images © UCD Research

Facilities, Resources and Support

Throughout your term of study here in UCD you will have access to our online electronic library resources, including a wide range of scientific journals and e-books. IT and Blackboard support will be available to assist with any issues you encounter. Students may also visit the library to use its resources and have the same right of access to campus facilities as our on-campus students.
This course relies on the significant teaching and research strengths across eight different Schools in UCD. This allows us to offer a multidisciplinary degree incorporating a wide range of topics, e.g., renewable energy resources, sustainable energy systems, environmental engineering and resource management, water quality assessment and conservation science.

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.

Fees

Tuition fees are charged on a 'pay as you go' basis each semester for just those modules taken. Information is available on www.ucd.ie/fees. The same fees apply to non-EU students.

Additional Course Delivery Options

- Graduate Diploma Environmental Sustainability (Negotiated Learning) (Sept Start, Jan Start)
- Graduate Certificate Environmental Sustainability (Negotiated Learning) (Sept Start, Jan Start)

Related Masters Programmes of Interest

- MSc Applied Environmental Science

Graduate Profiles

Zsuzsanna Lukacs

I have an environmental engineering degree and this was a good option as I'm also working full time and the online course works very well for me. The classes are well prepared and easy to understand even for someone whose first language is not English.

Maurice Ryan

I would describe the course as enjoyable and very flexible. I would advise prospective students not to rush the course. You have four years to get all 90 credits done in the case of the Masters and if you're busy with work then I recommend you use this time to get the best of both the online course and daily life. This is where the course scores fabulously for me. It's just so flexible.

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.

Roberta Bellini

I really enjoyed the online format as it gave me a lot of flexibility to look at the course material any time. I found the course very useful in my current job and it has given me a broader understanding of Ireland's environmental issues and solutions, as well as insight at a global scale.

EU Enquiries Associate Professor Mary Kelly-Quinn
: sustainabilityonline@ucd.ie : +353 1 716 2020
www.ucd.ie/courses/msc-environmental-sustainability
UCD School of Biology and Environmental Science, University College Dublin, Belfield, Dublin 4.

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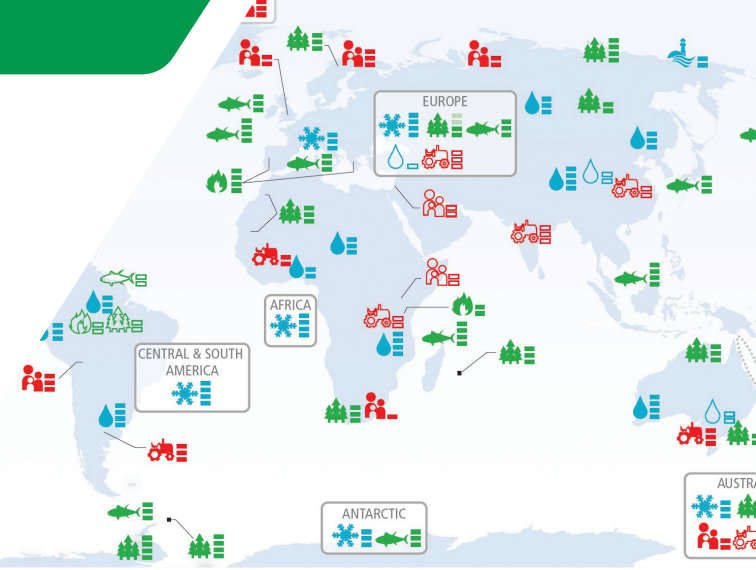

MSc Climate Change: Science & Impacts (1 Year Full Time)

The climate of the planet has changed tremendously over the last few decades, leading to excessive flooding, forest fires and rising global temperatures, and having various impacts on our planet and society.
It is crucial to study the causes of climate change and understand the impacts in different sectors in order to prepare us for any natural hazards or extreme changes that can be predicted and incorporate climate change into future sustainable development. This MSc programme has two strands:

1) Climate science and simulation
2) Climate change and impacts

On completion of the programme students should be able to critically understand climate change science and impacts, and creatively apply the knowledge in solving real-world problems.
It suits students with a degree in Science, Engineering, Economics or other environment-related disciplines with a strong interest in climate change science and impacts. Students will have the choice to either conduct a research project working with leading experts from multidisciplinary backgrounds or to work as a summer intern in various agencies or companies. In addition to data analysis and computational skills, students will have opportunities to develop their presentation and communication skills.

Key Fact

The UCD Earth Institute is Ireland's largest research institute dedicated to earth and environmental sciences. The curriculum for this MSc is continually updated and the coursework is practically oriented and benefits from cutting-edge expertise and multidisciplinary research profiles.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

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Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

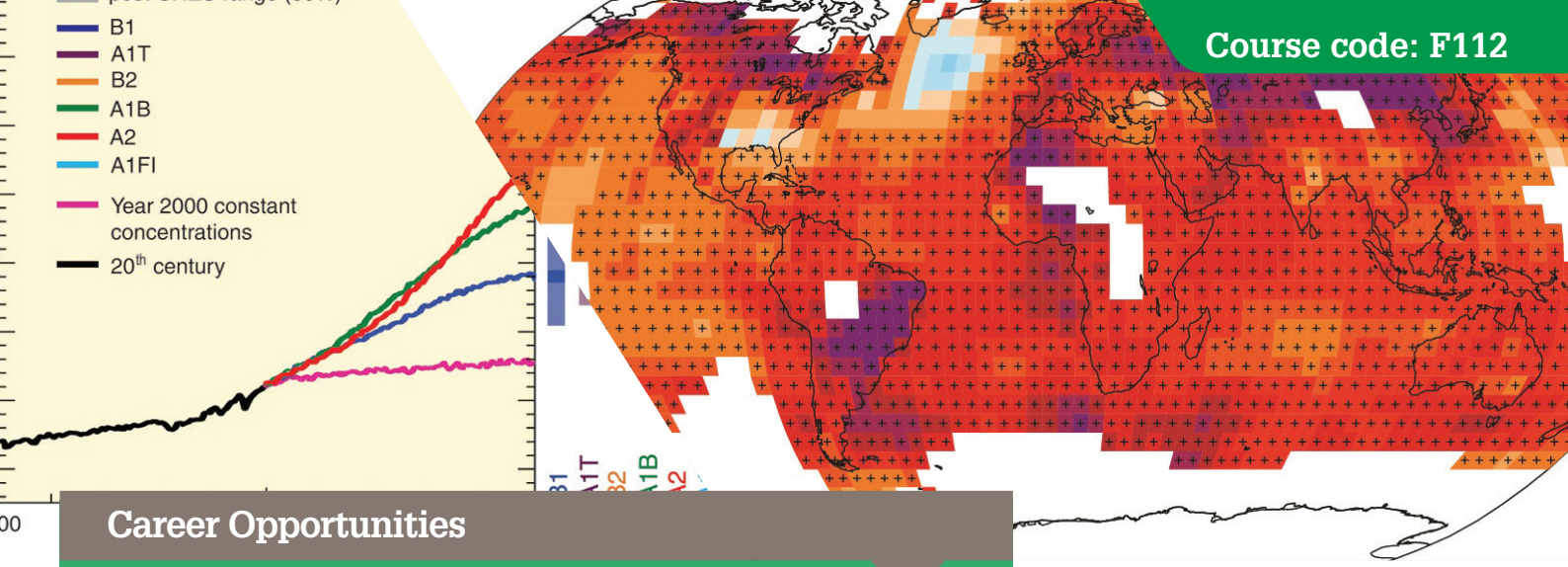
90 credits taught masters	**60 credits** taught modules	**30 credits** research project or summer internship

This campus-based full-time programme has been specifically designed for graduate students from various undergraduate disciplines without requiring previous climate change knowledge. The core modules will enable students to critically understand climate science and develop skills in climate data analysis and climate model simulations. Optional modules of the strand in climate science and simulation will advance students' ability in climate model simulation and application in real world problems. Optional modules in the strand of climate change and impacts will reinforce students' creative thinking of climate impacts in different sectors.

Core modules include:
- Weather and climate
- Climate model and scenarios theory
- Climate model and scenarios applications
- Case studies of climate change and impacts

Optional modules include:
- Numerical simulation and theory
- Practical Statistics
- Paleo-climate
- Environmental Impact Assessment
- Climate, Carbon, and Soil
- Energy System and Climate Change
- Energy Market and Climate Change
- Global Business
- Biofuel & Bioenergy resources
- Research Skills

Modules and topics shown are subject to change and are not guaranteed by UCD.
Modules can be substituted for other modules if agreed with the programme director.



Course code: F112

Career Opportunities

The multidisciplinary nature of this programme enables our graduates to work across different disciplines and backgrounds to suit global market demands. Graduates could pursue various careers, such as in governmental or international organisations, NGOs, insurance or consulting companies, with their strong skills in climate data analysis and broad knowledge of climate impacts. The experience of engaging with cutting-edge research in the UCD Earth Institute places students in a strong position for further studies at 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 degree in Science, Engineering, Economics or other Environment-related disciplines. An upper second class honours or international equivalent is required.
- A strong interest in climate science and impacts 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.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for fulltime, self-funding international students, holding an offer of a place on masters programmes. Please see www.ucd.ie/international/scholarships for further information.

Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at www.ucd.ie/residences/
For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodation-booking- support/ for further details.

Related Masters Programmes of Interest

- MSc Applied Environmental Science
- MSc Environmental Sustainability (Online)
- MSc Global Change: Ecosystem Science & Policy
- MSc Food Business Strategy

Staff Profiles

Associate Professor Xuefeng Cui, Senior Lecturer, UCD Earth Institute, UCD School of Mathematics and Statistics

Trained as a climate modeller, Dr Cui works on a large range of topics in climate change and impacts with a focus on land use change, food security and geoengineering.
He has served as Lead Author for the latest IPCC AR5 during 2010-2014 and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) since 2014.

Dr Conor Sweeney, Lecturer, UCD Earth Institute, UCD School of Mathematics and Statistics

Climate Science is a brilliant area to be working in, full of interesting questions to research. One research project I'm working on at the moment studies data from observations and climate models to predict how extremes in temperature and rainfall may change in the future. Another research project looks at how warming may change large atmospheric scales, which could have an impact on wind energy. There are always new challenges, and the demand for improved climate knowledge is increasing all the time!

EU Enquiries Programme Administrator pgstudies@maths.ucd.ie
+353 1 716 2452 www.ucd.ie/courses/msc-climate-change
UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

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MSc Actuarial Science
(1 Year Full Time)

The MSc in Actuarial Science is designed for students from quantitative disciplines who ultimately 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 & Faculty of Actuaries, UK and is fully accredited by the Institute & Faculty of Actuaries, 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 dissertation will allow you to develop an understanding of how the theory and principles covered in the Core Technical subjects are applied in practice.

The programme is suitable for students with no prior exemptions and for students who wish to add to any exemptions they already have. In addition you may also be able to take advanced courses in finance at the world class UCD Michael Smurfit Graduate School of Business.

Top school among Irish universities

UCD offers the widest range of Actuarial Science programmes in Ireland and has established a reputation for providing high quality graduates for the actuarial and finance industries in Ireland and internationally. The MSc Actuarial Science is accredited by the Institute & Faculty of Actuaries, UK and is delivered by qualified actuaries and other academic experts. The MSc Actuarial Science won the Science Postgraduate Course of the Year at the gradireland Higher Education Awards in 2016 and 2017.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

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 Technical subjects 1 to 8 (CT 1-8) and Core Applications subject 1 (CA1) of the examinations of the Institute and Faculty of Actuaries, UK.

The Core Technical subjects are:

- Financial Mathematics (CT1)
- Finance & Financial Reporting (CT2)
- Probability and Mathematical Statistics (CT3)
- Models (CT4)
- Contingencies (CT5)
- Statistical Methods (CT6)
- Business Economics (CT7)
- Financial Economics (CT8)

Depending on your subject choices in semesters 1 and 2 you may also undertake advanced modules in finance at the UCD Michael Smurfit Graduate School of Business.

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.

The Institute and Faculty of Actuaries, which accredits this programme, is currently in the process of updating its syllabus and hence the titles and contents of the subjects listed here are subject to change. For ongoing updates on this process please see https://www.actuaries.org.uk/studying/curriculum-2019. Modules and topics shown are subject to change and are not guaranteed by UCD.

Course code: F034

Career Opportunities

As a graduate of the MSc 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. 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.

The actuarial profession is a global profession with actuaries in demand in Europe, America, Asia and Australia.

Images © UCD Research

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.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at www.ucd.ie/residences/ For information and advice on living off-campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodation-booking-support/ for further details.

Related Masters Programmes of Interest

- MSc Statistics
- MSc Data Analytics (Online)
- MSc Data & Computational Science

gradireland Higher Education Awards 2018 — Postgraduate Course of the Year Science — WINNER

Graduate Profile

Troy Tyson, Trainee actuary in the Product Management department of 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 life insurance sector, and also allowed me to show my enthusiasm toward the profession and my willingness to work hard to achieve my goals. 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.

EU Enquiries Programme Administrator : pgstudies@maths.ucd.ie
: +353 1 716 2452 www.ucd.ie/courses/msc-actuarial-science
UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

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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 & Faculty of Actuaries, UK.

The programme provides a solid foundation in mathematics, statistics, economics and finance for future actuarial studies. The Graduate Diploma in Actuarial Science offers potential exemptions from the Core Technical subjects 1 to 8 (CT 1-8) of the examinations of the Institute & Faculty of Actuaries, UK. If you have prior actuarial exemptions you may choose to study all or part of the syllabus for the Core Applications 1 (CA1) subject of the examination of the Institute and Faculty of Actuaries. The programme is therefore suitable for students with no prior exemptions and for students who wish to add to any exemptions they already have. On completing this programme, you will be able to apply a variety of complex statistical and financial models in appropriate settings, model cash flows and summarise economic activity through the use of a variety of metrics, quantify risks associated with complex financial contracts and understand how to mitigate them, and calculate the value of complex financial contracts, allowing for mortality and morbidity.

Key Fact

UCD offers the widest range of Actuarial Science programmes in Ireland and has established a reputation for providing high quality graduates for the actuarial and finance industries in Ireland and internationally. The Graduate Diploma Actuarial Science is accredited by the Institute & Faculty of Actuaries, UK and is delivered by qualified actuaries and other academic experts.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
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Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

60 credits graduate diploma

60 credits taught credits

There is no option to complete the Graduate Diploma on a part-time basis. The Graduate Diploma in Actuarial Science covers the Core Technical subjects 1 to 8 (CT 1-8) and Core Applications subject 1 (CA1) of the examinations of the Institute and Faculty of Actuaries, UK. Depending on your background and subject to the approval of the programme director, you may select between five and seven subjects to study.

The Core Technical subjects are:

- Financial Mathematics (CT1)
- Finance & Financial Reporting (CT2)
- Probability and Mathematical Statistics (CT3)
- Models (CT4)
- Contingencies (CT5)
- Statistical Methods (CT6)
- Business Economics (CT7)
- Financial Economics (CT8)

The Institute and Faculty of Actuaries, which accredits this programme, is currently in the process of updating its syllabus and hence the titles and contents of the subjects listed here are subject to change. For ongoing updates on this process please see https://www.actuaries.org.uk/studying/curriculum-2019

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

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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. The Actuarial Profession is a global profession with actuaries in demand in Europe, America, Asia and Australia.

Apply Now

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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.

Fees

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Related Masters Programmes of Interest

- MSc Actuarial Science
- MSc Statistics
- MSc Data Analytics (online)

Graduate Profile

Alex Clarke, Actuarial Trainee, Lloyds of London

I chose to study the Higher Diploma in Actuarial Science in UCD because I felt that it would give me an edge when applying for actuarial jobs, rather than having only my mathematics undergraduate degree. The agreement between The Institute and Faculty of Actuaries and UCD means that a diligent student has an excellent opportunity to get the first series of Core Technical (CT) qualifying exams under their belt in just one year. In practice this usually translates to a higher starting salary when joining the workforce.

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.

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: +353 1 716 2452 www.ucd.ie/courses/gdip-actuarial-science
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MSc/Professional Diploma Data Analytics (3 Years/9 Months Part Time) (Online)

The MSc and Professional Diploma in Data Analytics from the UCD School of Mathematics and Statistics will help you to analyse and understand the large data sets that are being created via the huge growth in online information. The value of these data sets is being increasingly recognised in business circles, with many companies seeking to recruit individuals with skills in data analytics to extract the valuable insights contained therein. Data Analytics is at the crossroads between statistics and computer science, and our courses contain elements of both. We will give you the tools to apply advanced skills from these fields to maximum effect in any work-related, "big data", environment.

There are no lectures to attend as the courses are delivered completely online. Students will be given videos, demonstrations, and interactive games to enhance their learning, with regular feedback and interaction with lecturers. This provides flexibility to students who can learn wherever and whenever they like, as well as at a pace that suits them. Students will attend a UCD exam centre at the end of each semester for exams.

Key Fact

The UCD School of Mathematics and Statistics has a strong research track record through its interdisciplinary approach to research, with academics involved in the UCD Institute for Discovery. Members of the School are also heavily involved in Insight: the National Centre for Data Analytics, which was created in 2013 with a combined €88m of Government and industry funding.

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Global careers
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Course Content and Structure

90 credits
taught masters (online) – all taught modules

20 credits
professional diploma (online) – all taught modules

This 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:
Data Mining
Predictive Analytics
Multivariate Analysis
Time Series Analysis
Stochastic models
Bayesian Analysis

Computing modules:
Monte Carlo
R
C
Java
Python
SAS

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

Course code: F084

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. Prospective employers include any company that requires detailed, robust analysis of data sets. Some examples 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)

Images © UCD Research

Apply Now

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Fees

Tuition fee information is available on www.ucd.ie/fees

Related Masters Programmes of Interest

- MSc Data & Computational Science
- MSc Mathematical Science
- MSc Statistics

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.

Staff Profile

Assistant Professor Michael Salter-Townshend, UCD School of Mathematics and Statistics.

I am a Statistician and Lecturer working on applied computational problems. What I like most about my work is that I get to tackle a wide variety of challenges in multiple scientific disciplines, using cutting edge probabilistic and machine learning techniques. Typically this involves a combination of finding the right statistical tools for the job and even contributing new ones. I work on everything from social networks to palaeo-climate reconstruction, but my main focus is on statistical genetics. For this I get to collaborate closely with colleagues in the bio-sciences. I build, test, and distribute sophisticated statistical software for population genetics. This is a field of science that seeks to characterise the shared variability between sub-populations of a species. This has direct applications in detection of natural selection, inference of past demography, and refining models for association testing between various diseases and genetics. Between my research and lecturing I work on:

- Statistical genetics
- Bayesian Inference
- Multivariate analysis
- Stochastic processes and time series analysis
- Spatial and spatio-temporal modelling
- Computational statistics

EU Enquiries Programme Administrator
: DataAnalyticsOnline@ucd.ie +353 1 716 2452
www.ucd.ie/courses/msc-data-analytics
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MSc Data & Computational Science (One Year Full Time)

The MSc in Data and 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 recognizes 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. Topical application areas are offered each year, including cryptography, numerical weather prediction, and financial mathematics. The dissertation will give you further hands-on experience in computational science and will allow you to apply the key theoretical and practical skills by working on a challenging research topic.

Key Fact

The UCD School of Mathematics and Statistics is at the forefront of collaborative research in computational science and data analytics. Leading researchers in the school are embedded in interdisciplinary research institutes including the UCD Institute for Discovery, the Earth Institute and the Insight Centre for Data Analytics. Active collaborations include high-performance computing across disciplines and the application of statistical extreme value theory to climate and ocean modeling.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

90 credits	60 credits	30 credits
taught masters	taught modules	research project

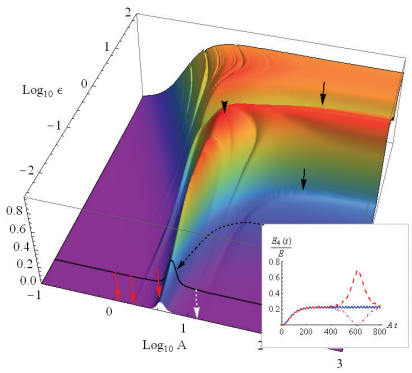
The structure of the programme is as follows:

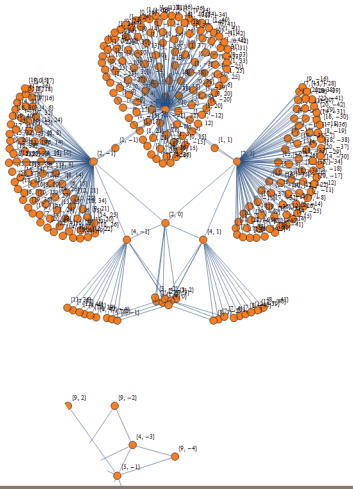
Core modules in simulation and modelling
- Simulation Modelling and Analysis
- C and Fortran programming
- Parallel computing using MPI
- Mathematica for Research

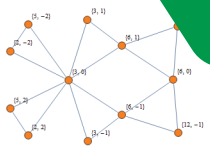
Core modules in statistics and data analytics
- Linear Models
- Statistical Data Mining
- Data programming
- Multivariate Analysis
- Bayesian Analysis

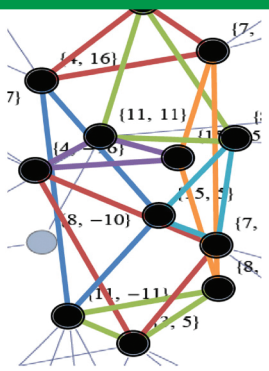
Optional topical modules, for example:
- Cryptography or Coding Theory
- Advanced Fluid Mechanics
- Weather and Climate
- Financial Mathematics

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. This is a new highly specialised programme in the School. Recent past graduates from this programme and other similar past programmes in the school work in firms including:

- ICT companies (e.g. Google, Paddy Power, LinkedIn)
- The financial services industry (e.g. Citi, Deloitte, Geneva Trading, Murex)

Apply Now

Apply 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.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offer a number of postgraduate scholarships for fulltime, self-funding international students, holding an offer of a place on master's programmes.Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at www.ucd.ie/residences/ For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodationbooking- support/ for further details.

Related Masters Programmes of Interest

- MSc Statistics
- MSc Data Analytics (Online)
- MSc Actuarial Science

Staff Profile

Dr Conor Sweeney, School of Mathematics and Statistics

I am a lecturer in Applied and Computational Mathematics and am also a member of the Meteorology and Climate Centre and the UCD Earth Institute. In my research, I am interested in making our weather forecasts better, and improving our understanding of climate change. To do this, I run mathematical models of the atmosphere and the Earth System at High Performance Computing centres such as the Irish Centre for High-End Computing and the European Centre for Medium-Range Weather Forecasts. No model is perfect, however, so my research also involves developing new statistical techniques to remove any systematic errors in the forecasts, and to quantify uncertainties in the model output.

Graduate Profile

Cian O'Callaghan, Paddy Power

I would thoroughly recommend the MSc in Data and Computational Science to students interested in pursuing a career/further studies in the data science field. 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. Best of all, I found that writing a thesis in the summer term cemented what I had learned throughout the year and allowed me put my skills to use.

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: pgstudies@maths.ucd.ie : +353 1 716 2452
www.ucd.ie/courses/msc-data-computational
UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

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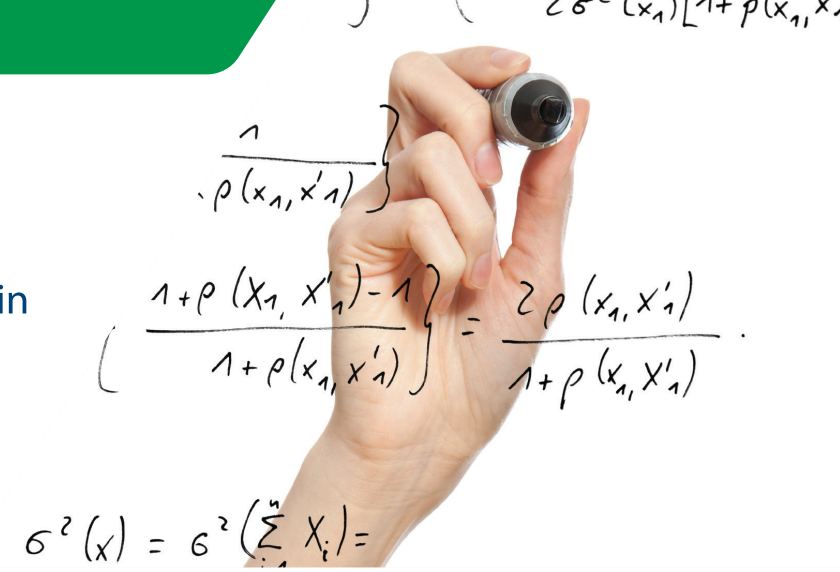

MA Mathematics
(16 Months Full Time)

The MA in Mathematics is designed for graduates who wish to obtain a Masters degree in Mathematics but who have not completed a four-year honours BSc in Mathematics. It combines components of the Higher Diploma in Mathematical Sciences and the MSc in Mathematical Sciences to offer an opportunity for a student to complete an MA in Mathematics within a 16-month period. The MA contains two streams – Mathematics or Applied and Computational Mathematics. Both streams offer an attractive alternative to the more standard 24-month pathway of the Higher Diploma followed by the MSc in Mathematical Sciences. On successful completion of the programme you will have the knowledge, experience and confidence to pursue a PhD in mathematics, or a related discipline, have attained an advanced and modern mathematical and computational training, developed excellent presentation skills and acquired a much sought-after qualification that can be applied to a wide variety of careers in the quantitative, financial, and IT sectors.

Key Fact

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. As well as having a strong commitment to basic research, several members in the school are involved in the UCD Institute for Discovery and the Insight Centre for Data Analytics.

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Safety
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Course Content and Structure

120 credits taught masters	**90 credits** taught modules	**30 credits** project work

Students in the Mathematical stream choose modules from a selection of Mathematics courses. Students in the Applied and Computational Mathematics 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.

- Calculus of Several Variables
- Vector Integral and Differential Calculus
- Linear Algebra 2
- Groups, Rings and Fields
- Functions of One Complex Variable
- Ring Theory
- Combinatorics
- Cryptography and Elliptic Curves
- Modular Forms of One Variable
- Number Theory
- Matrix Theory
- Mathematical Theory of PDEs
- Fractal Geometry
- Dynamical Systems
- Survey of Applied and Computational Mathematics
- Advanced Computational Science
- Foundations of Fluid Mechanics
- Advanced Fluid Mechanics
- Numerical Algorithms
- Case Studies in Simulation Science
- Differential Geometry for Relativity

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

Course code: F081

Career Opportunities

The MA in Mathematics will give you the opportunity to develop numeracy, organisation and problem-solving skills, which are required in areas such as the trading floor of an investment bank, the mathematics classroom, predicting the weather and in the insurance industry. 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, IBM, IFSC, Intel, Google, Lloyds, Marine Institute, Met Eireann, Microsoft, Nokia, Norkom, Numerica Corporation, OpenHydro, Paddy Power, Phillips, RIM, Simula Research and the Tyndall Institute.

Images © UCD Research

Apply Now

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Entry Requirements

- This programme is intended for applicants who hold a degree with high mathematical content such as Mathematics, Mathematics & Education, or Economics & Finance. An upper second class honours 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.

Staff Profile

Professor Gary McGuire, UCD School of Mathematics and Statistics

Gary McGuire is the director of the Claude Shannon Institute for Coding, Cryptography and Discrete Mathematics, which is part of the Security and Trust cluster of the UCD Institute for Discovery.
"I have taught Elliptic Curve Cryptography, which takes students from the mathematical theory of elliptic curves to its real-world applications in cryptography. I am the director of the Claude Shannon Institute, where we have a team doing cutting-edge research in cryptography and coding theory."

Fees and Scholarships

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Related Programmes of Interest

- MSc Mathematical Science
- Higher Diploma Mathematical Science

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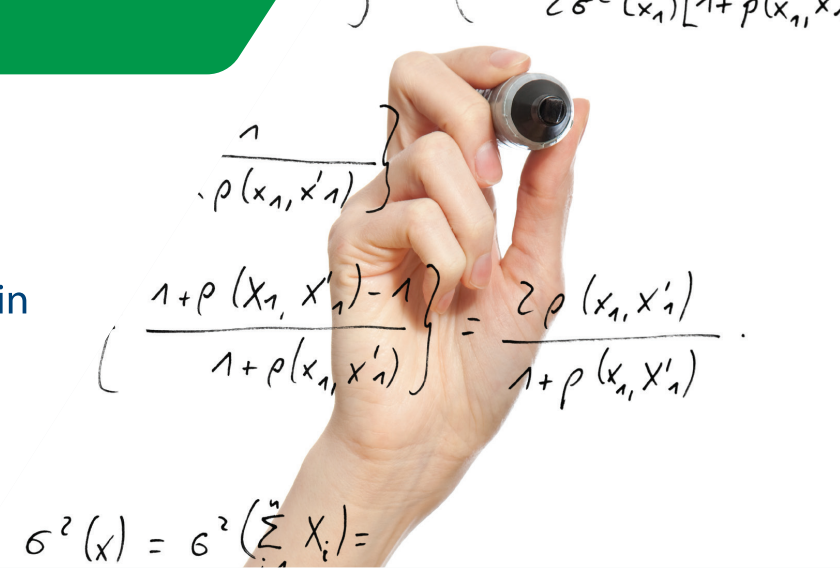

MSc Mathematical Science
(1 Year Full Time)

The UCD MSc Mathematical Science programme is designed for mathematics and applied mathematics graduates with a passion for their subject and a desire to up skill to a level required to embark on a career in research.
This MSc programme combines a taught masters and a dissertation. It is an extremely versatile programme, giving students the opportunity to choose from a range of modules and projects from the different disciplines of Mathematics, Applied and Computational Mathematics and Statistics within the UCD School of 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, have 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.
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 the university.

Key Fact

As well as having a strong commitment to basic research, several members in the UCD School of Mathematics and Statistics are involved in the UCD Institute for Discovery and the Insight Centre for Data Analytics.

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Safety
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Course Content and Structure

90 credits	60 credits	30 credits
taught masters	taught modules	project work and dissertation

Below is a representative list of modules available to you. Modules offered change from year to year.

- Numerical Algorithms
- Advanced Fluid Mechanics
- Introduction to C Programming
- Parallel Algorithm Design & Analysis
- Numerical Methods of PDEs
- Mathematics for Research
- Case Studies in Simulation
- Science
- Fractal Geometry
- Graduate Analysis
- Modular Forms
- Mathematical Theory of PDEs
- Cryptography & 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

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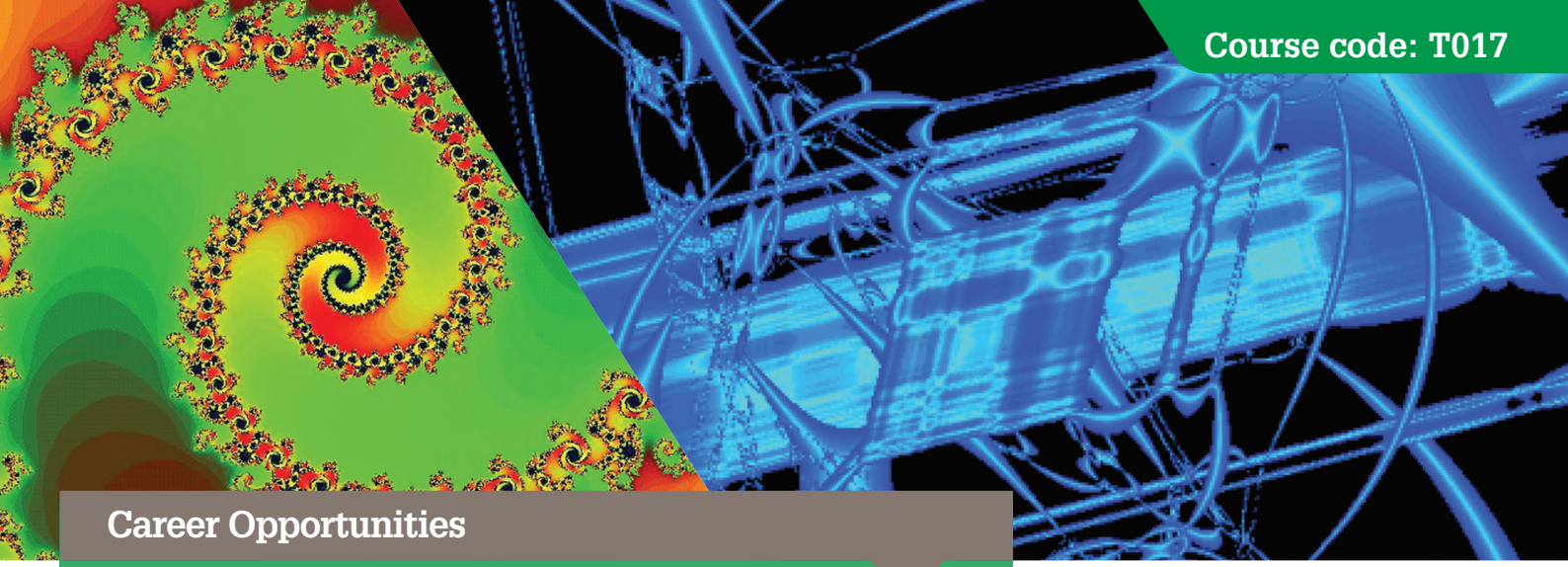

Course code: T017

Career Opportunities

Numeracy, organisation and problem-solving skills are required in areas such as the trading floor of an investment bank, the mathematics classroom, predicting the weather and in the insurance industry. 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, IBM, IFSC, Intel, Google, Lloyds, Marine Institute, Met Éireann, Microsoft, Nokia, Norkom, Numerica Corporation, OpenHydro, Paddy Power, Phillips, RIM, Simula Research and the Tyndall Institute.

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Apply Now

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Entry Requirements

- This programme is intended for applicants with a degree in Statistics, Mathematics, Mathematical Physics, Applied Mathematics, or Theoretical Physics. 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 Sciences 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.

Staff Profile

Professor Frederic Dias, France, ERC Advanced Grant Awardee and Science Foundation Ireland Principal Investigator in the 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.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

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Additional Course Delivery Options

- MSc Mathematical Science 2 Year Part Time

Related Programmes of Interest

- MA Mathematics
- Higher Diploma Mathematical Science
- MSc Applied Mathematics & Theoretical Physics

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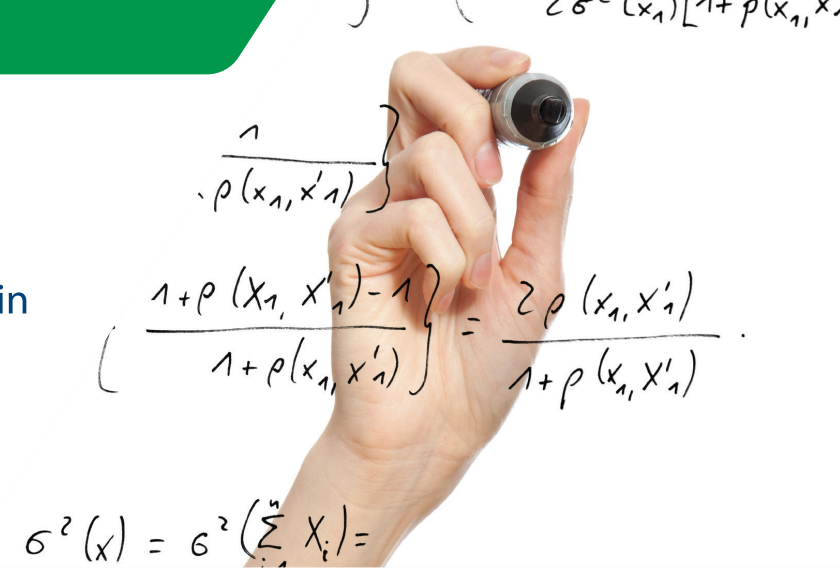

Higher Diploma Mathematical Science (1 Year Full Time)

This Higher Diploma 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 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.

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Key Fact

Academics from the UCD School of Mathematics and Statistics are involved in the UCD Institute for Discovery and the Insight Centre for Data Analytics.

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Safety
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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.

- 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 & Integration
- Intro to Topology
- Advanced Mathematical Methods
- Dynamical Systems
- Foundations of Fluid Mechanics
- Foundations of Quantum Mechanics
- Electrodynamics & Gauge Theory
- Potential Theory and Electrostatics
- Environmental Fluids
- Mathematical Biology
- Relativistic Quantum Mechanics
- Advanced Computational Science
- Differential Geometry
- Advanced Dynamical Systems

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

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Career Opportunities

Numeracy, organisation and problem-solving skills are required in areas such as the trading floor of an investment bank, the mathematics classroom, predicting the weather and in the insurance industry. 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, IBM, IFSC, Intel, Google, Lloyds, Marine Institute, Met Éireann, Microsoft, Nokia, Norkom, Numerica Corporation, OpenHydro, Paddy Power, Phillips, RIM, Simula Research and the Tyndall Institute.

Apply Now

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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.

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 do 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. It introduced me to both the topic of my future PhD research in coding theory and to my future PhD supervisor. Overall, I think the HDip in Mathematical Science is a very good choice for anyone wishing to do a conversion course in mathematics.

Fees

Tuition fee information is available on www.ucd.ie/fees

Accommodation

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Related Programmes of Interest

- MSc Mathematical Science
- MA Mathematics
- Higher Diploma Mathematical Studies

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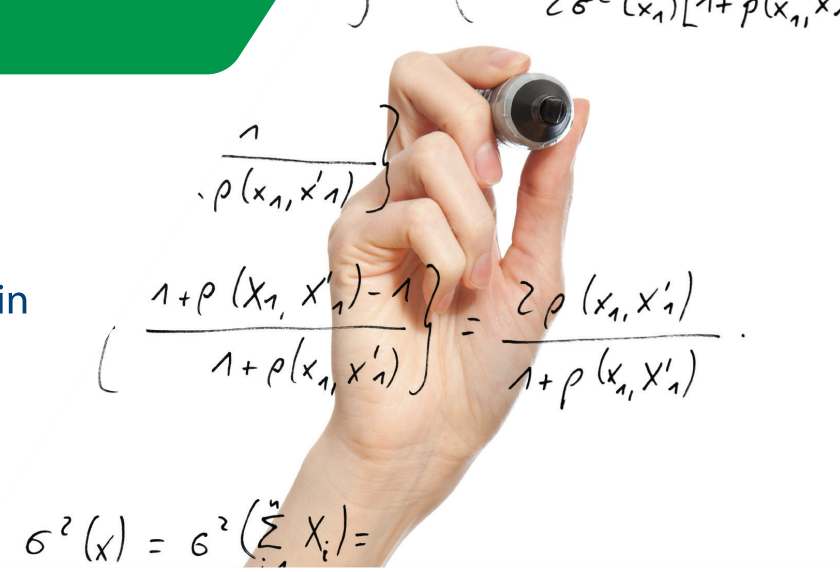

Higher Diploma Mathematical Studies (1 Year Full Time)

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 UCD Higher Diploma in Mathematical Studies you will achieve a level of competence equivalent to that of a Mathematics major in a three-year honours degree programme.
It will qualify you to continue with more advanced studies in mathematics and demonstrate the understanding and technical skills associated with advanced mathematics.

Key Fact

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).

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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.

Images © UCD Research

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
- Computer animation
- Systems biologist
- Statistician
- Meteorologist
- Graduate entry into banking/accountancy
- Internet security, software

Prospective employers include Bell Labs, Campbell Scientific, IBM, Intel, IFSC, Google, Met Éireann, Microsoft, Nokia, Norkom, Phillips, RIM and the Tyndall Institute.

Apply Now

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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. A lower second class honours 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.

Staff Profile

Dr Robert Osburn, Lecturer, UCD School of Mathematics and Statistics

Mathematics is a universal language, which underpins science, education and industry. The Higher Diploma in Mathematical Studies at UCD is a demanding and rewarding endeavour, which prepares students for careers as researchers, highly qualified teachers or innovators. The training and development of a skilled workforce in these areas are of vital importance to Ireland's growth as a competitive and dynamic economy in the EU.

Graduate Profile

Cathal Dempsey, Risk Analyst

I chose to study the Higher Diploma in Mathematical Studies as I had an interest in Mathematics and graduates with qualifications in Mathematics are in high demand. Having completed a BComm a few years previously, 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. Overall I found the course to be so interesting and enjoyable that I decided to continue on and study the UCD Higher Diploma in Mathematical Sciences, for which the Higher Diploma in Mathematical Studies is an excellent foundation.

Fees

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Accommodation

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Additional Course Delivery Options

- Higher Diploma Mathematical Studies 2 Year Part Time

Related Masters Programmes of Interest

- MA Mathematics

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MA Statistics
(16 Months Full Time)

Ireland is home to over 250 global financial institutions. This degree will prepare students for a career in industry, government, IT, economics and finance.

Currently, students without sufficient statistical background knowledge can attain masters 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.

This programme is intended for students with a numerate background but who may have insufficient background knowledge to gain entry to the MSc programme.
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.

Key Fact

UCD is ranked in the top 250 in the world in the 2018 QS Rankings for the subject area of Mathematics.
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.

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Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

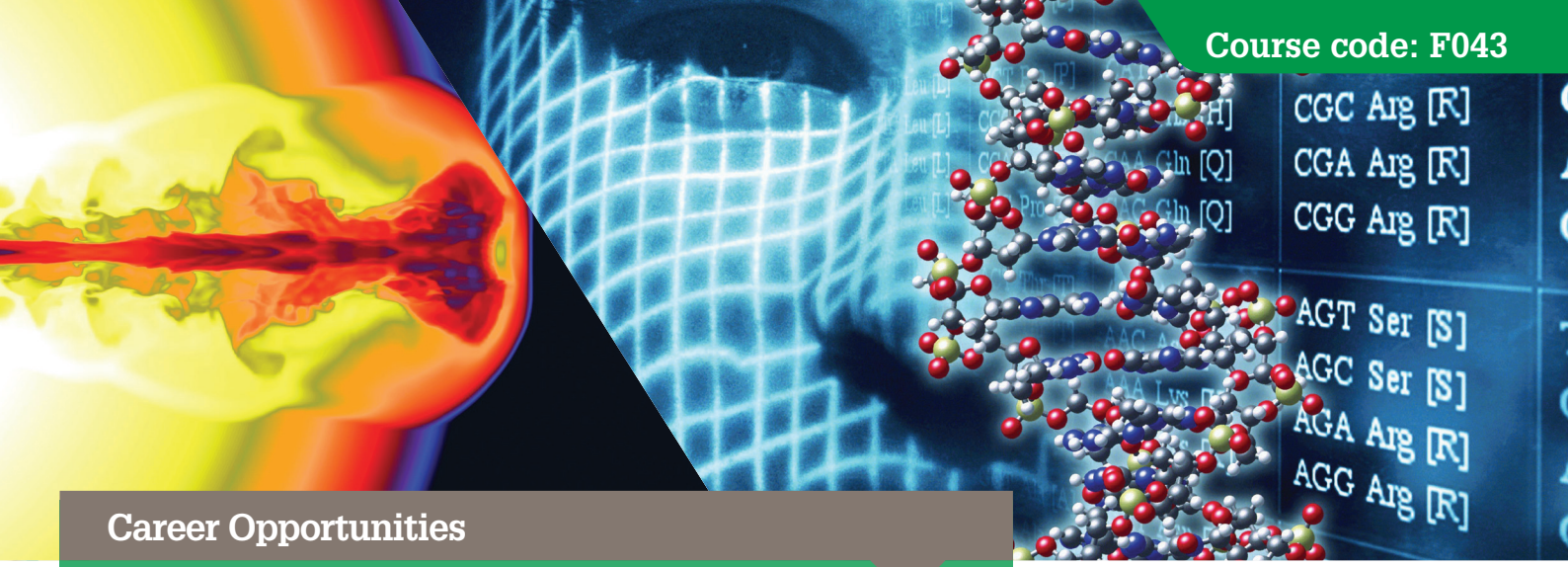
Course Content and Structure

120 credits	90 credits	30 credits
taught masters	taught modules	dissertation or data analytics project

The MA in Statistics is of 16 months' duration (four semesters) 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
- Data Mining
- Time Series
- Multivariate Analysis
- Experimental Design
- Mathematical Statistics
- Monte Carlo inference
- Actuarial Statistics
- Survival Analysis
- Stochastic models
- Bayesian analysis
- Data Programming with R

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



Course code: F043

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Career Opportunities

Career prospects on completion of the MA in Statistics is equivalent to that of the MSc in Statistics and graduates pursue careers in the pharmaceutical industry (e.g., Elan, Quintiles), 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. Some past students embarked on a career in academia by proceeding to study for a PhD in Statistics. Former MSc and MA students are currently working for such firms as Google, Western Union, AIB, Norbrook, Ernst & Young, O2 and SPSS, while others chose to do a PhD. 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 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.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at www.ucd.ie/residences/
For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodation-booking-support/ for further details.

Related Programmes of Interest

- MSc Statistics
- Higher Diploma Statistics
- MSc Actuarial Science
- MSc Data Analytics (Online)

Staff 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. Some projects I have worked on include:

- Estimating the dynamics of temperature movement across Croatia
- The estimation and prediction of the rainfall in Switzerland
- Identifying dynamic gene regulatory networks that determine how genes interact with one-another when they are infected with influenza or the HIV virus
- Penalised smoothing for density estimation and its implications for risk management

Industrial collaborations are also a rich source of intriguing and challenging research projects. I have worked on the following projects:

- Uplift quadratic programme in Irish electricity price setting (Bord Gais)
- Risk management of non-maturing deposits and pricing a swaption (Bank of Ireland)
- Oil pricing and the assessment of it effect on companies financials (Liontrust)
- Forecasting accuracy with Dell EMEA service parts (Dell)
- Forecasting grain shipment and supply (Transport Canada)

EU Enquiries Programme Administrator
: pgstudies@maths.ucd.ie : +353 1 716 2452
www.ucd.ie/courses/ma-statistics
UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

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University College Dublin
Ireland's Global University

MSc Statistics
(1 Year Full Time)

Ireland is home to over 250 global financial institutions. There are opportunities for MSc in Statistics graduates in industry, government, IT, economics and finance. On completion of this MSc in Statistics, you will have skills such as the ability 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.

The UCD MSc in Statistics is aimed at students who have an undergraduate degree in Statistics or a degree in a discipline related to Statistics and with numerate skills. It consists of a mixture of compulsory and optional modules and a major project. 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 students 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.

Key Fact

UCD is ranked in the top 250 in the world in the 2018 QS Rankings for the subject area of Mathematics.
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.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

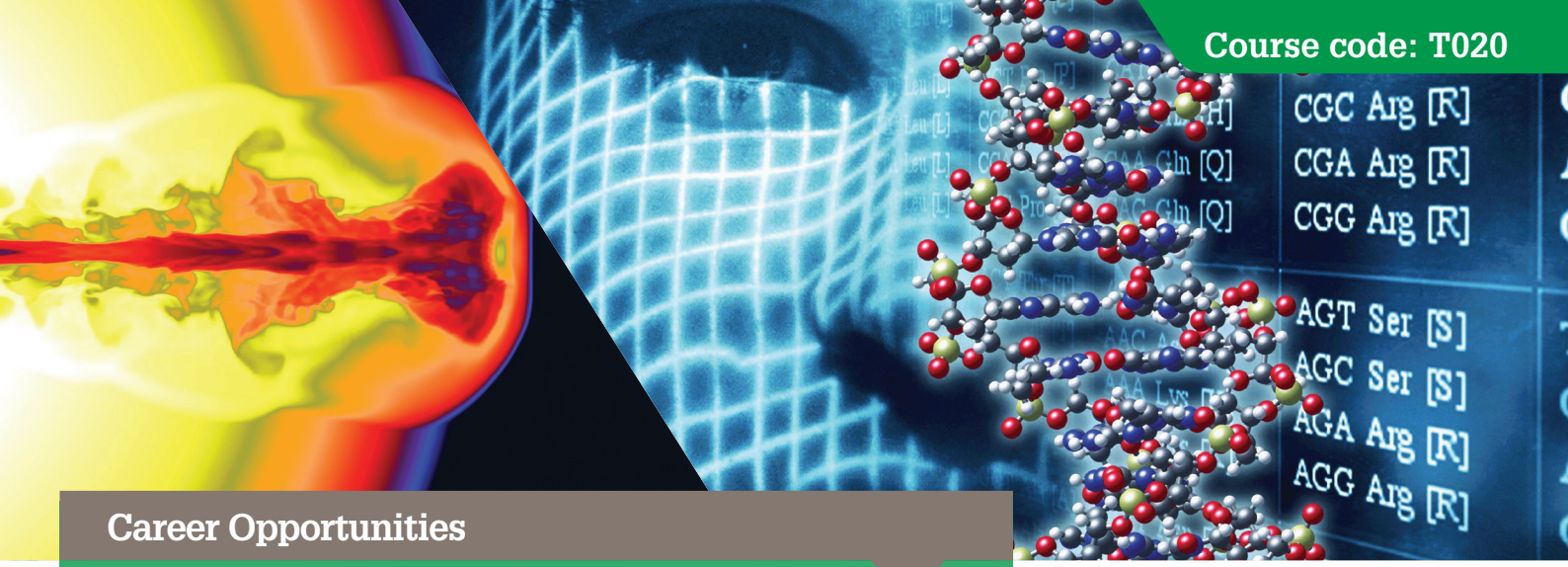
Course Content and Structure

90 credits taught masters	**60 credits** taught modules	**30 credits** research project/dissertation

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

- Mathematical Statistics
- Monte Carlo inference
- Actuarial Statistics
- Survival Analysis
- Data Mining
- Time Series
- Multivariate Analysis
- Nonparametric statistics
- Experimental Design
- Data Programming with R
- Bayesian Analysis
- Uncertainty Quantification
- Machine Learning
- Stochastic Models
- Data Programming with Python
- Regression analysis

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



Course code: T020

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Career Opportunities

Career prospects on completion of the MSc in Statistics are excellent. Many graduates pursue careers in the pharmaceutical industry for companies and career opportunities also exist in industries including banking, finance and risk management. There is also an increase in demand for statisticians from the IT sector. In addition, many government departments employ statisticians. Some past students embarked on a career in academia by proceeding to study for a PhD in Statistics. Former MSc and MA students 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 semester 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.

Graduate Profiles

Stephen Sah, Biostatistician, Monaghan Mushrooms R&D Department, Ireland

The MSc degree in Statistics in UCD prepared me well for my current job. The combination of classroom work and analysis of real-world data using the current statistical tools make this course exceptional. The lecturers were more than helpful, both inside and outside the classroom, in assisting me whenever I had difficulties with my studies. I chose to study in UCD because of the interesting modules they offered. Now, my plan is to gain as much work experience as possible and hopefully obtain a doctoral degree.

Valda Murphy, Project Lead, Novartis, Basel, Switzerland

I am very 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.

Fees and Scholarships

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Additional Course Delivery Options

- MSc in Statistics 2 Year Part Time

Related Programmes of Interest

- MA Statistics
- Higher Diploma Statistics
- MSc Actuarial Science
- MSc Data Analytics (Online)
- MSc Data & Computational Science

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: pgstudies@maths.ucd.ie : +353 1 716 2452
www.ucd.ie/courses/msc-statistics
UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

University College Dublin
Ireland's Global University

Higher Diploma Statistics
(1 Year Full Time)

Ireland is home to over 250 global financial institutions and there are opportunities for Higher Diploma Statistics graduates in industry, government, IT, economics and finance. This programme is aimed at graduates whose level of statistical or mathematical training is high, but below that of the BSc Degree Honours in Statistics, and who have demonstrated numerical ability. It enables them to reach in one year a level of statistical knowledge equivalent to that of BSc Honours graduates. It provides students with a good background in statistical theory and methods, which can be used in a variety of areas of application. Students who are awarded a distinction or upper second class honours in the Higher Diploma in Statistics are qualified to enter the MSc degree in Statistics.

On successful completion of the programme 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.

Key Fact

UCD is ranked in the top 250 in the world in the 2018 QS Rankings for the subject area of Mathematics.
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Global careers
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Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

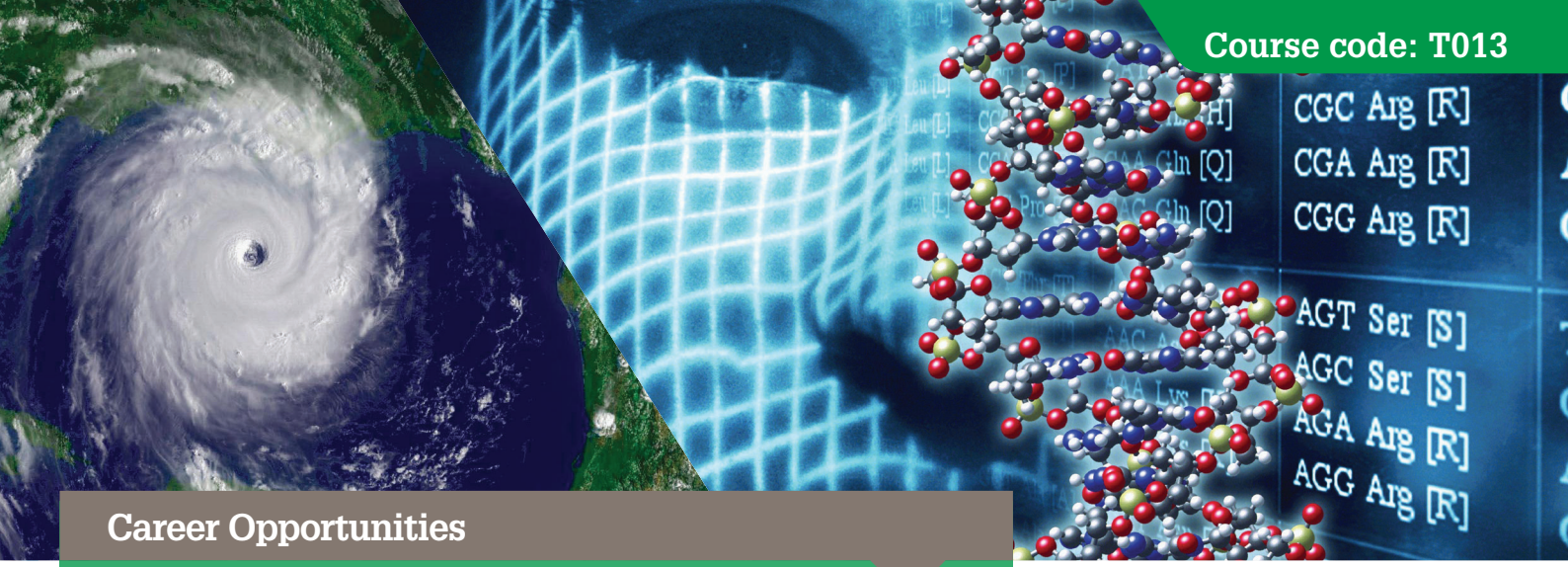
Course Content and Structure

60 credits
higher diploma – all taught modules

Modules available include:

- Probability Theory
- Statistical Inference
- Biostatistics
- Survey Sampling
- Models – Stochastic
- Data Mining
- Linear Models
- 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.



Course code: T013

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Career Opportunities

Career prospects on completion of the Higher Diploma in Statistics are excellent. 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 (e.g., Google, Intel, data mining companies). In addition, many government departments employ statisticians including the Central Statistics Office. Many students embarked on the MSc in Statistics programme offered by UCD, based on achieving a second class honours, grade 1 in the Higher Diploma in Statistics.

Prospective employers include Vodafone, Google, Irish Life, Paddy Power, the ESRI, SPSS, Bank of Ireland, Quintiles, Accenture, Tesco, eBay and Aviva.

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 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.

Graduate Profile

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

I enrolled in the Higher Diploma of Statistics programme as a part-time student, in order to gain a more thorough grasp of the statistical techniques I was using in my political science research, and to better understand the needs of students and researchers in my role as Director of the Irish Social Science Data Archive. The range of topics offered provided a challenging and ultimately rewarding environment in which I succeeded in meeting my goals as a social scientist, while gaining a deeper understanding and respect for the role of statistics across the entire spectrum of the sciences. 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.

Fees

Tuition fee information is available on www.ucd.ie/fees

Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at www.ucd.ie/residences/
For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodation-booking-support/ for further details.

Additional Course Delivery Options

- Higher Diploma Statistics 2 Year Part Time

Related Masters Programmes of Interest

- MA Statistics
- MSc Statistics
- MSc Actuarial Science
- MSc Data Analytics (Online)

EU Enquiries Programme Administrator
: pgstudies@maths.ucd.ie : +353 1 716 2452
www.ucd.ie/courses/higher-diploma-statistics
UCD School of Mathematics and Statistics, University College Dublin, Belfield, Dublin 4.

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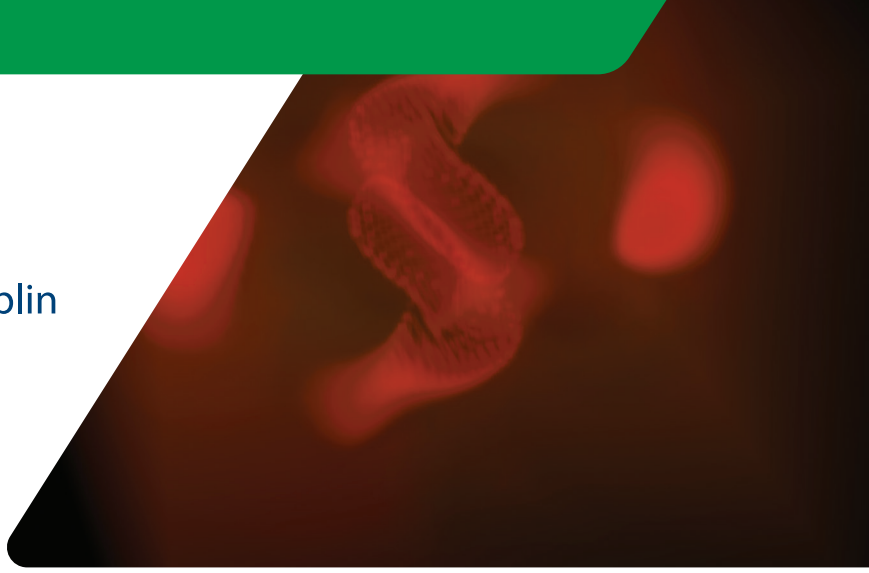

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MSc Physics (Negotiated Learning)
(1 Year Full Time)

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 is a uniquely flexible and innovative programme. It 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. 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 for a broader overarching qualification from the programme.

Key Fact

Modules in the programme are delivered by research active staff, many of whom are researching in the topic on which their module is delivered. The programme allows you to take modules from many UCD Schools, including Business, Chemistry, Computer Science, Mathematics and Statistics and the UCD Innovation Academy.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

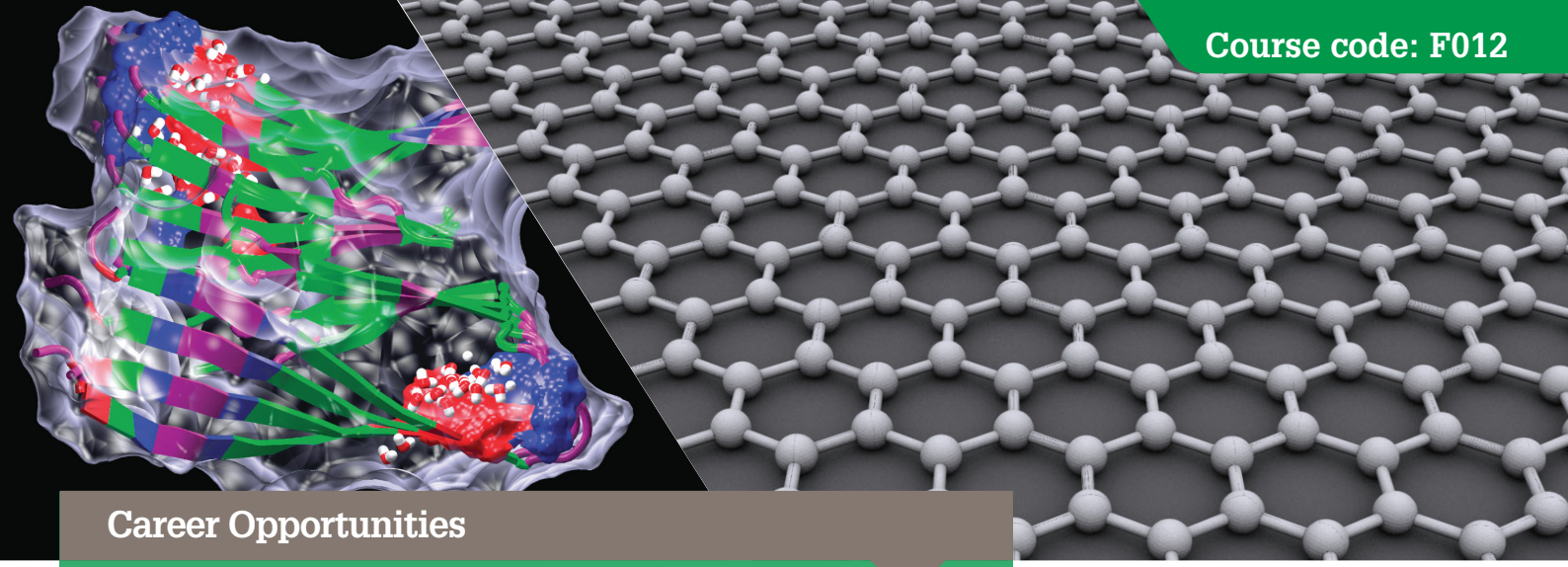
Course Content and Structure

90 credits taught masters	30 - 60 credits taught modules	30 - 60 credits project

Modules in the programme include:

- EUV Science & Technology
- Graduate Tutoring & Demonstrating
- Applied Quantum Mechanics
- Applied Optics
- Lasers & Spectroscopy
- Nanomaterials
- Biomimicry
- The Space Environment
- Quantum Condensed Matter
- Advanced Statistical Mechanics
- Nanomechanics

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



Course code: F012

Career Opportunities

This is a relatively new programme so the number of graduates is low. Two graduates have gone 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.

Images © UCD Research

Apply Now

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. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Graduate Profile

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

I chose to study the MSc in 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, both in academia and industry. I fully recommend it for anybody who wants to progress in a physics-based career. On completing this programme, you are ready to start a PhD in related areas, or ready for employment in industry.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offer a number of postgraduate scholarships for fulltime, self-funding international students, holding an offer of a place on master's programmes.
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Accommodation

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Related Masters Programmes of Interest

- MSc Space Science & Technology
- MSc NanoBio Science
- MSc Computational Physics
- MSc Applied Mathematics & Theoretical Physics
- MSc Nanotechnology

EU Enquiries Associate Professor Dominic Zerulla : dominic.zerulla@ucd.ie
: +353 1 716 2507 www.ucd.ie/courses/msc-physics-negotiated-learning
UCD School of Physics, University College Dublin, Belfield, Dublin 4.

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www.ucd.ie/international

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MSc NanoBio Science
(1 Year Full Time)

Nanotechnology research is an emerging sector, which covers many areas of product design. 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. Students will develop an understanding of the structure, function and regulation of biological systems at the nanoscale and in real time. This requires nanometre and femtosecond (quadrillionth of a second) technologies that will ultimately lead to devices and techniques that mimic those found in nature, such as high-efficiency solar cells based on photosynthetic processes and adaptive biocompatible materials for regenerative medicine. This MSc programme unites the technological with the biological aspects of the field in a unique way, equipping graduates with a truly interdisciplinary perspective of the field.

Access to major technology platforms

Students and staff have access to major technology platforms essential to conduct world-class cutting-edge research through the strength of the collaboration of the UCD School of Physics researchers with associated UCD Institutes including the UCD Conway Institute of Biomolecular & Biomedical Research, Systems Biology Ireland and the UCD Institute for Discovery and international partners.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

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Global community
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Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

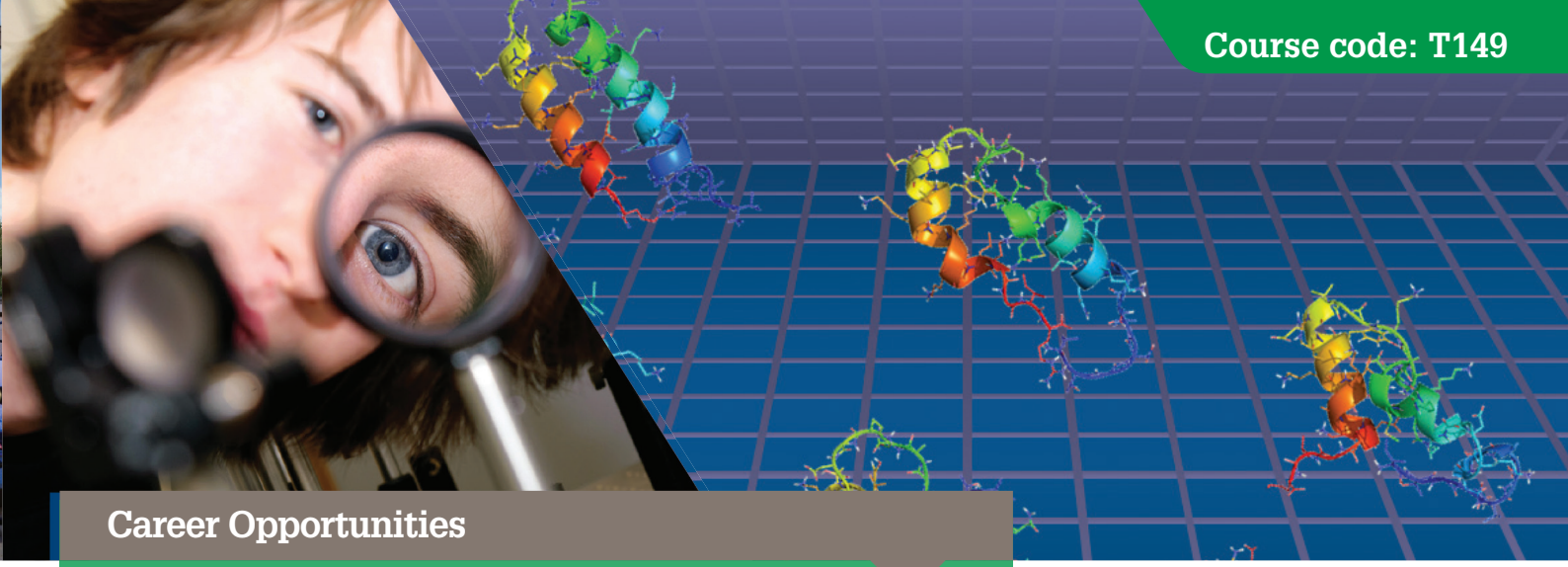
Course Content and Structure

90 credits	45 credits	45 credits
taught masters	taught modules	research project

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

- Nano-Optics and Bio-Photonics
- Physics of Nano-Materials
- Spectroscopy and Lasers
- Nano-Mechanics
- Atomic Force Microscopy
- Computational Biophysics
- Biophysics at the Nanoscale
- Biomimicry
- Bio-Fluid Mechanics
- Innovation
- Journal Club and Presentation Skills

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



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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.

Facilities and Resources

Students will have access to laboratories with state-of-the-art technologies that include atomic force microscopes, optical microscopes, near-field optical microscopes, Raman microscopy, 3D printing, continuous lasers and ultrafast lasers, adaptive optics, spectrometers and nanofabrication facilities.

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. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

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. Overall, I think this is a very good choice whether you're aiming for a career in research or in applied science.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

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Additional Course Delivery Options

- MSc NanoBio Science 2 Year Part Time
- Graduate Certificate NanoBio Science without research project component Full Time
- Graduate Certificate NanoBio Science without research project component Part Time

Related Masters Programmes of Interest

- MSc Physics (Negotiated Learning)
- MSc Computational Physics
- MSc Nanotechnology

EU Enquiries Associate Professor Dominic Zerulla
✉: dominic.zerulla@ucd.ie ☎: +353 1 716 2507 www.ucd.ie/courses/msc-nanobio-science
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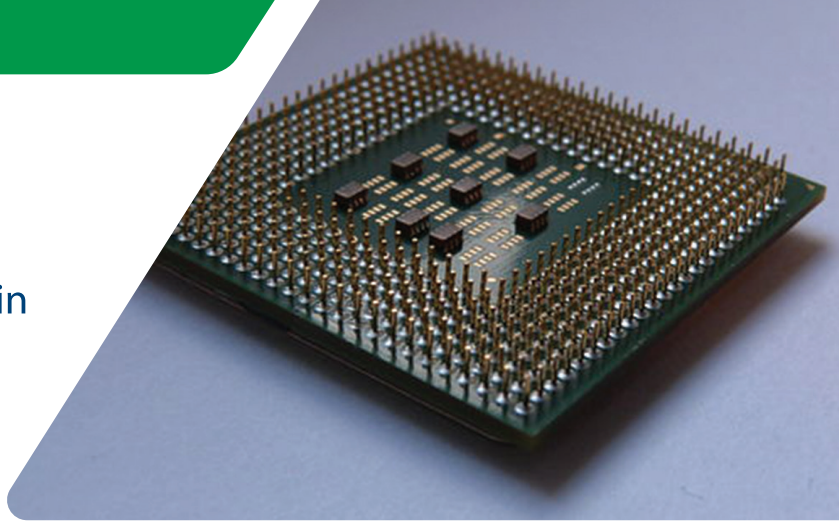

"Pentium 4 Underside Demonstrating PGA Socket" by Liam McSherry - Own work.
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MSc Nanotechnology
(1 Year Full Time)

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. Lectures are delivered by staff of international renown in these fields of research. About 50% of the time is devoted to classroom or lab-based activities. The student spends the remaining time carrying out a substantial research project, chosen in consultation with academic staff.
This course is delivered following consultation with members of the semiconductor industry and graduates from the programme can expect to be highly employable in that industry.

Key Fact

Students and staff have access to major technology platforms essential to conduct world-class cutting-edge research through the strength of the collaboration of the UCD School of Physics researchers with associated UCD Institutes including the UCD Institute for Discovery, Materials Engineering, and the Innovation Alliance between Trinity College Dublin and University College Dublin.

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Safety
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Course Content and Structure

90 credits taught masters

45 credits taught modules
45 credits research project

OR

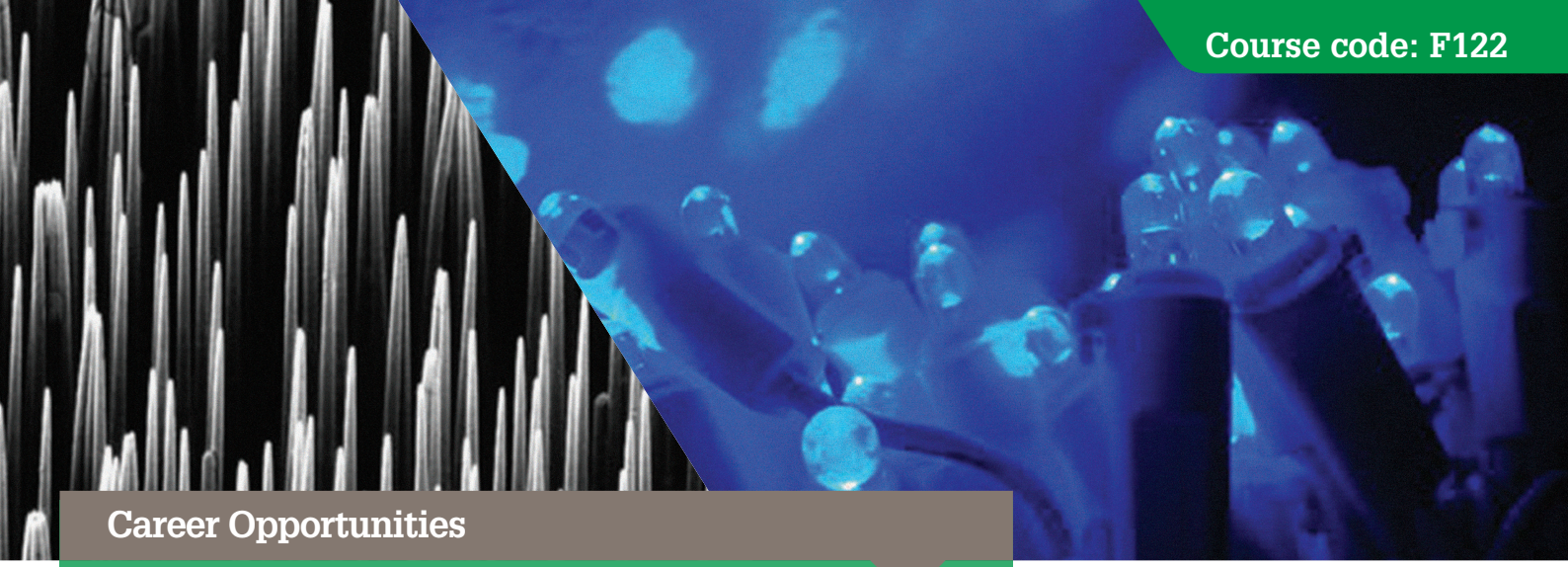
30 credits taught modules
60 credits research project

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
- Spectroscopy and Lasers
- Nano-Mechanics
- Atomic Force Microscopy
- Theoretical and Computational Simulation
- Extreme Ultraviolet Lithography
- Innovation
- Journal Club and Presentation Skills

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



Course code: F122

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 Intel, Abbott, Allergan, Andor, Asylum Research, Becton Dickinson, Boston Scientific, Carl-Zeiss Meditec, Covidien Imaging, Eblana Photonics, Intune Networks, Park Systems, Pharma-Bio Serv, Philips, and SensL.

Facilities and Resources

- Understanding the structure, function and regulation of materials at the nanoscale and in real time requires modern nanometer and femtosecond (quadrillionth of a second) technologies. Physical studies at these scales will ultimately lead to devices and techniques that possess novel properties applicable to the construction of, for example, single photon sources, solar cells and nanoelectronics, including nanomaterials such as nanotubes, nanoparticles and nanowires. This programme incorporates modern experimental and computational physics techniques and provides exposure to a variety of applications, and facilitates professional development.

Apply Now

This programme receives significant interest so please apply early online at www.ucd.ie/international/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. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Staff Profile

Dr 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. Dr Rice is the founding member of the Nanophotonic research group in UCD, which is a dynamic interdisciplinary research group advancing scientific knowledge by developing and investigating the properties of nanomaterials that will provide insight and innovations applicable to the development of nanotechnologies that address major national and global challenges.

Left - "Field Emitter Array" by Johann Vetter, GSI Darmstadt. Licensed under Creative Commons Attribution-Share Alike 3.0 via Wikimedia Commons.

Right - Alexofdodd at the English language Wikipedia, via Wikimedia Commons.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

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For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodation-booking-support/ for further details.

Additional Course Delivery Options

- MSc Physics (Negotiated Learning) Specialisation: Nanotechnology 2-Year, part-time
- Graduate Certificate Physics (Negotiated Learning) Specialisation: Nanotechnology part-time, without research project component

Related Masters Programmes of Interest

- MSc Physics (Negotiated Learning)
- MSc Space Science & Technology
- MSc NanoBio Science
- MSc Computational Physics
- MSc Applied Mathematics & Theoretical Physics

EU Enquiries Dr James Rice ✉ : james.rice@ucd.ie
www.ucd.ie/courses/msc-nanotechnology
UCD School of Physics, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries ✉ : internationaladmissions@ucd.ie
www.ucd.ie/international

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MSc Space Science & Technology
(1 Year Full Time)

This programme is ideal for graduates of Physics and Engineering who want to apply their expertise in the Space sector.

Why Space?
- The Space sector is growing fast, driven by the increasing demands of space exploration, Earth observation, telecommunications and satellite navigation.
- It offers a huge diversity of career opportunities.
- Employers have difficulty finding graduates with "Space expertise".

Why Ireland?
- Ireland's space industry is on the rise, with currently 30-40 companies operating in the sector.
- Ireland provides strategic access to Europe for US multinationals, such as Curtiss-Wright.
- Ireland is a long-standing member of the European Space Agency (ESA), with 70 companies participating in ESA contracts since 2000. Irish companies and researchers are involved in contracts for the Herschel and Planck Space Observatories, as well as the Rosetta mission, Solar Orbiter, Gaia and the James Webb Space Telescope.

What are the course highlights?
- Open to all graduates of Physics and Engineering
- Tailor your curriculum via options modules
- Unique access to senior industry practitioners in workshop sessions
- Placement opportunities with industry leaders
- Highly relevant to recruitment needs of employers

How will I benefit ?
You will enhance your CV with "Space expertise", which is much sought after by employers in the sector. Modules are taught by a combination of experienced academic staff and senior industry practitioners to provide students with knowledge and skills which are highly relevant to recruitment needs.

Key Fact
Past placements include ESA, NASA, Curtiss-Wright, Cosine, EnBio, InnaLabs, Parameter Space, Skytek, Elbana and Realtra.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

90 credits	60 credits	30 credits
taught masters	taught modules	research project

Topics available include:

Core modules:
- The Space Environment & Spacecraft
- Applications of Space Science
- Space Sector Professional Skills
- Space Detector Laboratory
- Satellite Subsystems Laboratory
- Space Mission Design Field Trip
- Industrial or Academic Internship

Optional modules:
- 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.

Images © ESA

Career Opportunities

Career opportunities include space research (mission specialist, payload scientist, mission planner), space-based applications (Earth observation and environmental monitoring, satellite navigation, telecommunications, space weather, radiation science, spacecraft engineering, manned space flight, space tourism), and enabling technology propulsion (simulations and testing orbital mechanics and materials). Top European employers include Airbus, Thales, Nammo, Curtiss-Wright, and the European Space Agency. The MSc can also be used as a stepping stone to PhD research.

Facilities and Resources

- Laboratory facilities and equipment are available for training in space detectors and small satellites, e.g., CubeSat and CanSat, with the opportunity for students to launch their own experiment on a high-altitude balloon. Mission design internationalises the student experience through collaboration with students from two other universities, in the design of a gamma-ray experiment modelled on the European Space Agency's concurrent design facility.

Apply Now

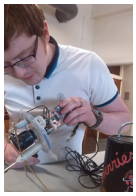
This programme receives significant interest so please apply early online at www.ucd.ie/apply

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. For IELTS 5.5, there is a pre-masters option, which guarantees access to the MSc after one year.

Graduate Profile

Conor O'Toole



MSc Space Science & Technology graduate Conor O'Toole did his research internship at NASA Ames Research Centre in California, adapting a space debris simulation to examine the potential of CubeSat technologies for a space-based Near-Earth Asteroid survey. After his MSc, Conor spent five months working at the European Space Agency and is now completing a PhD in gravitational waves.

Graduate Profile

Daniel Vagg

"My favourite part was the Space Mission Design field trip to Tenerife. We worked in competing international teams. This was an incredible and unique experience. My industry placement was with the US multinational Curtiss-Wright, who provide data-handling for rockets such as the SpaceX Dragon capsules." Dan is now working for a new UCD spin-out company as software systems architect for accessing data from ESA's Gaia satellite mission.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

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Related Masters Programmes of Interest

- MSc Physics (Negotiated Learning)
- MSc Nanotechnology
- MSc NanoBio Science
- MSc Computational Physics
- MSc Applied Mathematics & Theoretical Physics

EU Enquiries Dr Deirdre Coffey ✉: deirdre.coffey@ucd.ie
www.ucd.ie/courses/msc-space-science-technology
www.ucd.ie/spacescience/
UCD School of Physics, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries ✉: internationaladmissions@ucd.ie
www.ucd.ie/international

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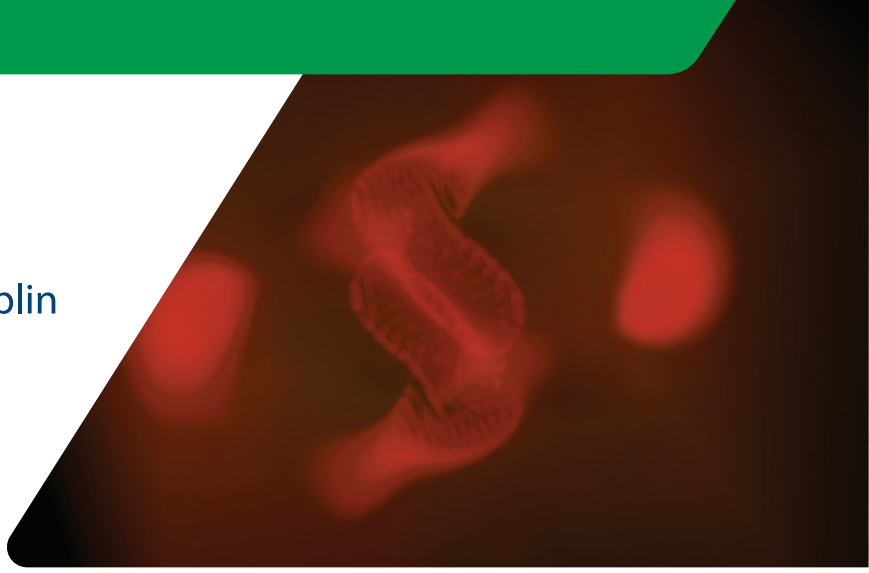

Images © UCD Research

MSc Applied Mathematics & Theoretical Physics
(1 Year Full Time)

The Applied Mathematics and Theoretical Physics specialisation 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. Our Applied Mathematics and Theoretical Physics MSc 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.
Students will be exposed to state-of-the-art concepts in fields as diverse as continuum mechanics, hydrodynamics, mathematical biology, waves, non-linear dynamics, numerical analysis, advanced mathematical methods, modern mathematical physics and complex systems theory.

Key Fact

Students will have access to courses aligned to a nationally unique range of research expertise across a broad range of Applied Mathematics and Theoretical Physics fields, including Fluid Dynamics, General Relativity, Quantum Field Theory, Climate Modelling, Turbulence, Condensed Matter Theory and Theoretical Astrophysics.

Why study at UCD?

Tradition
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Global profile
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Global community
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Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

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.

Course code: F124

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 National Institutes of Health, USA.

Images © UCD Research

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 2.2 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. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Staff Profile

Associate Professor Vladimir Lobaskin, UCD School of Physics & UCD Institute for Discovery

The research projects in Associate Professor Lobaskin's group at UCD are in the area of theory and simulation of nanostructured biosystems. His main scientific contributions are related to structure and interactions in charged colloidal dispersions, colloidal dynamics, mechanics of biomolecules, and flocking of active particles. He contributed to the development of multiscale simulation techniques and computational packages for soft matter research: MOLSIM and ESPResSo. The UCD Institute for Discovery is a dynamic interdisciplinary research community advancing scientific knowledge by extracting value from data that will provide insight and innovations to help major national and global challenges through mathematics and computational modelling.

Staff Profile

Professor Adrian Ottewill, UCD School of Mathematics and Statistics & UCD Institute for Discovery

Adrian Ottewill is UCD Professor of Mathematical Physics, with research interests 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). Professor Ottewill is a Principal Investigator in the UCD Institute for Discovery.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

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Additional Course Delivery Options

- MSc Applied Mathematics and Theoretical Physics 2 Year Part-time
- Graduate Certificate Physics (Negotiated Learning) Part-time with no research project component
- Graduate Diploma Physics (Negotiated Learning) Part-time with no research project component

Related Masters Programmes of Interest

- MSc Nanotechnology
- MSc NanoBio Science
- MSc Computational Physics
- MSc Space Science & Technology
- MSc Mathematical Science
- MSc Climate Change: Science and Impacts

EU Enquiries Associate Professor Vladimir Lobaskin ✉ : vladimir.lobaskin@ucd.ie
✆ : +353 1 716 2432 www.ucd.ie/courses/msc-appliedmaths-theoreticalphysics
UCD School of Physics, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries ✉ : internationaladmissions@ucd.ie
www.ucd.ie/international

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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. At UCD, our MSc Programme in Computational Physics is developed in close connection with the more applied NanoBio and NanoTechnology specialties, offering the students both a solid training in computational methods and a direct access to laboratory-based research projects. Our Computational Physics MSc 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. Students will learn how to plan and develop their modelling programmes and algorithms to imitate the underlying physical processes, and how to analyse and test the results of their calculations. In the negotiated learning framework, the students will be able to take modules in programming, mathematical and numerical methods and deepen their knowledge in modern theoretical and experimental physics research projects from atomistic and molecular modelling to nanooptics, spectroscopy and nanotechnology-related applications.

Key Fact

Students and staff have access to state-of-the-art computational and laboratory-based technology platforms through direct collaborations with the Irish Centre for High-End Computing (ICHEC) and several associated UCD research institutes including the UCD Institute for Discovery, the UCD Conway Institute of Biomolecular & Biomedical Research, and Systems Biology Ireland.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

90 credits taught masters

45 credits taught modules
45 credits research project

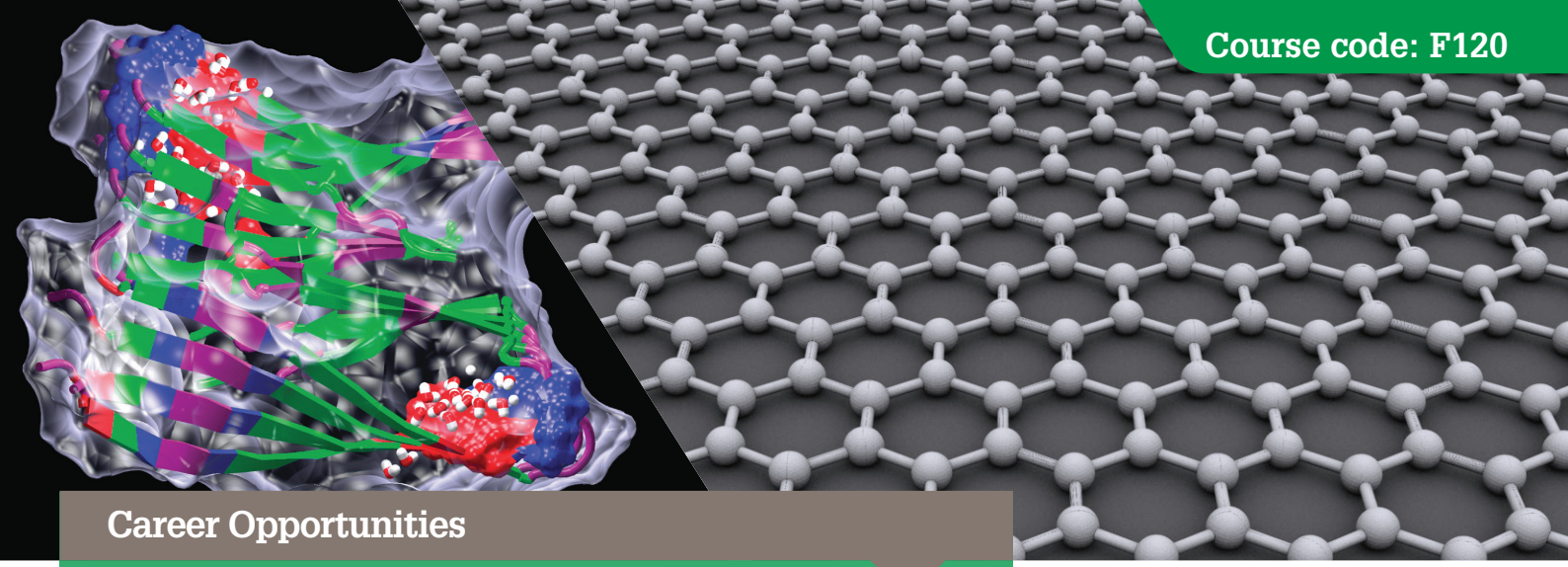
OR

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

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



Course code: F120

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 National Institutes of Health, USA.

Apply Now

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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 2.2 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. Applicants with an IELTS score of at least 5.5 may apply for admission to the UCD Pre-Masters Pathway programme.

Staff Profile

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

Associate Professor Buchete was awarded his PhD from Boston University, and held subsequent research and teaching positions at the National Institutes of Health in Bethesda, MD, and Boston University, USA. 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.

Staff Profile

Associate Professor Vladimir Lobaskin, UCD School of Physics & UCD Institute for Discovery

The research projects in Associate Professor Lobaskin's group at UCD are in the area of theory and simulation of nanostructured biosystems. His main scientific contributions are related to structure and interactions in charged colloidal dispersions, colloidal dynamics, mechanics of biomolecules, and flocking of active particles. He contributed to the development of multiscale simulation techniques and computational packages for soft matter research: MOLSIM and ESPResSo.

Fees and Scholarships

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Additional Course Delivery Options

- MSc Computational Physics 2 Year Part-time
- Graduate Certificate Physics (Negotiated Learning) Part-time with no research project component
- Graduate Diploma Physics (Negotiated Learning) Part-time with no research project component

Related Masters Programmes of Interest

- MSc Nanotechnology
- MSc NanoBio Science
- MSc Applied Mathematics
- MSc Space Science & Technology
- MSc Climate Change: Science and Impacts

EU Enquiries Associate Professor Nicolae-Viorel Buchete
✉ : nicolae-viorel.buchete@ucd.ie ☎ : +353 1 716 2088
www.ucd.ie/courses/msc-computational-physics UCD School of Physics, University College Dublin, Belfield, Dublin 4.

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www.ucd.ie/international

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MSc Petroleum Geoscience
(1 Year Full Time)

Oil, and particularly gas, are expected to remain a significant source of energy during the transition to a low-carbon economy. Geoscience plays a pivotal role in guiding exploration for new hydrocarbon reserves and in managing efficient production from existing fields.

The MSc in Petroleum Geoscience was set up in 2013 as a direct result of a collaborative initiative between Tullow Oil plc and the UCD School of Earth Sciences. The course, the only one of its kind in Ireland, covers all aspects of exploration, appraisal and development geoscience, and includes relevant geophysical and reservoir engineering topics integrated around a geological core. Lectures are complemented by significant components of fieldwork, industry-standard software training and practical experience of industry-style work. The course is taught by staff from the UCD School of Earth Sciences who are international research leaders in a range of complementary petroleum geoscience disciplines, including basin studies, deep water sedimentology, geophysics, structural geology, reservoir modelling and geoengineering. Co-opted industry instructors will contribute to some modules.

Key Fact

The UCD School of Earth Sciences has research funding that typically exceeds €2 million per year, with research projects currently supported by more than 13 international petroleum companies, and has a vibrant international community comprising researchers from over 15 countries.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support; 1 year stay-back visa

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and Structure

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

Samples of course modules comprise:

- Petroleum systems
- Introduction to seismic techniques
- Petrophysics
- Basin analysis and modelling
- Depositional systems and sequence stratigraphy
- Structural geology
- Fieldwork
- Exploration and prospect evaluation
- Production geoscience and field management
- Individual research project chosen in consultation with staff

The research project is a 12-week independent project providing an opportunity to work with active research groups within the School or directly with industry in the form of a work placement.

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

Course code: F056

Career Opportunities

Petroleum geoscientists are much in demand and find employment in a wide range of companies, consultancies, regulatory agencies, governmental organisations and academia. Petroleum products are important for power generation, transport and as a chemical feedstock and are likely to remain so for decades despite emerging new technologies. It is also essential for understanding and confronting many of the associated risks, safety issues and environmental concerns facing the industry.

Images © UCD Research

Facilities and Resources

- The course is housed in a purpose-built teaching lab in the UCD School of Earth Sciences, with individual twin-headed workstations running the leading petroleum industry geoscience software.

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 Geology, Geoscience, Earth Science, Geophysics or a cognate discipline. An upper second class honours or international equivalent is required.
- In exceptional circumstances, credit will be given for those with a lower second class honours degree with relevant work experience.
- 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.

Graduate Profile

Myles Watson, Geoscientist, Providence Resources

Since graduating from the course in 2014, I have worked as a Geoscientist for Irish oil and gas company Providence Resources Plc. The solid grounding given to me by the course in a broad range of petroleum geoscience disciplines has enabled me to work effectively as part of a G&G team focused on exploration and appraisal of hydrocarbon reservoirs.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

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EU Enquiries Professor Peter D.W. Haughton : peter.haughton@ucd.ie
Associate Professor Tom Manzocchi : tom.manzocchi@ucd.ie
www.ucd.ie/courses/msc-petroleum-geoscience
UCD School of Earth Sciences, University College Dublin, Belfield, Dublin 4

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www.ucd.ie/international

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MSc Computer Science (Negotiated Learning) (1 Year Full Time)

Ireland is home to the world's top 10 technology companies. It is known as the Internet and Games Capital of Europe and is among the world's most technologically developed nations. There are excellent job opportunities, with thousands of job vacancies in the sector at present.

The UCD MSc in Computer Science is a uniquely flexible and innovative programme. It offers a negotiated learning (NL) 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 robotics.

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 thematic streams covered by the programme.

Key Fact

Currently there are more than 100 module options offered in conjunction with the UCD Schools of Business, Physics, Information & Library Studies, Mathematics and Statistics, Philosophy, Psychology, Law and The NovaUCD Innovation and Technology Transfer Centre.

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Safety
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Course Content and Structure

90 credits	60 credits	30 credits
taught masters	taught modules	practicum/project

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 thematic streams include:

- Internet of Things
- Data Science
- Software Engineering
- Artificial Intelligence and Cognitive Science

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

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, Version1, 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.

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 Computer Science or ICT background. An upper second class honours degree, or the international equivalent, in computer science or a related area, or a minimum of three years' relevant industrial work experience, 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.

Graduate Profile

Ahmed Yawer, Equifax Technology

Since I was a child, I dreamed about doing my higher education at one of the finest, well-known universities in the world. My dream came true when I got the chance to do my Masters degree in Computer science (Negotiated Learning) at UCD, Ireland.

Doing that course was a huge step forward in my career. After the completion of the course, I secured a full-time job as programmer at Equifax technology. The Negotiated Learning course is very special as it 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. UCD is a very nice big modern campus with all kinds of activities and facilities including a gym, Olympic pool and much more.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please visit www.ucd.ie/international/scholarships for further information.

Accommodation

UCD has accommodation for over 2,500 students across five locations. Places are limited and more information is available at www.ucd.ie/residences/

For information and advice on living off campus, please contact the UCD Residences Off-Campus Office or the UCD Student Union Accommodation Services. Please visit www.ucd.ie/residences/accommodation-booking-support/ for further details.

Additional Course Delivery Options

- MSc Computer Science (Negotiated Learning) 2 Year Part Time

Related Masters Programmes of Interest

- MSc Data & Computational Science
- ME Electronic & Computer Engineering
- MSc Digital Investigation & Forensic Computing
- MSc Information Systems

EU Enquiries Ms Rosemary Deevy
: rosemary.deevy@ucd.ie : +353 1 716 2909
www.ucd.ie/courses/msc-computer-science-negotiated-learning
UCD School of Computer Science, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

University College Dublin
Ireland's Global University

MSc Computer Science (Conversion) (16 months Full Time)

Ireland is home to the world's top 10 technology companies. It is known as the Internet and Games Capital of Europe and is among the world's most technologically developed nations. There are excellent job opportunities in the sector at present.

UCD offers a skills conversion graduate programme for individuals who hold a primary degree in another discipline (e.g., Arts, Commerce), and would like to enter into an IT-related career. This conversion MSc introduces students to computational thinking and provides a thorough foundation in the practical aspects of modern Computer Science.

On completion of the programme you will be able to:

- apply the core principles of programming to solve real-world problems and process different types of information
- design, develop and query relational databases
- demonstrate an awareness of the roles and interactions of hardware components, operating systems and networking
- employ web application development concepts and technologies to design and create feature-rich and versatile websites

Key Fact

The UCD School of Computer Science has significant experience in the training of non-Computer Science graduates. The curriculum for this MSc is continually updated and the coursework is practically orientated, with an emphasis on developing coding skills and competence in emerging technologies.

Why study at UCD?

Tradition
Established 1854, with 160 years of teaching & research excellence

Global profile
UCD is ranked in the top 1% of higher education institutions worldwide

Global community
Over 6,000 international students from over 120 countries study at UCD

Global careers
Degrees with high employability; dedicated careers support

Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

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 semester, students choose 30 credits of taught modules from the MSc Computer Science (Negotiated Learning) programme.

The structure of the programme is as follows:

Year 1 (Sept-Dec)
- Python Programming
- Object Oriented Programming
- Computational Thinking
- Relational Databases & Information Systems
- Operating Systems
- Web Application Development

Year 1 (Jan-May)
- Java Programming
- Data Structures & Algorithms
- Data Analytics
- Software Engineering
- Computer Architecture
- Networks & Internet Systems

Year 1 (May-Aug)
- Research Practicum with an opportunity to engage with employers

Year 2 (Sept-Dec)
Choose* modules in areas such as:
- Data Science
- Software Engineering
- Forensics & Security
- Artificial Intelligence & Cognitive Science

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

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

Course code: T195

Career Opportunities

Some of the roles graduates of this MSc have worked in include the following:

- Software Engineer
- Computer Programmer
- IT Project Analyst
- Performance Engineer
- SAP Support Engineer
- Python Developer
- Web Applications Developer
- Business Analyst
- Technical Analyst
- Technical Consultant

Companies that have employed graduates include Demonware Ltd., Murex, SAP, Paddy Power Betfair, Novartis, CarTrawler, Amazon, Voysis, Zalando SE, Accenture, BT Ireland, Corvil, Guideware, and KPMG Ireland.

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.

Fees and Scholarships

Tuition fee information is available on www.ucd.ie/fees. Please note that UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on master's programmes.
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Related Masters Programmes of Interest

- MSc Computer Science (Negotiated Learning)
- MSc Information Systems

Graduate Profiles

Aoife Whelan, Data Analyst at Accenture

Aoife previously studied Physics at undergraduate level prior to applying for the MSc. There she gained some technical skills but felt it was not enough for a career in IT. She had an interest in data science and wanted to increase her skills and knowledge in this area. After graduating from the MSc she began working for Accenture in the area of data analytics. "The workload is large and the time pressures can be challenging but you'll find yourself with a lot of relevant skills and knowledge for finding work in the industry. You will learn a lot in a relatively short period of time."

Conor O'Kelly, Java Software Developer at Murex

Conor is a graduate in Economics and Business and took the conversion Masters with the goal of switching to a career path in the IT industry. "The course took a huge amount of time and dedication to complete but was immensely rewarding. I feel that I have achieved a solid grounding in the fundamental aspects of Computer Science. This base of knowledge gives me a deeper understanding when learning new technologies. This will stand to me throughout a career that requires continuous learning. The course offers a fantastic opportunity to acquire the well-rounded skill set needed to be an effective part of any IT team. I would highly recommend it to anyone who is serious about beginning a career in IT."

EU Enquiries : cs_conversion@ucd.ie : +353 (0) 1 716 2953
www.ucd.ie/courses/msc-computer-science-conversion
UCD School of Computer Science, University College Dublin, Belfield, Dublin 4.

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

V1 T195 2019

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MSc Digital Investigation & Forensic Computing (1 Year Full Time or 2 Years Part Time)

Would you like to be able to analyse a cyber attack, or reverse engineer malware? Would you like to know how to process a crime scene, interrogate suspects and witnesses, and prepare a statement for court? Would you like to be able to perform electronic discovery of documents, investigate spear phishing, intellectual property theft, blackmail, defamation, fraud and various other forms of corporate misconduct where crucial evidence exists in digital form? If your answer is "yes", then this MSc programme will give you the knowledge, skills, and practice. The programme is for students with a background in computer science, information technology, or a related discipline. It covers all aspects of digital investigations from legislation and crime scene processing to digital forensics, reverse engineering, and forensic reporting. Students also learn how to prevent re-occurrence of incidents by applying appropriate information security countermeasures. The information security component covers key technical elements of modern network security technology, information security management, and penetration testing. The programme can be used to upskill or to reorient a technical career.

World leader in cybercrime education

UCD is the No. 1 provider of digital forensics & cybercrime investigation education in Ireland. UCD School of Computer Science has been training cybercrime investigators for Irish and international law enforcement agencies since 1998, when we developed one of the first cybercrime investigation training courses in Europe. Based on 20 years experience of cybercrime investigation training, this programme is aimed at the business environment and half of the lecturers are industry experts managing digital forensics practices and information security departments in multinational consultancy firms and large financial corporations.

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Global community
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Global careers
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Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

Course Content and structure

90 credits	60 credits	30 credits
taught masters	taught modules	digital investigation project

The programme starts in September and finishes in August the following year. Students attend lectures and practical sessions on Tuesdays, Wednesdays, and Thursdays during the Autumn and Spring semesters. Some hands-on workshops are delivered on weekends. A Digital investigation Project occupies the entire summer semester from the middle of May to the middle of August. Besides coursework, students benefit from a regular Digital Forensics Seminar Series and optional visits to the Irish law courts to better understand the litigation process, and the role and responsibilities of expert witnesses. A limited number of industrial internships are available each year to suitable candidates upon successful completion of the programme.

Subjects studied include:

- Law for IT Investigators
- Computer Forensics Foundations
- Investigative Techniques, Live Forensics and Court Testimony
- Reverse Engineering for Information Security and Forensics
- Network Security and Forensics in a Corporate Environment
- Information Security Management and Penetration Testing
- Digital Investigation Project - an individual or team-based research project on a real-world topic in digital investigation
- Additional modules may be available.

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

Images © UCD Research

Career Opportunities

Our graduates are employed as malware analysts, digital forensics and information security consultants, information security managers, and developers of security software. Our graduates work in Deloitte, Ernst & Young, Grant Thornton, KPMG, PwC, FireEye, IBM, HP, Dell, Facebook, SAP as well as in law enforcement, banks and financial institutions such as Bank of America, Merrill Lynch, JP Morgan, Bank of Ireland, Central Bank of Ireland, Deutsche Bank, and Pioneer Investments.

Assessment

Your coursework will be assessed using a variety of methods including group and individual assignments, written exams and graded presentations.

Facilities and Resources

Students perform self-study assignments during the year, using their personal computers and UCD's online computer lab. They have access to a Virtual Crime Scene Simulator and the loan of forensic equipment as needed.

Apply Now

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

Entry Requirements

Applicants normally have an upper second class bachelor's degree in Computer Science, or equivalent work experience. Understanding of programming concepts and some familiarity with Java, C or C++ programming is required.

International Fees and Scholarships

Tuition fee information is at www.ucd.ie/fees. This fee includes tuition and examination costs. You should also budget for living expenses while studying at UCD. UCD offers a number of postgraduate scholarships for full-time, self-funding international students, holding an offer of a place on masters programmes. Please see www.ucd.ie/international/scholarships for further information.

Accommodation

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Alternative Delivery Course options

- MSc Digital Investigation and Forensic Computing (Part-time, Distance learning) F021

Graduate Profiles

Arnim Eijkhoudt

"I've tremendously enjoyed my time at UCD and always found everyone to be extremely helpful: lecturers, PhD students/assistants and all other staff/departments. The interpersonal contacts, which can be particularly difficult when dealing with international/remote students, have been exemplary and truly make DIFC an outstanding study."

Arushi Doshi, Cyber Risk Analyst, Deloitte

"The curriculum is very relevant and up to date and the modules are cohesive and provide a holistic foundation for cybersecurity. Dr Pavel Gladyshev is an observant and patient mentor and his experience in the field has helped me to gain insights beyond the coursework. Despite having no previous industry experience, this course has enabled me to pave a career path in cybersecurity and Forensics."

MD, Group Information Security and Risk, Irish Global 500, FTSE 100 company

"I studied part time while working and found that I could apply a lot of the learning immediately. When I was looking to move into a more senior role in a larger company, I felt that the UCD MSc was definitely a help."

Joe O Halloran, Implementation Architect, IBM

"I picked UCD for the convenience of doing it part time via distance learning. I enjoyed the variety of learning and the practicals and it provided me with new skills especially in relation to cloud technology and security."

EU Enquiries Dr Pavel Gladyshev
: pavel.gladyshev@ucd.ie : +353 1 716 2610
: cs-difc@ucd.ie : +353 1 716 2486 www.cs.ucd.ie
UCD School of Computer Science

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

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MSc Forensic Computing & Cybercrime Investigation (Distance Learning)

(1 Year Full Time or 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 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) to work on applied research and developing forensic tools and then to transfer high impact research achievements and efficient, free forensic tools to the law enforcement community. This programme is delivered by experienced academics from CS and CCI and also by experts who are leaders, managers and heads of forensic departments in law enforcement agencies and in industry.

A wide range of modules is available at beginner and advanced levels.

On successful completion of the programme, depending on the modules taken, students should be able to:

- Understand methods used to conduct forensic analysis of digital devices including computer systems and mobile devices
- Identify, collect, process, analyse and present digital forensics evidence
- Use common network investigation techniques
- Develop critical thinking in analysing and performing cybercrime investigation
- Research and develop custom tools for evidence analysis
- Work in groups to resolve computer forensic challenges
- Understand the cybercrime business model and how to perform financial fraud investigations
- Conduct research into novel forensic and cybercrime investigation problems
- Investigate cases of child sexual exploitation on the Internet
- Tackle the forensic analysis of future technologies (both hardware and software) through the development of new applications

Why study at UCD?

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Global careers
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Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

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
- Legislation
- Financial Fraud Investigation
- Online Fraud Investigations for Irish Law Enforcement
- Programming for Investigators

Optional modules include:

- Financial Investigation Techniques – Following the Money
- 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
- Case Study
- Research Project
- Advanced Computer Forensics
- Data and Database Forensics
- Advanced Malware Analysis

Key Fact

To date, over 900 law enforcement officers from agencies in 62 countries have studied on the programme. This is the only university Masters programme in this area designed exclusively for – and restricted to – law enforcement.

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

Course code: T025/T146

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. There is one intake in September each year.

Entry Requirements

- This programme is restricted to LAW ENFORCEMENT (LE) ONLY. Applicants must be working in an investigative role in an organisation that has responsibility for the enforcement of national or local legislation, including police; revenue & customs, border security, military, etc.
- Applicants to the MSc / Grad. Diploma / Grad. Certificate programme must have five years' experience in LE
  OR
  A degree in computing / policing studies / related discipline
  OR
  Two years' LE experience in Digital Forensics / Cybercrime Investigation
  OR
  Have completed three modules with average grade, B- or above
- 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.

Fees

Tuition fee information is available on www.ucd.ie/fees.

Additional Course Delivery Options

- As well as the MSc, there are Graduate Diploma, Graduate Certificate and single module options.

Related Masters Programmes of Interest

- MSc Digital Investigation & Forensic Computing

Graduate Profiles

Jason Hunsaker, Chandler Police Arizona

"The modules provide very practical application to my current job functions. The exposure to new disciplines has sparked an interest and given me a great foundation on which to build to be more effective in my current position as well as the potential for future opportunities."

Simon Crawley, Global Project Manager, MSAB (Micro Systemation AB)

"As a direct result of completing the MSc I was head hunted by two digital forensics companies - Cellebrite and MSAB. I decided to accept the position with MSAB and I became their Global Project Manager, so not only was it great completing the MSc, it directly led to a new, exciting - and well-paid job - a huge thanks to you all."

Ger Reidy, Team Leader, Army Ranger Wing (ARW), Irish Defence Forces

"I have really enjoyed this whole FCCI experience. It was very worthwhile doing, so much so that I have recommended the course to lots of my colleagues."

Erik Schaefer, Head of CERT Federal Police Germany (Bundespolizei)

"I cannot refrain from pointing out that you are doing a great job in at UCD in Dublin. That's why I am able to motivate more and more colleagues to study there."

EU Enquiries Dr Nhien-An Le-Khac ✉: an.lekhac@ucd.ie ☎: +353 1 716 2929 **Non-EU Enquiries** ✉: internationaladmissions@ucd.ie
www.ucd.ie/courses/msc-forensic-computing-cybercrime www.ucd.ie/international
Centre for Cybersecurity & Cybercrime Investigation, University College Dublin, Belfield, Dublin 4.

V1 T025 / T146 2019

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Ireland's Global University

MSc Cognitive Science
(1 Year Full Time)

Cognitive Science is an interdisciplinary field that has evolved during the past few decades at the intersection of a number of existing disciplines, including linguistics, computer science, philosophy, psychology and neuroscience. Each discipline makes its own distinctive contribution to the goal of teasing out the relationships between minds, brains and behaviour.
The MSc in Cognitive Science is ideal for students interested in issues relating to the understanding of the human mind from philosophical, psychological, and computational perspectives. Advanced computational skills are not a prerequisite. The course is designed as an ideal preparation for students hoping to tackle advanced research topics at PhD level.
Students 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 issues, 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.

Key Facts

The cognitive science programme is unique in Ireland and one of very few such taught programmes worldwide.

A strength of these courses is the wide range of disciplines from the UCD Schools of Computer Science, Philosophy, Psychology and Linguistics that contribute to the programme.

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Tradition
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Safety
Modern parkland campus with 24 hour security, minutes from Dublin city centre

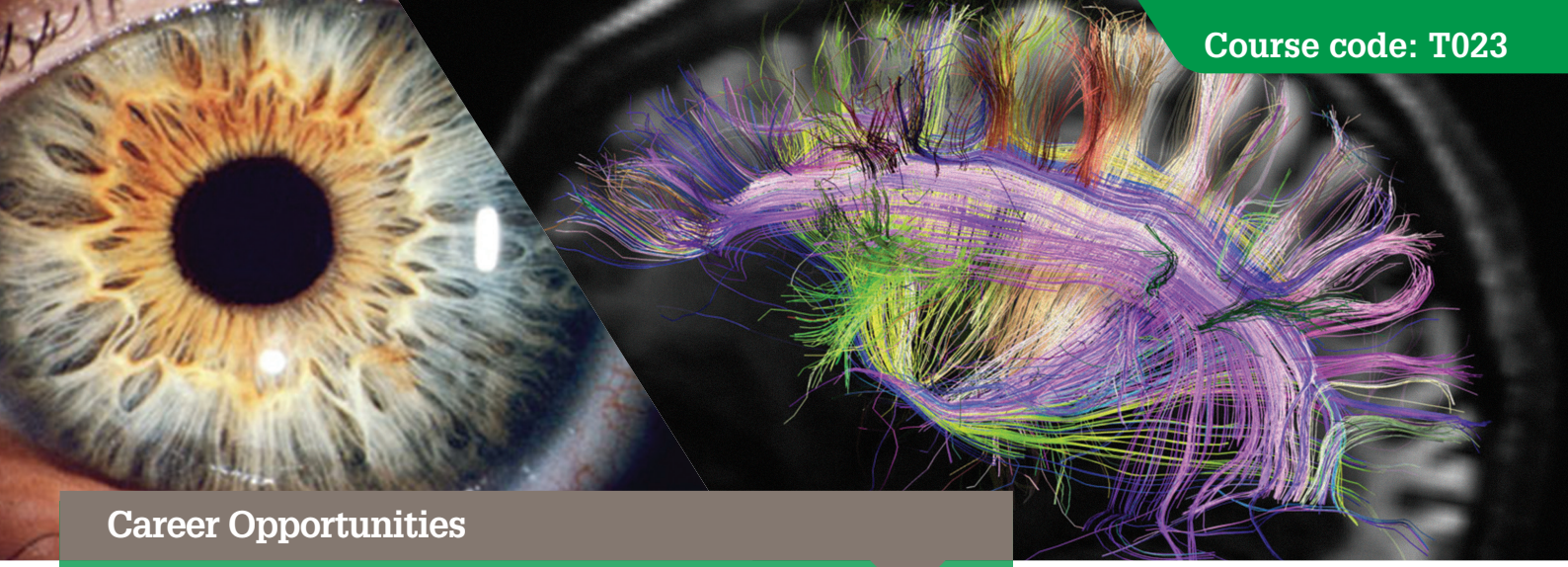
Course Content and Structure

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
- Topics in Cognitive Science: Post-cognitive approaches

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



Course code: T023

Career Opportunities

This is not a vocational course. In the course of 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. It also has the potential to enrich one's engagement with a very broad range of challenging material. 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.

Apply Now

This programme receives significant interest so please apply early online at www.ucd.ie/apply. Applications are accepted mid-July for the September start each year.

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.

Graduate Profile

Eileen Wahl, Kentucky USA, Graduate

Eileen Wahl is from Kentucky, USA, and gained her BSc in Biological Sciences from the University of Notre Dame, Indiana. She likes the interdisciplinary approach of the UCD Masters in Cognitive Science. Her favourite class was Advances in Neuroscience where every week the class read a couple of papers to read and discuss in class.
"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."

Fees and Scholarships

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Additional Course Delivery Options

Course content is identical irrespective of which stream a student is enrolled in.

- MSc Cognitive Science 2 Year Part Time

Related Masters Programmes of Interest

- MA Consciousness & Embodiment

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

Non-EU Enquiries : internationaladmissions@ucd.ie
www.ucd.ie/international

UCD Science
Mr Gary Dunne
+353 1 716 2637
gary.dunne@ucd.ie

Dr Orla Donoghue
+353 1 716 2311
orla.donoghue@ucd.ie

www.ucd.ie/science
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@UCDScience

UCD SCIENCE

GRADUATE TAUGHT COURSES ENTRY 2019

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