

UCD Science

Undergraduate Courses 2018

UCD Science
Open Evening
Tuesday 24 October 2017
Register online at
www.myucd.ie



Science DN200

Computer Science DN201

Actuarial and Financial Studies DN230



University College Dublin
Ireland's Global University

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WHY UCD SCIENCE?

Flexible Curriculum

UCD offers the broadest and most diverse Science programme in Ireland, with degree courses in biological, biomedical, chemical, geological, mathematical, physical and computer sciences, all delivered by lecturers at the forefront of teaching and research.

The curriculum can be adapted to your personal preferences through the unique flexibility of UCD Horizons.



UCD has over 150 clubs and societies as well as a cinema, student residences, excellent sports facilities, a gym and 50-metre swimming pool.



Study Abroad Opportunities

UCD has over 400 exchange partners worldwide and offers students opportunities to study with 29 partner universities throughout Europe.



UCD Jargon Buster



The following are some terms that you will come across when researching courses in **UCD**.

Academic Terms

BSc

Bachelor of Science.

BAFS

Bachelor of Actuarial and Financial Studies.

Degree Subject

Examples of degree subject areas are Microbiology, Physics with Astronomy & Space Science or Chemistry. In DN200 Science, your degree will eventually be in one of 26 different subjects.

Entry Requirements

The minimum standard in order to be eligible for consideration for admission.

Common Entry

A common entry programme has a single entry point for multiple potential degree options.

Stage

A student progresses through an undergraduate programme in stages. For full-time undergraduate students, a 60-credit stage will normally be completed in one academic year.

Major

A main area of study. A major will show what subject area your degree is in, such as Zoology.

Semester

The academic year is divided into semesters. Undergraduate programmes in UCD have two semesters. Semester 1 runs from September to December and Semester 2 runs from January to May.

Grade Point Average (GPA)

Each grade has a number associated with it, called a grade point. When you have completed all the modules of a Stage, all your grade points are averaged to get a Grade Point Average, or GPA, for that Stage.

Stream

DN200 Science in UCD has 4 streams. The Streams available in DN200 Science are Biological, Biomedical & Biomolecular Sciences (BBB), Chemistry & Chemical Sciences (CCS), Mathematical, Physical & Geological Sciences (MPG) and No Preference (NPF). Streams are used to categorise the 26 different subjects available as degree options available in the common entry programme. By meeting the requirements of a particular stream in first year, the subjects within that stream remain available to choose in second year.

Information on Classes

Module

A self-contained unit of teaching and learning, which is usually studied over one semester. Undergraduate modules are normally 5 credits. A standard 5-credit UCD module represents 100-125 hours of student effort including time spent in class, studying and assessment. Modules in UCD are divided into core, option and elective modules.

Core Module

A compulsory module that you must do as part of your programme. You will usually be pre-registered to these modules.

Option Module

A module that is part of your programme but is not compulsory. You will be given a list of option modules to choose from when you register online.

Elective Module

As well as Core and Option modules, UCD students can study Elective modules that either deepen your knowledge in your chosen programme (In-Programme Electives) or allow you to explore subjects outside of your area of study (General Electives). For example, a student in Computer Science could take a Business or language module.

Timetable

Each student will have their own personalised timetable based on their individual module selection. The timetable will be filled with a variety

of class types such as lectures, practicals, tutorials etc. An average first year timetable will have 30 hours of class time per week including lectures, practicals and tutorials. Sample timetables for first year are available on the UCD Science website at www.ucd.ie/science/

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 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.

Student Life

Orientation

To help you settle into life at UCD, orientation events are organised for new students prior to the start of term. This includes important academic advice as well as extra-curricular activities to help you settle into life at UCD.

Societies

Student societies are a great way to explore your interests or develop new ones. UCD currently has over 70 active societies so there really is something for everyone, from fun events to guest speakers, plays to debates and comedy nights. An example is the UCD Science Society (SciSoc). SciSoc is one of UCD's biggest societies and it is responsible

for a range of events such as the annual "Cycle to Galway", Science Day festival, the Science Ball and many more.

Peer Mentor

Peer Mentors are students in Stage 2 or 3 who very generously give of their time to help welcome and support Stage 1 students. Students are introduced to their Peer Mentor during Orientation.

Clubs

UCD sports clubs are at the centre of student sport. Clubs provide a range of opportunities to train, play and compete in sport, no matter your passion, ability or level.

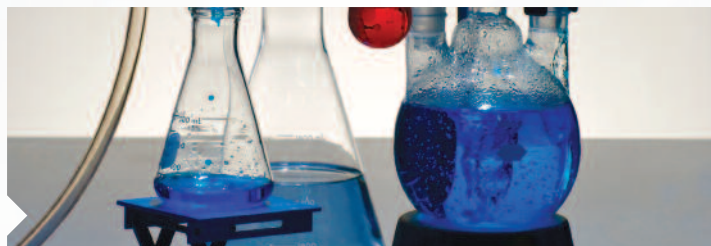
Science Careers Map

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

- BSc Biochemistry & Molecular Biology
- BSc Cell & Molecular Biology
- BSc Genetics
- BSc Microbiology
- BSc Neuroscience
- BSc Pharmacology
- BSc Physiology
- BSc Chemistry
- All BSc Physics Degrees
- BSc Chemistry with Environmental & Sustainable Chemistry
- BSc Medicinal Chemistry & Chemical Biology

Careers

Depending on the degree, careers include:

- QA/QC Analyst
- Analytical Chemist
- Microbiologist
- Environmental Scientist
- Clinical Research Associate
- Biochemist
- Medical Physicist

Energy, Climate Conservation & Environment



Degrees

- BSc Environmental Biology
- BSc Plant Biology
- BSc Zoology
- BSc Chemistry with Biophysical Chemistry
- BSc Chemistry with Environmental & Sustainable Chemistry

Careers

Depending on the degree, careers include:

- Environmental Consultant
- Environmental Officer
- Plant Scientist
- Conservation Scientist
- Environmental Manager
- Emissions Control Manager
- Photovoltaic Engineer

Natural Resources



Degrees

- BSc Geology
- BSc Environmental Biology

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 BSc and BAFS degree maps to different jobs, depending on the qualification and skills required for a particular job.

* Includes Professional Placement

Computing, Risk, Finance & Analytics



Degrees

- BSc Computer Science
- BSc Applied & Computational Mathematics
- BAFS Actuarial & Financial Studies*
- BSc Financial Mathematics
- BSc Mathematics
- BSc Mathematical Science
- BSc Statistics
- BSc Physics
- BSc Theoretical Physics
- BSc Physics with Astronomy & Space Science

Careers

Depending on the degree, careers include:

- Software Engineer
- Database Administrator
- Trainee Actuary
- Investment Banker
- Risk Analyst
- Business Analyst
- Financial Analyst

Semiconductor, Nanotechnology, Meteorology & Space Industry



Degrees

- BSc Physics
- BSc Theoretical Physics
- BSc Physics with Astronomy & Space Science
- BSc Chemistry

Careers

Depending on the degree, careers include:

- Semiconductor Engineer
- Meteorologist
- Medical Device Engineer
- Materials Scientist
- Radiation Protection Officer
- Space Program Manager
- Space Scientist
- Space Systems Engineer
- Space Flight Operations Controller

Further Education & Research



Degrees

- PME Science/Maths Teacher
- MSc, PhD – Academia/Research
- Graduate Veterinary Medicine
- Graduate Medicine
- Graduate Entry to Pharmacy

Careers

Depending on the degree, careers include:

- Science Teacher
- Medical Doctor
- Vet
- Pharmacist

UCD Science, Computer Science and Actuarial & Financial Studies Internships

We are committed to helping our students prepare for their careers throughout their time studying at UCD.

Plan Your Career Path

First Year – Get Involved

- ▶ Visit the Career Development Centre in your first year.
www.ucd.ie/careers
- ▶ Check out modules that cover career and professional development and identify modules you might like to take over the coming years.
- ▶ Consider the elective module "Prepare for Your Career".



Second and Third Year – Explore Your Career Options

- ▶ There is a career development lecture included in biology, biomolecular, maths and chemistry modules in second year which will introduce you to career planning.
- ▶ The Career Centre has 562 companies on their database. Identify company talks or workshops you'd like to attend.
- ▶ Consider an internship or work placement during your studies.
- ▶ Develop a CV and cover letter and develop skills at interviews.



Fourth Year

- ▶ Research job opportunities and graduate studies.
- ▶ Attend some fairs at UCD or at GradIreland, usually held in the RDS, Dublin.
- ▶ Check all deadlines for PhD funding opportunities and for MSc courses. Some are in the first semester of your fourth year so plan ahead.
- ▶ Find out which companies have graduate programmes.

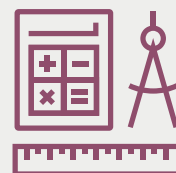


Internship Programmes

- ▶ We have recently introduced a Professional Science Placement that allows you to validate credits by completing a Summer Internship (3-months) or depending on specific disciplines a longer placement in industry (5-6 months).

Third year students opting for these disciplines can avail of the Placement programme:

- ▶ Chemistry
- ▶ Biomolecular and Biomedical Science
- ▶ Biology and Environmental Science
- ▶ Computer Science
- ▶ Mathematics
- ▶ Earth Science
- ▶ Physiology



- ▶ The Actuarial and Financial Studies degree has a 6 month professional placement built into the programme where students have the opportunity to work in industry.
- ▶ Our internship manager, Carla Naltchayan, prepares students for the application process which is competitive in the same way as applying for a graduate course or your first job and sources internship opportunities in each sectors.

Types of Companies

This new professional placement is just starting in 2018 and we are currently in contact with companies such as **Sanofi, Abbott, Top Chem, Aerogen, Pfizer, BMS, Astellas, Helsinn, Baxter, Henkel, SAP, Amazon, Dell, MongoDB, Deloitte, Facebook, Google, Intel, Analog, En Ocean Munich.**

Deloitte.



What Our Students Say

Orla Sherwood, Biochemistry & Molecular Biology

"I completed an internship at the Pasteur Institute, Paris in the area of Microbiology during my third year summer. When I graduate, I hope to complete a Masters in Science Communication."

Clíodhna Connolly, Computer Science*

"I completed a Summer Internship after third year with Deloitte in their Technology Consulting department. For my Fourth Year project I chose to develop a web application called Helping Hand. It connects people with others in their locality to get help with small favours such as asking for a drop of milk. When I graduate, I plan to return to Deloitte in a full-time position."

*The full blog is online at www.myucdblog.com/deloitte-internship/

You can read more about the Deloitte Summer Internship programme at www.deloitte.ie/students

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

genzyme
GENERAL

Lilly

Johnson & Johnson
(IRELAND) LTD.

BAUSCH+LOMB

Wyeth®



GlaxoSmithKline



Schering-Plough

Baxter

Abbott
A Promise for Life

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

**TOP
5**



Worldwide
security software
companies are
located in Ireland

The 10 Top Ten

"Born on the Internet" companies are based in Ireland





Biotechnology, Biomedical, Pharmaceutical & Chemical Sciences



What Our Graduates Say

Senior Clinical Project Manager o4 Research Belfast

Mark Herley
BSc Biochemistry, MSc

"I chose the BSc in Biochemistry due to my interest in science (particularly biotechnology), the reputation of UCD Science and the student lifestyle at the Belfield campus."

Technology Transfer Lead Eli Lilly

Dr Theresa Ahern
BSc Industrial Chemistry, PhD Chemistry
MSc Biopharmaceutical Science

"My degree and PhD in Chemistry gave me the opportunity to work with Eli Lilly, a leading chemical and biotechnology company. I am a technology transfer lead for biotechnology new product introductions from the development facility in Indianapolis to the commercial manufacturing facility at Lilly, Kinsale."

Associate Specialist in Quality Merck Sharp & Dohme

Dr Susan Molloy
BSc Microbiology, PhD

"In part fulfillment of my Bachelor degree, I had the opportunity to carry out an industrial based research project with Pfizer, Dun Laoghaire."

Director Merck Sharp & Dohme (MSD) Merck Sharp & Dohme

Dr Tom O'Ceallaigh
BSc Chemistry, PhD Chemistry

"My degree and PhD in Chemistry from UCD facilitated me with getting a job, leading to my current role in Process Development and Commercialisation with Merck Sharp & Dohme (MSD), a leading pharmaceutical company. I currently lead a team of Chemists and Engineers involved in the development of new drug substances and technology transfers."

PhD Medical Physicist St James's Hospital

Dr Seán Courmane
BSc Theoretical Physics,
MSc Physical Sciences in Medicine

"Diagnostic imaging (such as x-ray, MRI, ultrasound and nuclear medicine imaging) is a practical application of physics used for diagnosing and treating patients."



Energy, Climate, Natural Resources & Environment



What Our Graduates Say

BBC Natural History Unit

Ferne Corrigan
BSc Zoology

"I completed my Zoology degree in 2011 and went straight into my MA in Wildlife Documentary Production. I am about to start my new job with the BBC's Natural History Unit as a runner on a children's natural history series."

Senior Scientist EPA's Office of Radiological Protection

Ms Stephanie Long
BSc Experimental Physics
MSc Experimental Physics

"Radon is a naturally occurring radioactive gas that is the second cause of lung cancer in Ireland after smoking. Our work includes research on the behaviour of radon in the environment."

Environmental Officer BirdWatch Ireland

Domhnall Finch
BSc Environmental Biology

"I have been interested in the environment as long as I can remember. This is why I went on to do a BSc Environmental Biology in UCD. Through UCD I was able to conduct my undergraduate research project in South Africa."

Graduate Geologist EnQuest plc, UK

Peter McArdle
BSc Geology
MSc Integrated Petroleum Geoscience

"I work on the mature Brent province Heather Field. My job focuses on finding infill drilling targets, working with engineers and drillers to plan new wells."

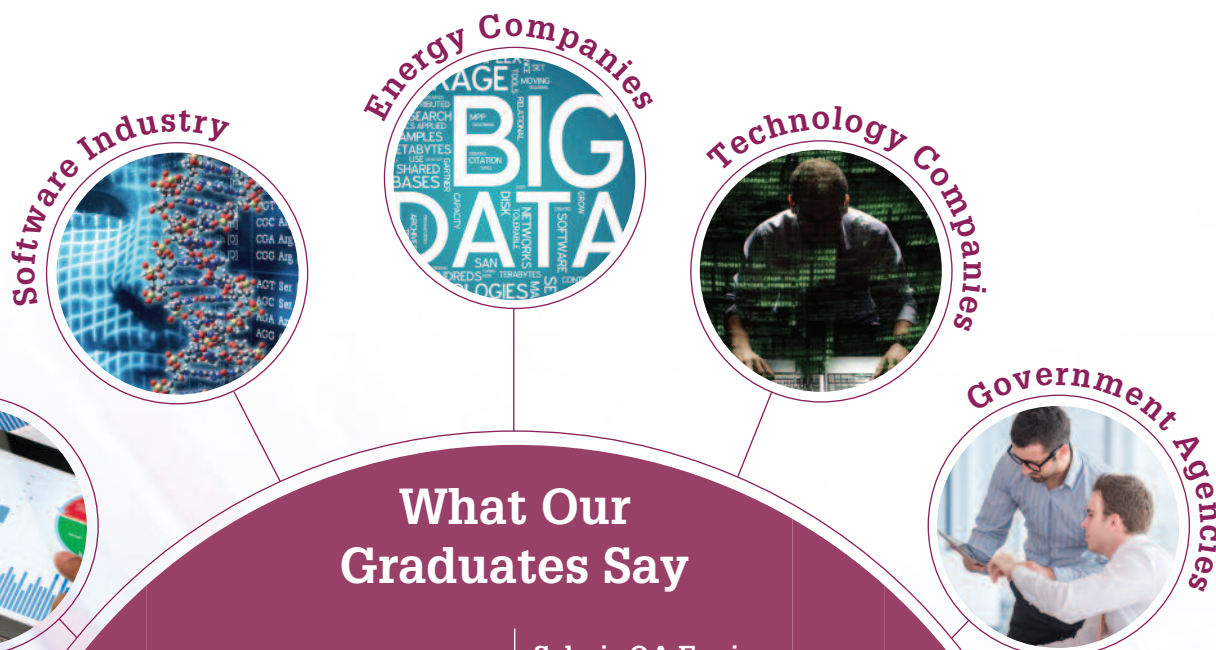
Research Manager Aquamarine Power

Dr Kenneth Doherty
BSc Experimental Physics and Applied Mathematics, PhD

"By studying Applied Mathematics at UCD, I am well equipped with the mathematical and computational skills to achieve my goals."



Computing, Risk, Finance & Analytics



What Our Graduates Say

Head of Technology Accenture Ireland

Hilary O'Meara
BSc Computer Science

"I believe my Computer Science degree was an exceptional platform from which to launch my career, as I not only learned technology skills, but developed a passion for the industry. I am proud to be a UCD Computer Science graduate."

Statistician Creme Global

Sylwia Sterecka
BSc Mathematical Science

"I developed problem solving skills and learned how to apply my knowledge in practice by analysing data using software for statistical analysis. These skills proved to be particularly valuable to employers."

Solaris QA Engineer Sun Microsystems

Chris Quinn
BSc Computer Science

"UCD provided exposure to a variety of different operating systems and programming languages throughout the course; knowledge which was to come in particularly handy out in the real working world."

FIA Santander Insurance Ireland

Elena McLroy De La Rosa
BAFS, FSAI

"The BAFS degree at UCD is undoubtedly the best Actuarial course in Ireland. Small classes, tough exams, work and play hard."

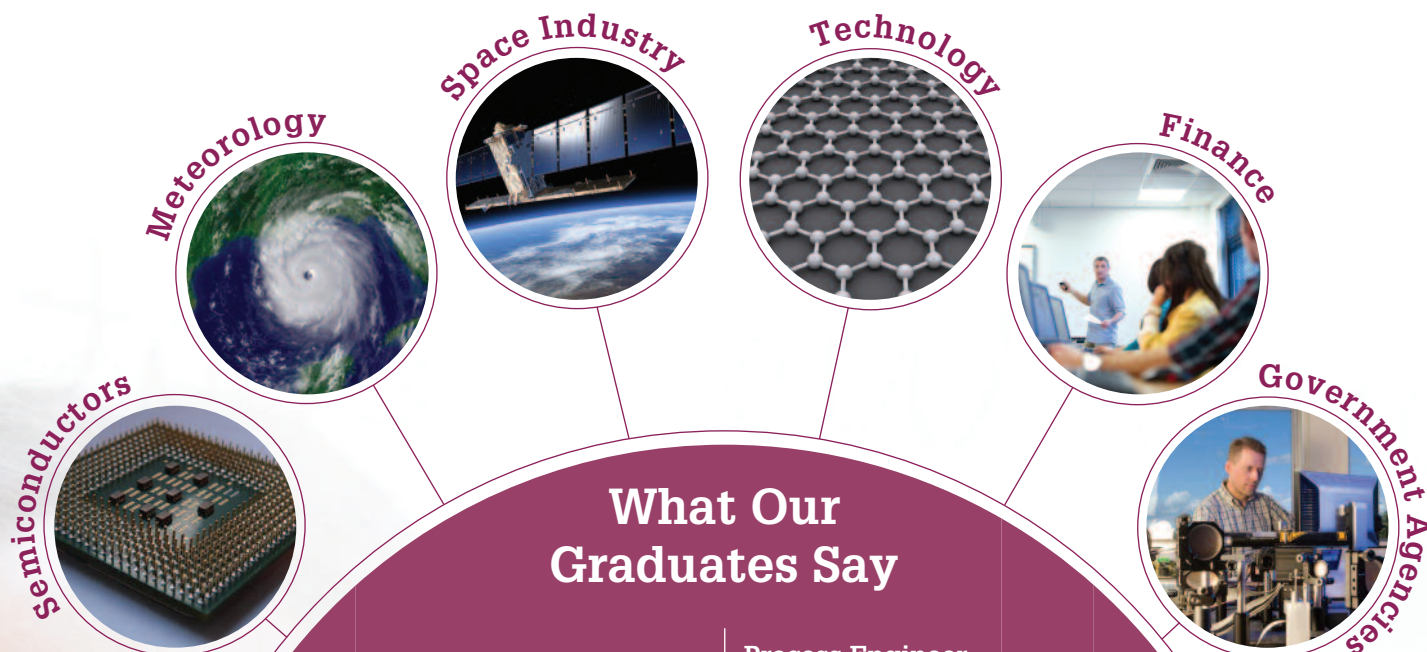
Investment Analyst Seroa Kernel Life Sciences

Jennifer McKeever
BSc Pharmacology
MSc Business & Biotechnology

"The analytical skills and scientific rationale that I acquired during my undergraduate degree have been of significant value to me upon entering the workforce."



Semiconductor, Nanotechnology, Meteorology & Space Industry



What Our Graduates Say

Researcher Intel

Dr Fergus Quilligan
BSc Physics

"Physics was an excellent choice for developing the ability to solve problems, a ubiquitous skill in most jobs."

Chief Scientist Met Éireann's Valentia Observatory

Keith Lambkin
BSc Experimental Physics
MSc High Performance Computers
MSc Meteorology

"I am now Chief Scientist at Met Éireann's Valentia Observatory. Among other responsibilities, I currently manage Ireland's Ozone, Magnetic and Weather Balloon programmes. Travelling the world on business is always a great bonus!"

Process Engineer Intel

Dr Michael Carroll
BSc Chemistry, PhD Chemistry

"My BSc Honours degree and PhD in Chemistry enabled me to obtain a job with Intel, the world leader in semiconductor chip manufacturing. I work as part of a team who strive to develop and improve some of the world's most advanced processes for chip manufacturing."

AMPAC-ISP

Dr Ronan Wall
BSc, PhD Physics

"I graduated from UCD Physics with a BSc in 1996 and, following a PhD in Nuclear Physics at Manchester University, landed a job as a Mission Systems Engineer at EADS Astrium. I now work as a Programme Manager for AMPAC-ISP at its Dublin HQ, being responsible for spacecraft propulsion development programmes such as a new European High Thrust engine."

Deputy Head of Forecasting Met Éireann

Ms Evelyn Cusack
BSc, MSc Physics

"The main function of a forecaster involves providing weather forecasts and warnings to the general public and special interest clients in order to save lives and property."

DN230

Actuarial & Financial Studies



The DN230 Actuarial & Financial Studies course will prepare you for a professional career in the actuarial or financial professions.



Maximum exemptions

from Core Technical series examinations (CT1:8) as well as the Core Applications CA1 examination of the Institute and Faculty of Actuaries.



Professional work placement in Third Year



Students have completed their third-year work placements in a variety of companies including Allianz, Aon Hewitt, Susquehanna (SIG), Deloitte, Central Bank of Ireland, Irish Life, Zurich and Willis. The placements last at least six months.

Frequently Asked Questions

Q: How long does it take to become a qualified actuary?

A: Students must successfully complete 15 professional exams and complete a work-based skills framework with their employer which includes a Learning Log. The exams are held twice a year. It typically takes 3 to 6 years to complete the exams, depending on the extent to which you can claim exemptions on the basis of relevant third-level qualifications. The UCD Actuarial & Financial Studies programme offers the maximum exemptions available from the professional exams.



Q: How can I find out more information?

A: The Society of Actuaries in Ireland is the professional body representing the actuarial profession in Ireland. The Society is dedicated to serving the public by fostering the highest standards of professionalism and competence in actuarial practice.

Further information on becoming an actuary is available at the Society of Actuaries at <https://web.actuaries.ie/>

Actuarial & Financial Studies

CAO code: DN230

Sample pathway for a degree in Actuarial & Financial Studies *

YEAR
1

ENGAGE WITH THE PRINCIPLES

MATHEMATICS

Topics include:

- ▶ Linear Algebra in the Mathematical and Physical Sciences
- ▶ Numbers & Functions
- ▶ Calculus in the Mathematical and Physical Sciences
- ▶ Statistical Modelling

COMPUTER SCIENCE

Topics include:

- ▶ Introduction to Programming

BUSINESS

Topics include:

- ▶ Principles of Microeconomics
- ▶ Principles of Macroeconomics
- ▶ Financial Accounting

- ▶ Two Elective modules



YEAR
2

CHOOSE YOUR SUBJECTS

ACTUARIAL & FINANCIAL STUDIES

Topics include:

- ▶ Principles of Finance
- ▶ Linear Models
- ▶ Analytics Modelling

- ▶ Financial & Actuarial Mathematics
- ▶ Probability Theory
- ▶ Inferential Statistics

- ▶ Two Elective modules

- Learn how actuaries understand the nature of risk and find ways to manage it
- Develop the analytical skills and business knowledge necessary to design and manage programmes that control risk for the insurance and pension sectors

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

ACTUARIAL & FINANCIAL STUDIES – Topics include:

- ▶ Advanced Corporate Finance
- ▶ Models – Stochastic Models
- ▶ Time Series Analysis
- ▶ Models – Survival

- ▶ Information Management for Actuaries
- ▶ BAFS Professional Work Placement (at least 6 months)

- ▶ One Elective module

YEAR
4

REFINE YOUR KNOWLEDGE

ACTUARIAL & FINANCIAL STUDIES – Topics include:

- ▶ Actuarial Risk Management
- ▶ Actuarial Statistics

- ▶ Financial Economics
- ▶ Actuarial Mathematics

- ▶ One Elective Module
- ▶ One Option

BAFS (Honours) Actuarial and Financial Studies

Industry

- ▶ Insurance Actuarial Trainee in the following areas:
 - ▶ Life
 - ▶ Pensions
 - ▶ Health
 - ▶ General Insurance
 - ▶ Banking or Finance
 - ▶ Business Analyst
 - ▶ Financial Analyst

PhD

- ▶ Students can pursue a PhD in Ireland or abroad in areas as diverse as: Mathematics, Statistics and Actuarial studies

Conversion Courses

- ▶ MSc Data & Computational Science
- ▶ MSc Mathematical Sciences
- ▶ MSc Mathematics
- ▶ MSc Statistics

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

“

The wide recognition of the BAFS course was really useful in applying for jobs. The BAFS course was great preparation for the further actuarial exams and left me with a very sound technical knowledge in this area. Doing the work placement on the BAFS course was a huge help, and meant I could settle into the work environment very quickly.

Sean Roe, Graduate

”

i

Associate Professor Shane Whelan
UCD School of Mathematics and Statistics

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facebook.com/UCDSchool
twitter.com/ucdscience



www.ucd.ie/myucd/actuarialandfinancialstudies

DN201

Computer Science Computer Science with Data Science



The DN201 Computer Science course is mainly a software engineering degree and is suitable for students with or without previous programming experience.

Total
immersion
software
engineering
degree



70%

Software Engineering



30%

Mathematics
in first year



At the end of
Year 2,

choose to major in
either Computer
Science or
Computer Science
with Data Science



Learn programming languages such as Java, Perl and Ruby; mark-up languages such as HTML, XML; Internet technologies such as ASP, PHP and Flash; and graphics languages such as OpenGL and VRML. Students will also use both Windows and Linux/Unix operating systems.

Frequently Asked Questions

Q: Do I need to have prior experience of programming?

A: No. Computer Science DN201 is mainly a software engineering degree and is suitable for students with or without previous programming experience. There is no assumption that students have prior programming experience and all students will take introductory programming modules in first year.



Q: Where can I practice programming to see if I enjoy it?

A: There are many excellent resources available online to try out programming and Computer Science. Beginners can use resources such as MIT's Scratch or Greenfoot. Students looking to advance their knowledge can also use resources such as Coursera and edX to sample free online courses in Computer Science.

Computer Science

CAO code: DN201

Sample pathway for a degree in Computer Science *

YEAR
1

ENGAGE WITH THE PRINCIPLES

COMPUTER SCIENCE

Topics include:

- ▶ Algorithmic Problem-Solving
- ▶ Computer Programming
- ▶ Introduction to Computer Architecture

- ▶ Formal Foundations
- ▶ Computer Science in Practice
- ▶ Software Engineering Project 1

MATHEMATICS

Topics include:

- ▶ Matrix Algebra
- ▶ Foundations of Mathematics for Computer Science

- ▶ Two Elective modules

YEAR
2

BROADEN YOUR KNOWLEDGE

COMPUTER SCIENCE – Topics include:

- ▶ Data Structures & Algorithms
- ▶ Introduction to Java
- ▶ Discrete Mathematics for Computer Science
- ▶ Software Engineering Project 2

- ▶ Linear Algebra II
- ▶ Databases and Information Systems I
- ▶ Digital Systems
- ▶ Introduction to Operating Systems
- ▶ Introduction to Functional Programming

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

COMPUTER SCIENCE – Topics include:

- ▶ Foundations of Computing
- ▶ Networks and Internet Systems
- ▶ Object-Oriented Programming

- ▶ Software Engineering Project 3
- ▶ Introduction to Artificial Intelligence
- ▶ Program Construction 1

- ▶ Computer Graphics 1
- ▶ Processor Design
- ▶ Graphs and Networks
- ▶ Information Theory

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

COMPUTER SCIENCE – Topics include:

- ▶ Computer Science Project
- ▶ AI for Games and Puzzles
- ▶ Spatial Information Systems
- ▶ Machine Learning
- ▶ Data Mining

- ▶ Multimedia Security & Data Hiding
- ▶ Distributed Systems
- ▶ Advances in Wireless Networking

- ▶ Compiler Construction
- ▶ Programme Construction II
- ▶ Cloud Computing
- ▶ Practical Android Programming
- ▶ Mobile App Development

BSc (Honours) Computer Science

MSc (Taught)

- ▶ MSc Computer Science (Negotiated Learning)
- ▶ MSc Digital Investigation & Forensic Computing
- ▶ MSc Cognitive Science

Research

Many graduates pursue MSc and PhD studies in Ireland and abroad in diverse areas such as:

- ▶ Artificial Intelligence
- ▶ Software and Systems Engineering
- ▶ Networks and Distributed Systems
- ▶ Postdoctoral researcher

Industry

- ▶ High-Tech Sector
- ▶ Financial Sector
- ▶ Consultancies
- ▶ R&D
- ▶ UCD Tech Start-ups
- ▶ Education (Third Level)

Conversion Courses

- ▶ Smurfit Business School postgraduate degrees, e.g., Masters in Business Administration; Masters in Business Analytics



Caroline Keiller, Horea Catanase and Alan Fitzpatrick “visualising a goal” as part of Computer Science module Project Management.

Image by Niall Hayes © UCD

- Develop skills in object-oriented programming languages such as Java and Ruby, the latest Internet technologies, software engineering, mobile application development, database technology and operating systems such as Windows, Unix and Linux

“ I chose to study Computer Science at UCD because of my avid interest in technology and the great opportunities it afforded me going forward. I have always been really passionate about technology, and always intended on pursuing a career within the field. Upon graduating I intend on pursuing a career in the technology consultancy field, exercising technical expertise within the business sector.



Ryan Kane, Student

”

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

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www.ucd.ie/myucd/computerscience

Computer Science with Data Science

CAO code: DN201



- Learn key skills to demonstrate basic knowledge and understanding of the fundamentals of data science.
- Develop the technical depth and the practical experience that you will need to stand out in an increasingly demanding market-place.

Professor Cunningham is Head of the School of

Computer Science and Professor of Knowledge and Data Engineering. He has been involved in research in Data Analytics for over 20 years and has published over 200 papers in the area. He is a founding director of the Insight Centre for Data Analytics (insight-centre.org) and the Centre for Applied Data Analytics (ceadar.ie), both located in UCD. Through CeADAR and Insight the UCD School of Computer Science collaborate with over 70 companies on Data Science research.

Professor Pádraig Cunningham, Staff



Sample pathway for a degree in Computer Science with Data Science *

YEAR 1

ENGAGE WITH THE PRINCIPLES

COMPUTER SCIENCE

Topics include:

- ▶ Algorithmic Problem-Solving
- ▶ Computer Programming
- ▶ Introduction to Computer Architecture

- ▶ Formal Foundations
- ▶ Computer Science in Practice
- ▶ Software Engineering Project 1

MATHEMATICS

Topics include:

- ▶ Matrix Algebra
- ▶ Foundations of Mathematics for Computer Science

- ▶ Two Elective modules

YEAR 2

BROADEN YOUR KNOWLEDGE

COMPUTER SCIENCE WITH DATA SCIENCE – Topics include:

- ▶ Data Structures & Algorithms
- ▶ Introduction to Java
- ▶ Discrete Mathematics for Computer Science
- ▶ Software Engineering Project 2

- ▶ Linear Algebra II
- ▶ Databases and Information Systems I
- ▶ Digital Systems
- ▶ Introduction to Operating Systems
- ▶ Introduction to Functional Programming

- ▶ Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

COMPUTER SCIENCE WITH DATA SCIENCE – Topics include:

- ▶ Data Science in Python
- ▶ Introduction to Project Management
- ▶ Probability Theory

- ▶ Introduction to Artificial Intelligence
- ▶ Graphs & Networks
- ▶ Data Science in Practice

- ▶ Industry Internship
- ▶ Information Visualisation
- ▶ Programming for Big Data

- ▶ Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

COMPUTER SCIENCE WITH DATA SCIENCE – Topics include:

- ▶ Data Science Project
- ▶ Machine Learning
- ▶ Cloud Computing
- ▶ Data Mining
- ▶ Collective Intelligence
- ▶ Multi-Agent Systems

- ▶ Parallel and Cluster Computing
- ▶ Text Analytics
- ▶ Human Language Technology
- ▶ Connectionist Computing
- ▶ Spatial Information Systems
- ▶ Information Security

- ▶ Linear Models
- ▶ Unix Programming
- ▶ Networks and Internet Systems
- ▶ Information Theory
- ▶ Inferential Statistics

BSc (Honours) Computer Science with Data Science

MSc (Taught)

- ▶ MSc Computer Science (Negotiated Learning)
- ▶ MSc Digital Investigation & Forensic Computing
- ▶ MSc Cognitive Science

Research

Many graduates pursue MSc and PhD studies in Ireland and abroad in diverse areas such as:

- ▶ Artificial Intelligence
- ▶ Software and Systems Engineering
- ▶ Networks and Distributed Systems
- ▶ Postdoctoral Research

Industry

- ▶ Banking and Financial Services
- ▶ Consultancy (e.g. Accenture, Deloitte)
- ▶ Internet companies such as Google, PayPal and Facebook
- ▶ Established ICT companies such as IBM, Microsoft and Intel
- ▶ ICT Startups

Conversion Courses

- ▶ Smurfit Business School postgraduate degrees, e.g., Masters in Business Administration; Masters in Business Analytics

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



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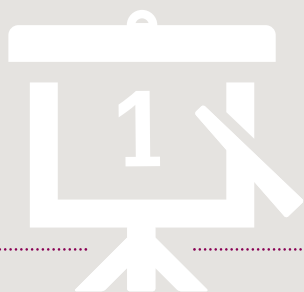
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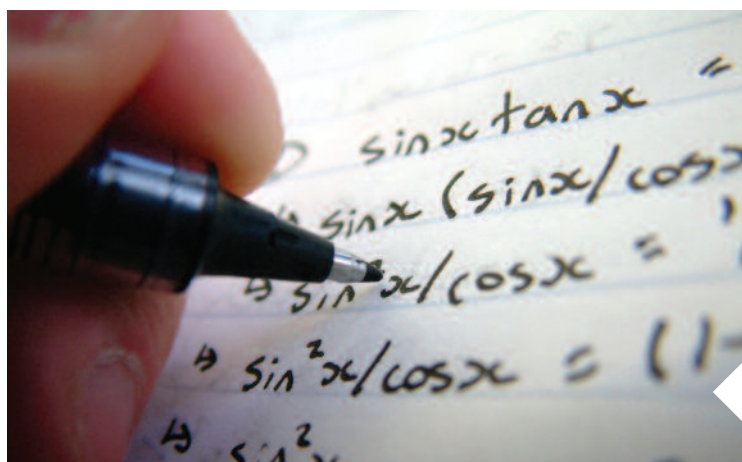
DN200

Science

The first year of the DN200 Science programme is designed to enable you to sample a number of subjects in your chosen area. You can focus on your preferred stream immediately or explore a range of subjects. All DN200 Science students are guaranteed a degree from within a stream of their choice.



COMMON ENTRY:
1 CAO Code, 26 different degrees



Did You Know?

Students have the option to become Science and Maths teachers at post-primary level through DN200 Science via one of 4 Teaching Council approved pathways.



TIME



Time to change your mind
in First Year



4 Year

Honours BSc course

No Preference

Students who want to sample a number of degree options from different streams can choose DN200 No Preference.

Frequently Asked Questions

Q: Is DN200 Science a General Science degree?

A: No. The DN200 Science course is a Level 8 BSc Honours degree of four years. Students enter by a single route and graduate with a BSc Honours degree in one of 26 different subjects, for example, BSc Theoretical Physics, BSc Mathematics, BSc Chemistry.



Q: Does common entry mean all students take a common first year?

A: Common entry does not mean that all students take a common first year. The advantage of a common entry course is that you can choose to specialise from first year or you can leave your options open. The number of compulsory modules in First Year for each stream has been kept low to allow you the option to try out other subjects that you may not be familiar with or to deepen your interest in the areas that you wish to pursue to degree level.

Biochemistry & Molecular Biology

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)



Blood cell preparation in the UCD Conway Institute.
Image by Naheda Alkazemi © UCD

Develop practical skills in:

- Protein and DNA isolation and analysis
- Molecular Biology techniques used in pharmaceutical and biotechnology
- Clinical trials tests such as immunoassays used in hospital laboratories

“

I completed a summer studentship in neurochemistry in Dr Gethin McBean's lab. My research project investigated the molecular basis of neurodegeneration in a rare genetic disorder, called Cystinosis. This pilot project investigated whether there is the possibility that cysteine accumulation, exhibited in Cystinosis, leads to reduced levels of the major antioxidant glutathione in brain glial cells.

Dylan Ryan, Student

”

Sample pathway for a degree in Biochemistry & Molecular Biology *

YEAR
1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- ▶ Biology in Action
- ▶ Life on Earth
- ▶ Cell Biology & Genetics
- ▶ Biomedical Sciences

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

BIOCHEMISTRY & MOLECULAR BIOLOGY

Topics include:

- ▶ Principles of Biochemistry
- ▶ Molecular Genetics and Biotechnology
- ▶ Biomolecular Laboratory Skills
- ▶ Metabolic and Immune Systems
- ▶ Chemistry for Biologists

MICROBIOLOGY

Topics include:

- ▶ Principles of Microbiology
- ▶ Research Methods for Science

PHARMACOLOGY

Topics include:

- ▶ Biomedical Science of Drugs

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

BIOCHEMISTRY & MOLECULAR BIOLOGY – Topics include:

- ▶ Metabolism and Disease
- ▶ Biochemist's Toolkit
- ▶ Advanced Cell Biology
- ▶ Cell Signalling

- ▶ Regulation of Gene Expression
- ▶ Molecular Basis of Disease
- ▶ Proteins and Enzymes
- ▶ Genomics and Proteomics

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

BIOCHEMISTRY & MOLECULAR BIOLOGY – Topics include:

- ▶ Biochemistry Career Skills
- ▶ Advanced Neurochemistry
- ▶ Advanced Cell Signalling

- ▶ Biochemical Research Strategies
- ▶ Biochemistry Research Project
- ▶ Protein Structure & Analysis

- ▶ Three optional modules on topics such as cancer, genetics, microbiology and pharmacology

BSc (Honours) Biochemistry & Molecular Biology

MSc (Taught)

- ▶ MSc Biotechnology
- ▶ MSc Biotechnology & Business
- ▶ MSc Molecular Medicine
- ▶ MSc Biological & Biomolecular Science (NL)
- ▶ MSc Biotherapeutics
- ▶ MSc Biotherapeutics & Business

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as medical research, drug development and biomedical science

Industry

- ▶ Pharmaceutical Companies
- ▶ Food sector
- ▶ Biotechnology sector
- ▶ Chemical Industries

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Veterinary Medicine
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



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Cell & Molecular Biology

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for a degree in Cell & Molecular Biology *

YEAR
1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences

CHEMISTRY

Topics include:

- The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- Mathematics for the Biological & Chemical Sciences

- Two Elective modules
- One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

CELL & MOLECULAR BIOLOGY

Topics include:

- Biological Systems
- Principles of Cell Biology
- Principles of Genetics
- Chemistry for Biologists
- Biomolecular Laboratory Skills

MICROBIOLOGY

Topics include:

- Metabolic and Immune Systems
- Principles of Microbiology

GENETICS

Topics include:

- Principles of Genetics
- Molecular Genetics and Biotechnology

- Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

CELL & MOLECULAR BIOLOGY – Topics include:

- Advanced Cell Biology
- Research Methods in Cell Biology
- Genetics

- Regulation of Gene Expression
- Developmental Biology
- Plant Cell Growth and Signalling

- Molecular Basis of Disease
- Working with Biological Data

- Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

CELL & MOLECULAR BIOLOGY – Topics include:

- Membrane Trafficking
- Programmed Cell Death
- Cell Signalling

- Epithelial Transport
- Biological Imaging

- Cell Biology Research Project
- Human Genetics & Disease

BSc (Honours) Cell & Molecular Biology

MSc (Taught)

- MSc Biological & Biomolecular Science (NL)
- MSc Molecular Medicine
- MSc Biotechnology
- MSc Biotechnology & Business
- MSc Plant Biology & Biotechnology

PhD

- Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as cell & molecular biology, biochemistry, genetics, systems biology and biomolecular science

Industry

- Pharmaceutical and Biotechnology companies
- Semi-State bodies such as BIM, Teagasc
- Hospital laboratories
- Genetic Counselling
- Forensic Science

Conversion Courses

- Professional Master of Education (PME)
- Graduate Veterinary Medicine
- Graduate Medicine
- Master of Business Administration
- Master in Management

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



Niamh Morgan studying mammalian cells under a fluorescence wide field microscope.

Image by Niall Hayes © UCD

- Learn why healthy cells become cancerous, what happens at a cellular level in diseases and the basic concept of genetics
- Develop practical skills in microscopy, cellular assays and diagnostic techniques used in industry, hospitals and research labs

“

Upon completion of my Cell and Molecular Biology degree, I pursued a Masters in Management at University College London, with the intention to combine both to eventually manage a venture capital trust with a pharmaceutical focus. My degree has given me the necessary skills to carefully interpret and assess existing literature, problem solve, critically evaluate, and manage my time effectively.

Paula Burke, Graduate

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www.ucd.ie/myucd/cellandmolecularbiology

Environmental Biology

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)



Rare Festoon butterfly taken on a third year field trip to Spain.
Image by Dr Tasman Crowe © UCD

- Learn how environmental biology is central to our ability to understand and manage the world's environmental problems
- Develop practical skills in field-based sampling of plants and animals in their natural environments in Ireland, Spain and Costa Rica

“

Science at UCD was my top choice. I knew then that I was interested in biology, chemistry and environmental science. After graduating with a BSc in Environmental Biology from UCD, I obtained a PhD position in the Department of Microbiology at Cornell University, USA. Currently I am working on my thesis, which focuses on the molecular interactions between fungi and bacteria.

Olga Lastovetsky, Graduate

”

Sample pathway for a degree in Environmental Biology *

YEAR
1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- ▶ Biology in Action
- ▶ Life on Earth
- ▶ Cell Biology & Genetics
- ▶ Biomedical Sciences

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

ENVIRONMENTAL BIOLOGY

Topics include:

- ▶ Principles of Environmental Biology and Ecology
- ▶ Biological Systems
- ▶ Evolutionary Biology
- ▶ Microbial Interactions
- ▶ Global Environmental Change
- ▶ Forests, Climate and Carbon
- ▶ Applied Plant Biology

ZOOLOGY

Topics include:

- ▶ Principles of Zoology
- ▶ Animal Behaviour
- ▶ Molecular Genetics and Biotechnology

PLANT BIOLOGY

Topics include:

- ▶ Principles of Plant Biology and Biotechnology

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

ENVIRONMENTAL BIOLOGY – Topics include:

- ▶ Systems Ecology
- ▶ Biogeography and Field Biology
- ▶ Diversity of Vertebrates

- ▶ Diversity of Plant Form & Function
- ▶ Ecology & Environmental Microbiology
- ▶ Wildlife and Fisheries Management

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

ENVIRONMENTAL BIOLOGY – Topics include:

- ▶ Environmental Biology Research Project
- ▶ Marine Community Ecology
- ▶ Bioassessment of Freshwaters
- ▶ Biological Invasions

- ▶ Insect-Plant Interactions
- ▶ Ecological Modelling and QGIS
- ▶ Biodiversity
- ▶ Foodborne Pathogens

- ▶ Tropical Field Ecology
- ▶ Environmental Impact Assessment
- ▶ Peatlands and Environmental Change

BSc (Honours) Environmental Biology

MSc (Taught)

- ▶ MSc Applied Environmental Science
- ▶ MSc World Heritage Management
- ▶ MSc Plant Biology & Biotechnology

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in areas such as ecology, microbiology, fisheries, conservation biology, environmental management and global change

Industry

- ▶ National Parks and Wildlife Services
- ▶ Environmental Management with State agencies, companies or consultancies
- ▶ Semi-State bodies such as the EPA and BIM and NGOs such as An Taisce
- ▶ Conservation Organisations
- ▶ Agriculture and Aquaculture

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Veterinary Medicine
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management

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www.ucd.ie/myucd/environmentalbiology

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Genetics

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for a degree in Genetics *

YEAR
1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- ▶ Biology in Action
- ▶ Life on Earth
- ▶ Cell Biology & Genetics
- ▶ Biomedical Sciences

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

GENETICS

Topics include:

- ▶ Chemistry for Biologists
- ▶ Molecular Genetics and Biotechnology
- ▶ Principles of Genetics
- ▶ Metabolic and Immune Systems
- ▶ Biomolecular Laboratory Skills

MICROBIOLOGY

Topics include:

- ▶ Principles of Microbiology: Medicine, Environment and Biotechnology

ZOOLOGY

Topics include:

- ▶ Biological Systems
- ▶ Principles of Zoology
- ▶ Animal Behaviour
- ▶ Evolutionary Biology

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

GENETICS – Topics include:

- ▶ Regulation of Gene Expression
- ▶ Bioinformatics
- ▶ Genome Structure
- ▶ Genetics

- ▶ Animal Development
- ▶ Genomics & Proteomics
- ▶ Genetic Basis of Disease
- ▶ Evolutionary Biology

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

GENETICS – Topics include:

- ▶ Genetics Disease & Behaviour
- ▶ Gene Regulation

- ▶ Systems Microbiology
- ▶ Model Organism Genetics

- ▶ Genetics Research Project

BSc (Honours) Genetics

MSc (Taught)

- ▶ MSc Biotechnology
- ▶ MSc Biotechnology & Business
- ▶ MSc Plant Biology & Biotechnology
- ▶ MSc Biotherapeutics
- ▶ MSc Biological & Biomolecular Science (NL)
- ▶ MSc Biotherapeutics & Business

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as biotechnology, cell biology, biomedical and health science and bioinformatics

Industry

- ▶ Biotechnology, pharmaceutical, and genomics companies
- ▶ Hospital labs
- ▶ Forensic Science labs
- ▶ Agribiotech and horticulture

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Veterinary Medicine
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



These are transgenic zebrafish larvae (5 days old, 3mm long) that express green fluorescent protein in all their blood vessels. The zebrafish is our animal model to study retinal development and disease. Image by Dr Yolanda Alvarez © UCD

- Explore molecular genetics and molecular biology, which are core components of modern biology and medicine, and form the basis of biotechnology

“

The most valuable part of the course was the thesis project I undertook in my final year. Although this was, at times, a really challenging placement I found great satisfaction and enjoyment from optimising experiments, learning new skills and making new discoveries. I knew that this was the career path I wanted to take and I am now a PhD student in Infectious Disease at the University of Cambridge.

Amie Regan, Graduate

”

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www.ucd.ie/myucd/genetics

Microbiology

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)



Emma Cullen in a Microbiology practical in the new UCD O'Brien Centre for Science

- Learn about microbes that cause diseases, clean up environmental spills and produce antibiotics
- Understand how we engineer fungi and bacteria to produce a vast array of compounds, ranging from antibiotics and hormones to washing powder

“

I am now working in a highly innovative start-up company called StableLab, where I develop rapid diagnostic solutions for the equine industry. The work is challenging, but I really enjoy it as I'm given a lot of creative freedom. Seeing a product that I've worked on making its way to market and subsequently improving the lives of horses is hugely rewarding.

Di-Sien Chan, Graduate ”



Sample pathway for a degree in Microbiology *

YEAR 1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences

CHEMISTRY

Topics include:

- The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- Mathematics for the Biological & Chemical Sciences

- Two Elective modules
- One Small-Group Project

YEAR 2

CHOOSE YOUR SUBJECTS

MICROBIOLOGY

Topics include:

- Chemistry for Biologists
- Molecular Genetics and Biotechnology
- Biomolecular Laboratory Skills
- Metabolic and Immune Systems
- Principles of Microbiology: Medicine, Environment and Biotechnology

CELL & MOLECULAR BIOLOGY

Topics include:

- Biological Systems
- Principles of Cell and Molecular Biology

GENETICS

Topics include:

- Principles of Genetics

- Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

MICROBIOLOGY – Topics include:

- Regulation of Gene Expression
- Microbial Cell Factory
- Applied Microbiology
- Microbial Diversity & Growth

- Microbial Physiology
- Medical Microbiology
- Skills in Microbiology
- Ecology & Environmental Microbiology

- Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

MICROBIOLOGY – Topics include:

- Microbiology Research Project
- Ecological & Environmental Microbiology
- Systems Microbiology

- Foodborne Pathogens
- Microbial Pathogenicity
- Enzyme Technology & Protein Engineering

- Bioprocessing
- Natural Product Synthesis
- Host Defense Mech. In Health

BSc (Honours) Microbiology

MSc (Taught)

- MSc Biotechnology
- MSc Biotechnology & Business
- MSc Environmental Management
- MSc Toxicology & Regulatory Affairs
- MSc Plant Biology & Biotechnology
- MSc Biotherapeutics

PhD

- Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as Biotechnology, Environmental Biology, Medical and Veterinary Sciences

Industry

- Pharmaceutical Companies
- Food and food-related companies
- (Veterinary) Hospitals and related laboratories
- Government agencies including the EPA and county councils

Conversion Courses

- Professional Master of Education (PME)
- Graduate Veterinary Medicine
- Graduate Medicine
- Medical Scientist
- Master of Business Administration

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



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Neuroscience

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for a degree in Neuroscience *

YEAR
1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- ▶ Biology in Action
- ▶ Life on Earth
- ▶ Cell Biology & Genetics
- ▶ Biomedical Sciences

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ Two Elective modules
- ▶ One Small-Group Project



Examining embryos at different stages of development.
Image by Ciara O'Hanlon © UCD

YEAR
2

CHOOSE YOUR SUBJECTS

NEUROSCIENCE

Topics include:

- ▶ Chemistry for Biologists
- ▶ Molecular Genetics and Biotechnology
- ▶ Biomolecular Laboratory Skills
- ▶ Metabolic and Immune Systems
- ▶ Principles of Neuroscience

PHYSIOLOGY

Topics include:

- ▶ Introduction to Physiology
- ▶ Organs and Systems Physiology

PHARMACOLOGY

Topics include:

- ▶ Biomedical Science of Drugs

GENETICS

Topics include:

- ▶ Principles of Plant Biology and Biotechnology

- ▶ Two Elective modules

- Learn how to employ state-of-the-art techniques to study the nervous system at the molecular, cellular and behavioural levels

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

NEUROSCIENCE – Topics include:

- ▶ Cell Signalling
- ▶ Drugs used in CNS diseases
- ▶ Nervous System Development
- ▶ Membrane Biology

- ▶ Biostatistics
- ▶ Sensory Neuroscience
- ▶ Genetic Basis of Disease
- ▶ Higher Cortical Function

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

NEUROSCIENCE – Topics include:

- ▶ Synaptic Plasticity
- ▶ Advanced Topics in Neural Development
- ▶ Neuroscience Research Project

- ▶ Advanced Neuropharmacology
- ▶ Advanced Neurochemistry
- ▶ Molecular Neuroimmunology

- ▶ Genetics of Disease & Behaviour
- ▶ Synaptic Signalling
- ▶ Emerging Therapies

BSc (Honours) Neuroscience

MSc (Taught)

- ▶ MSc Biotechnology
- ▶ MSc Biotechnology & Business
- ▶ MSc Biotherapeutics
- ▶ MSc Biotherapeutics & Business

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in Neuroscience or in areas as diverse as biotechnology, cell biology, biomedical and health science.

Industry

- ▶ Biotechnology companies
- ▶ Hospital laboratories
- ▶ Forensic Science laboratories
- ▶ Pharmaceutical companies

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Veterinary Medicine
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management

“



I discovered that I was fascinated by the brain and nervous system, so I chose Neuroscience as my final degree subject. My course offers a combination of practical and theoretical studies, ranging from lectures on the ground-breaking research taking place in neurodegenerative disease, to monitoring my own brain waves via an electroencephalogram in the lab.

Katie O'Byrne, Student ”

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

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Professor Michael Scott
UCD School of Biomolecular and Biomedical Science

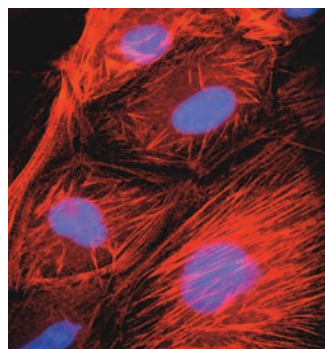
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www.ucd.ie/myucd/neuroscience

Pharmacology

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)



The process of cell changes called EMT (epithelial mesenchymal transdifferentiation) that occur when kidney epithelial cells are treated with drugs. Image by Tara McMorow and Eric Campbell © UCD

- Study how drugs work at a molecular level, what the body does to drugs and the effects of drugs on the different body systems
- Understand the actions of drugs used in the cardiovascular, respiratory, renal, endocrine and central nervous systems

“ My keen interest in biomedical science and healthcare led me to choose



Pharmacology at UCD. I acquired a strong scientific background during my degree, which facilitated a smooth transition into my postgraduate studies in my MSc Biotechnology & Business (UCD). I obtained an internship in a life science venture capital firm upon graduating from my MSc and was subsequently made permanent.

Jennifer McKeever, Graduate

”

Sample pathway for a degree in Pharmacology *

YEAR 1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- ▶ Biology in Action
- ▶ Life on Earth
- ▶ Cell Biology & Genetics
- ▶ Biomedical Sciences

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR 2

CHOOSE YOUR SUBJECTS

PHARMACOLOGY

Topics include:

- ▶ Chemistry for Biologists
- ▶ Molecular Genetics and Biotechnology
- ▶ Metabolic and Immune Systems
- ▶ Biomolecular Laboratory Skills
- ▶ Pharmacology: Biomedical Science of Drugs

PHYSIOLOGY

Topics include:

- ▶ Introduction to Physiology
- ▶ Organs and Systems Physiology

MICROBIOLOGY

Topics include:

- ▶ Principles of Microbiology: Medicine, Environment and Biotechnology

- ▶ Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

PHARMACOLOGY – Topics include:

- ▶ Cell Signalling
- ▶ Biostatistics
- ▶ Drug action in body systems
- ▶ Chemotherapeutic agents

- ▶ Drugs used in CNS diseases
- ▶ Advanced CNS Pharmacology
- ▶ Toxicology
- ▶ Molecular Pharmacology

- ▶ Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

PHARMACOLOGY – Topics include:

- ▶ Advanced Neuropharmacology
- ▶ Adv. Cardiovascular Pharmacology
- ▶ Finding new Pharmaceuticals

- ▶ Adv. Pharmacology of Cancer
- ▶ Emerging Therapies
- ▶ Advanced Renal Pharmacology
- ▶ Gene Regulation

- ▶ Drug Discovery & Development
- ▶ Pharmacology Research Project

BSc (Honours) Pharmacology

MSc (Taught)

- ▶ MSc Biotechnology
- ▶ MSc Biotechnology & Business
- ▶ MSc Biotherapeutics
- ▶ MSc Toxicology & Regulatory Affairs

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as drug development and biomedical science

Industry

- ▶ Pharmaceutical Companies
- ▶ Drug regulatory bodies such as the Irish Medicines Board
- ▶ Biotechnology sector
- ▶ Chemical safety and toxicology

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Veterinary Medicine
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



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Physiology

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for a degree in Physiology *

YEAR
1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- ▶ Biology in Action
- ▶ Diversity of Life
- ▶ Cell Biology & Genetics
- ▶ Biomedical Sciences

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ Two Elective modules
- ▶ One Small-Group Project



Physiology students working on an experiment in the Conway Institute. Image by Niall Hayes © UCD

YEAR
2

CHOOSE YOUR SUBJECTS

PHYSIOLOGY

Topics include:

- ▶ Chemistry for Biologists
- ▶ Molecular Genetics and Biotechnology
- ▶ Biomolecular Laboratory Skills
- ▶ Introduction to Physiology
- ▶ Organs and Systems Physiology
- ▶ Metabolic and Immune systems
- ▶ Neurophysiology

NEUROSCIENCE

Topics include:

- ▶ Principles of Neuroscience

MICROBIOLOGY

Topics include:

- ▶ Principles of Microbiology: Medicine, Environment and Biotechnology

- ▶ Two Elective modules

- Understand normal and abnormal processes within the body in health and disease
- Explore various body organs and their functions as well as an understanding of the structure and function of key biomolecules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

PHYSIOLOGY – Topics include:

- ▶ Cardiovascular System
- ▶ Biostatistics
- ▶ Experimental Physiology
- ▶ Endocrine/Reproductive Physiology

- ▶ Digestion, Absorption and Excretion
- ▶ Membrane Biology
- ▶ Higher Cortical Function
- ▶ Respiratory Physiology

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

PHYSIOLOGY – Topics include:

- ▶ Lung Function Under Stress
- ▶ Control of Vascular Resistance
- ▶ Physiology Research Project

- ▶ Physiological Basis of Disease
- ▶ Haemostasis and Thrombosis
- ▶ Adaptation to Hypoxia

- ▶ Integrated Animal Physiology

BSc (Honours) Physiology

MSc

- ▶ Students can pursue a Taught Masters or Research Masters in universities in Ireland or abroad in any physiological discipline or a diverse range of medical or other biological areas

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in any physiological discipline or a diverse range of medical or other biological areas

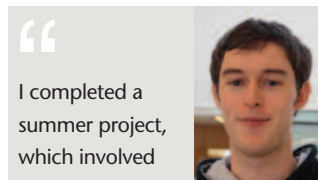
Industry

- ▶ Pharmaceutical Research (Laboratory)
- ▶ Clinical Research Associate
- ▶ Pharmaceutical Industry Sales

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Entry Veterinary Medicine
- ▶ Graduate Entry Medicine
- ▶ Graduate Entry Physiotherapy

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



I completed a summer project, which involved learning essential lab skills and gaining experience in a laboratory setting by looking for a new experimental technique to identify changes to lung structure in an animal model of lung disease. The biggest benefit of completing the summer project was gaining essential lab experience, which has now developed my enthusiasm for research.

Stephen Murphy, Student

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www.ucd.ie/myucd/physiology

Plant Biology

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)



Experiment on maize in the Programme for Experimental Atmospheres and Climate (PÉAC) lab at UCD.
Image by Peter Lang © UCD

- Understand how plants are a vital component of the biosphere and are responsible for the environmental conditions essential for all life on Earth
- Develop skills to study how plants and plant cells grow and develop

“

My UCD degree has provided me with the opportunity to work abroad and it has also allowed me to travel all over Europe and even to China as part of my current research.

Padraic Flood, Graduate

”

Sample pathway for a degree in Plant Biology *

YEAR 1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- ▶ Biology in Action
- ▶ Life on Earth
- ▶ Cell Biology & Genetics
- ▶ Biomedical Sciences

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR 2

CHOOSE YOUR SUBJECTS

PLANT BIOLOGY

Topics include:

- ▶ Chemistry for Biologists
- ▶ Biological Systems
- ▶ Principles of Plant Biology and Biotechnology
- ▶ Applied Plant Biology
- ▶ Principles of Cell and Molecular Biology

ENVIRONMENTAL BIOLOGY

Topics include:

- ▶ Principles of Environmental Biology and Ecology

ZOOLOGY

Topics include:

- ▶ Principles of Zoology
- ▶ Animal Behaviour
- ▶ Molecular Genetics and Biotechnology

- ▶ Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

PLANT BIOLOGY – Topics include:

- ▶ Plant Diseases
- ▶ Plant Form & Function
- ▶ Plant Biotechnology
- ▶ Plant Growth & Nutrients

- ▶ Plant Cell Growth & Signalling
- ▶ Working with Biological Data
- ▶ Genetics
- ▶ Systems Ecology

- ▶ Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

PLANT BIOLOGY – Topics include:

- ▶ Plant Atmosphere Climate Interactions
- ▶ Peatlands and Env. Changes
- ▶ Plant Biology Research Project

- ▶ Environmental Impact Assessments
- ▶ Developmental Plant Genetics
- ▶ Cell Signalling in Plants

- ▶ Plants and Stress
- ▶ Different Photosynthetic Pathways

BSc (Honours) Plant Biology

MSc (Taught)

- ▶ MSc Applied Environmental Science
- ▶ MSc World Heritage Management
- ▶ MSc Plant Biology & Biotechnology

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as climate change, marine biology or cell and molecular biology.

Industry

- ▶ National Parks and Wildlife Services
- ▶ State and Semi-State bodies
- ▶ Conservation Bodies
- ▶ Agriculture and Aquaculture
- ▶ Environmental Management

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management
- ▶ Graduate Veterinary Medicine

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



www.ucd.ie/myucd/plantbiology

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Zoology

CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for a degree in Zoology *

YEAR
1

ENGAGE WITH THE PRINCIPLES

BIOLOGY

Topics include:

- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences

CHEMISTRY

Topics include:

- The Basis of Organic and Biological Chemistry

MATHEMATICS

Topics include:

- Mathematics for the Biological & Chemical Sciences

- Two Elective modules
- One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

ZOOLOGY

Topics include:

- Principles of Zoology
- Biological Systems
- Animal Behaviour
- Molecular Genetics and Biotechnology
- Chemistry for Biologists

ENVIRONMENTAL BIOLOGY

Topics include:

- Principles of Environmental Biology and Ecology

GENETICS

Topics include:

- Principles of Genetics
- Metabolic and Immune Systems
- Biomolecular Laboratory Skills

- Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

ZOOLOGY – Topics include:

- Systems Ecology
- Working with Biological Data
- Diversity of Vertebrates
- Evolutionary Biology

- Functional Morphology
- Arthropoda
- Diversity of Invertebrates
- Field courses in Ireland and Spain

- Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

ZOOLOGY – Topics include:

- Biological Invasions
- Zoology Research Project

- Marine Community Ecology
- Bioassessment of Freshwaters
- Biodiversity

- Molecular Phylogenetics and Evolution
- Physiology of epithelial transport

BSc (Honours) Zoology

MSc (Taught)

- MSc Applied Environmental Science
- MSc World Heritage Management
- MSc Plant Biology & Biotechnology

PhD

- Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as evolution and population biology and cell and molecular biology

Industry

- National Parks and Wildlife Services
- Semi-State bodies such as the ESB, BIM and Salmon Research Trust
- Conservation Bodies
- Agriculture and Aquaculture
- Environmental Management

Conversion Courses

- Professional Master of Education (PME)
- Graduate Veterinary Medicine
- Graduate Medicine
- Master of Business Administration
- Master in Management



An image taken on a field trip with students from the School of Biology & Environmental Science.

Image by Dr Jon Yearsley © UCD

- Learn about animals from the level of individual molecules to how animals interact with one another and their environment
- Develop key practical skills in field work, behavioural observation, species identification, genetic analysis, physiology and anatomy

“

The field trip to Southern Spain involved exploration of terrestrial and marine sites. The most exciting part of the trip, for me, was encountering so many animals I had never come across in Ireland. I really appreciated being able to get some hands-on, in-field experience, while at the same time getting to know both my classmates and my lecturers that bit better.

Irene Sullivan, Graduate

”

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

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zoology

Biology, Mathematics & Education

CAO code: DN200 Option: Biological, Biomedical & Biomolecular Science (BBB)



Students attending an Education module class.

“ I have always had an interest in mathematics and a curiosity for the world around us. The DN200 Science course therefore really appealed to me as it allowed me to explore a diverse range of modules in first and second year before deciding on a degree path. I chose to specialise in Biology and Mathematics Education as I am passionate about teaching and love the idea of studying science and education in an integrated manner. I also enjoy getting involved around campus and have made some amazing friends through volunteering with the Science Society and the Maths Sparks programme. In fact, the wide range of opportunities, amazing facilities and level of engagement and support from the academic staff make coming to UCD the best decision I ever made.



Emily Lewanowski-Breen,
Student

Sample pathway to become a Biology and Mathematics teacher *

YEAR
1

ENGAGE WITH THE PRINCIPLES

EDUCATION

Topics include:

- ▶ Introduction to Mathematics Pedagogy

BIOLOGY

Topics include:

- ▶ Biology in Action
- ▶ Life on Earth
- ▶ Cell Biology and Genetics

MATHEMATICS

Topics include:

- ▶ Linear Algebra
- ▶ Calculus
- ▶ Statistical Modelling

SCIENCE

- ▶ Chemistry
- ▶ Physics

- ▶ One Small-Group Project
- ▶ Elective Modules

YEAR
2

CHOOSE YOUR SUBJECTS

EDUCATION

Topics include:

- ▶ Education Issues and Ideas
- ▶ Science and Mathematics Pedagogy

BIOLOGY

Topics include:

- ▶ Principles of Plant Biology and Biotechnology
- ▶ Principles of Environmental Biology and Ecology
- ▶ Laboratory Skills
- ▶ Molecular Genetics and Biotechnology

MATHEMATICS

Topics include:

- ▶ Calculus of Several Variables
- ▶ Mathematical Modelling
- ▶ Analysis

- ▶ Elective Modules

YEAR
3

REFINE YOUR KNOWLEDGE

EDUCATION

Topics include:

- ▶ Collaborative Pedagogy in Mathematics Education
- ▶ Schools and Society

SCHOOL PLACEMENT

- ▶ Post-Primary Placement
- ▶ Peer-Assisted Tutoring
- ▶ Small Group Tutoring

BIOLOGY

Topics include:

- ▶ Systems Ecology
- ▶ Functional Morphology
- ▶ Regulation of Gene Expression
- ▶ Microbiology
- ▶ Ecology
- ▶ Environmental Microbiology

MATHEMATICS

Topics include:

- ▶ Algebraic Structures
- ▶ Probability Theory

YEAR
4

PREPARE FOR PROFESSIONAL PRACTICE

EDUCATION

Topics include:

- ▶ Pedagogical Approaches to Mathematics and Science
- ▶ Psychology for Teaching and Learning

SCHOOL PLACEMENT

- ▶ Year-Long Placement in Post-Primary School
- ▶ Classroom Teaching
- ▶ Broad Experience of Wider School Context

MATHEMATICS

Topics include:

- ▶ Differential Equations with Computer Algebra
- ▶ Geometry
- ▶ Complex Analysis
- ▶ History of Mathematics

BSc Biology, Mathematics & Education

YEAR
5

PREPARE FOR PROFESSIONAL PRACTICE

EDUCATION

Topics include:

- ▶ Research Methods
- ▶ Professional Dissertation

SCHOOL PLACEMENT

- ▶ Year-Long Placement in Post-Primary School
- ▶ Experience Both Teaching and Non-Teaching Activities
- ▶ Further Development of Professional Practice Portfolio

MSc Mathematics and Science Education

Post-Primary
School
Teacher

QUALIFIED TO TEACH

Biology
Leaving Certificate

Mathematics
Leaving Certificate

Science
Junior Certificate

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



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Chemistry

CAO code: DN200 Option: Chemistry & Chemical Sciences (CCS)

Sample pathway for a degree in Chemistry *

YEAR
1

ENGAGE WITH THE PRINCIPLES

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry
- ▶ The Basis of Physical Chemistry
- ▶ The Molecular World

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ One Small-Group Project

- ▶ Two Elective modules

YEAR
2

CHOOSE YOUR SUBJECTS

CHEMISTRY

Topics include:

- ▶ The Basis of Inorganic Chemistry
- ▶ Organic Chemistry
- ▶ Physical Chemistry
- ▶ Inorganic Chemistry

MEDICINAL CHEMISTRY & CHEMICAL BIOLOGY

Topics include:

- ▶ Molecular Genetics and Biotechnology
- ▶ Principles of Biochemistry
- ▶ Medicinal Chemistry & Chemical Biology
- ▶ Pharmacology: Biomedical Science of Drugs
- ▶ Biomolecular Laboratory Skills

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

CHEMISTRY – Topics include:

- ▶ Quantum Mechanics
- ▶ Carbonyl Chemistry & Synthesis
- ▶ Chemical Kinetics
- ▶ Mechanism & Stereochemistry

- ▶ Instrumental Analysis
- ▶ Organometallic & Solid State Chemistry
- ▶ Main Group Chemistry & Bonding
- ▶ Symmetry & Computational Chemistry

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

CHEMISTRY – Topics include:

- ▶ Methods in Organic Synthesis
- ▶ Chemical Thermodynamics
- ▶ Research Project

- ▶ Electrochemistry
- ▶ Reactivity & Change
- ▶ Nanochemistry

- ▶ Advanced Inorganic Chemistry
- ▶ Methods in Organic Synthesis 2
- ▶ Modern Methods and Catalysis

BSc (Honours) Chemistry

PhD

Students can pursue a PhD in Ireland or abroad in areas as diverse as:

- ▶ Pharmaceutical design
- ▶ Atmospheric kinetics
- ▶ Biological aspects of nanoscience
- ▶ Energy generation
- ▶ Pollution control
- ▶ Novel material synthesis
- ▶ Polymer chemistry
- ▶ Materials analysis bio-inorganic chemistry
- ▶ Computational studies

Industry

Most graduates work in the pharmaceutical or chemical industries. Positions range from manufacturing chemists to quality control/analysis/assurance, research and development and raw materials/product analysis in manufacturing.

- ▶ 2nd level or 3rd level Teaching
- ▶ State Labs such as the Forensic laboratory
- ▶ ESB and Bord Gáis
- ▶ Environmental Protection Agency
- ▶ Medical device industry
- ▶ Patent law
- ▶ Healthcare industry

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



Preparing an experiment in Chemistry.

- Understand the important role chemistry plays in controlling the conversion of matter into useful substances such as new materials, sensors and medicines
- Develop skills in modern synthesis and analysis techniques used in the pharmaceutical and chemistry industries

“

Having an internationally renowned university on my CV certainly helped me to get a job in a Biotech company in London. UCD is well recognised in the UK and this has led to my role at the cutting edge of anti-cancer research developing and synthesising new drug molecules which have huge potential to be used in the clinic.

Dr Elizabeth Dunny,
Graduate

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Associate Professor Mike Casey
UCD School of Chemistry

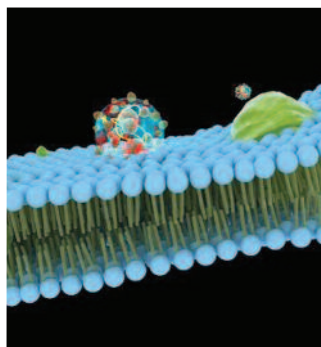
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chemistry

Chemistry with Biophysical Chemistry

CAO code: DN200 Option: Chemistry & Chemical Sciences (CCS)



A nanoparticle with encapsulated active ingredient is penetrating a cell membrane. Image and copyright of Nanobotmodels Company (info@nanobotmodels.com).

- Develop theoretical and practical skills in exploiting the physical and chemical principles of the biomolecular world in modern industrial and biomedical applications

“

In the summer after third year, I did a summer internship in Associate Professor Vitaly Buckin's lab in UCD which I found really interesting as well as very helpful in preparing me for the final year research project. This, as well as my thesis research in my final year, led me to realise that I'd like to pursue further research in a PhD which is what I hope to continue into in the coming year.

Rian Lynch, Student

”

Sample pathway for a degree in Chemistry with Biophysical Chemistry*

YEAR
1

ENGAGE WITH THE PRINCIPLES

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry
- ▶ The Basis of Physical Chemistry
- ▶ The Molecular World

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

BIOLOGY

Topics include:

- ▶ Cell Biology & Genetics

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

CHEMISTRY WITH BIOPHYSICAL CHEMISTRY

Topics include:

- ▶ Biophysical Chemistry
- ▶ Physical Chemistry
- ▶ Inorganic Chemistry
- ▶ Organic Chemistry

CHEMISTRY

Topics include:

- ▶ Students who choose Chemistry with Biophysical Chemistry as their main subject for second year also cover the requirements for Chemistry.

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

CHEMISTRY WITH BIOPHYSICAL CHEMISTRY – Topics include:

- ▶ Instrumental Analysis
- ▶ Carbonyl Chemistry & Synthesis
- ▶ Quantum Mechanics
- ▶ Mechanism & Stereochemistry
- ▶ Nano-Assemblies and Interfaces

- ▶ Organometallic & Solid State Chemistry
- ▶ Main Group Chemistry & Bonding
- ▶ Symmetry & Computational Chemistry
- ▶ Optional modules in Biomolecular, Organic and Inorganic Chemistry

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

CHEMISTRY WITH BIOPHYSICAL CHEMISTRY – Topics include:

- ▶ Research Project in Biophysical Chemistry
- ▶ Metals in Biology
- ▶ Electrochemistry

- ▶ Biophysical Chemistry
- ▶ Advanced Kinetics and Thermodynamics
- ▶ Nanochemistry

- ▶ Optional modules in Biomolecular, Organic and Inorganic Chemistry

BSc (Honours) Chemistry with Biophysical Chemistry

PhD

- Students can pursue a PhD in Ireland or abroad in areas as diverse as:
- ▶ Pharmaceutical and biomedical biomolecular formulations design
 - ▶ Bio-processing and bio-engineering
 - ▶ Bio-nanotechnology
 - ▶ Forensic science
 - ▶ Food and agro technologies
 - ▶ Energy generation
 - ▶ Novel materials and materials analysis
 - ▶ Polymer chemistry

Industry

- ▶ Pharmaceutical, Biomedical, Medical Device Industry
- ▶ Biotechnology, Food Technology, Agrochemistry
- ▶ Fine Chemical, Chemical Development
- ▶ Personal Care, Cosmetics, Environmental Protection, Paints and Coatings/ Petrochemistry
- ▶ Patenting
- ▶ Science-based Sales, Marketing, Finance

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Veterinary Medicine
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



www.ucd.ie/myucd/biophysicalchemistry

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Chemistry with Environmental & Sustainable Chemistry

CAO code: DN200 Option: Chemistry & Chemical Sciences (CCS)

Sample pathway for a degree in Chemistry with Environmental & Sustainable Chemistry *

YEAR
1

ENGAGE WITH THE PRINCIPLES

CHEMISTRY Topics include:

- ▶ The Basis of Organic and Biological Chemistry
- ▶ The Basis of Physical Chemistry
- ▶ The Molecular World

MATHEMATICS Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

- ▶ One Small-Group Project

- ▶ Two Elective modules

YEAR
2

CHOOSE YOUR SUBJECTS

CHEMISTRY WITH ENVIRONMENTAL & SUSTAINABLE CHEMISTRY Topics include:

- ▶ Environmental and Sustainable Chemistry
- ▶ Inorganic Chemistry
- ▶ Physical Chemistry
- ▶ Environmental Geochemistry

CHEMISTRY Topics include:

- ▶ The Basis of Inorganic Chemistry
- ▶ Organic Chemistry
- ▶ Chemical Biology
- ▶ Biophysical Chemistry

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

CHEMISTRY WITH ENVIRONMENTAL & SUSTAINABLE CHEMISTRY – Topics include:

- ▶ Quantum Mechanics
- ▶ Carbonyl Chemistry & Synthesis
- ▶ Self-Assembly of Biomolecules
- ▶ Mechanism & Stereochemistry

- ▶ Instrumental Analysis
- ▶ Organometallic & Solid State Chemistry
- ▶ Main Group Chemistry & Bonding
- ▶ Symmetry & Computational Chemistry

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

CHEMISTRY WITH ENVIRONMENTAL & SUSTAINABLE CHEMISTRY – Topics include:

- ▶ Green and Sustainable Chemistry
- ▶ Research Project in Sus./Env. Chem
- ▶ Methods in Organic Synthesis

- ▶ Chemical Thermodynamics
- ▶ Nanochemistry
- ▶ Electrochemistry
- ▶ Reactivity & Change
- ▶ Modern Methods and Catalysis

- ▶ Advanced Inorganic Chemistry
- ▶ Methods in Organic Synthesis 2
- ▶ Industrial Internship

BSc (Honours) Chemistry with Environmental & Sustainable Chemistry

Apart from the positions that a chemistry degree would qualify a student for (see below), graduates in this degree would be uniquely qualified to work in fields related to Environmental Protection (e.g., the Environmental Protection Agency), Green Chemistry and Sustainable Energy generation.

PhD

Students can pursue a PhD in Ireland or abroad in areas as diverse as:

- ▶ Pharmaceutical design
- ▶ Atmospheric kinetics
- ▶ Biological aspects of nanoscience
- ▶ Energy generation
- ▶ Pollution control
- ▶ Novel material synthesis
- ▶ Polymer chemistry
- ▶ Materials analysis bio-inorganic chemistry
- ▶ Computational studies

Industry

Most graduates work in the pharmaceutical or chemical industries. Positions range from manufacturing chemists to quality control/analysis/assurance, research and development and raw materials/product analysis in manufacturing.

- ▶ 2nd level or 3rd level Teaching
- ▶ State Labs such as the Forensic laboratory
- ▶ ESB and Bord Gáis
- ▶ Medical device industry
- ▶ Patent law
- ▶ Healthcare industry

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



- Learn the basis of 'Green Chemistry' and what happens, at a molecular level, when chemicals interact with the environment
- Discover techniques to produce energy and commodity chemicals sustainably



Currently my research spans

Environmental Chemistry, where we study catalysts to remove pollutants from car exhausts, Green Chemistry, where we improve processes used in polymer production, and Chemistry in Sustainable Energy generation, which focuses on materials for solar hydrogen production and storage and synthesis of biofuel.

Associate Professor
James Sullivan, Staff



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[www.ucd.ie/myucd/
environmentalandsustainablechemistry](http://www.ucd.ie/myucd/environmentalandsustainablechemistry)

Medicinal Chemistry & Chemical Biology

CAO code: DN200 Option: Chemistry & Chemical Sciences (CCS)



UV determination of enzyme kinetics is a key step in the design of industrially relevant biocatalysts.

- Learn how to apply the tools of Chemistry to study biological systems
- Develop experience in techniques and instrumentation used in the pharmaceutical industry, e.g., the synthesis, identification and analysis of chemicals



“ I enjoyed practical lab work, drug development, organic chemistry and aspects of pharmacology that I probably would not have realised if I had chosen a specialisation straight out of school. I hope to do a masters in organic chemistry or instrumental analysis when I graduate.

Tricia Madden, Student

”

Sample pathway for a degree in Medicinal Chemistry & Chemical Biology *

YEAR 1

ENGAGE WITH THE PRINCIPLES

CHEMISTRY

Topics include:

- ▶ The Basis of Organic and Biological Chemistry
- ▶ The Basis of Physical Chemistry
- ▶ The Basic of Inorganic Chemistry
- ▶ The Molecular World

MATHEMATICS

Topics include:

- ▶ Mathematics for the Biological & Chemical Sciences

BIOLOGY

Topics include:

- ▶ Cell Biology & Genetics

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR 2

CHOOSE YOUR SUBJECTS

MEDICINAL CHEMISTRY & CHEMICAL BIOLOGY

Topics include:

- ▶ Molecular Genetics and Biotechnology
- ▶ Principles of Biochemistry
- ▶ Medicinal Chemistry & Chemical Biology
- ▶ Pharmacology: Biomedical Science of Drugs

- ▶ Biomolecular Laboratory Skills
- ▶ Organic Chemistry
- ▶ Physical Chemistry
- ▶ Inorganic Chemistry

CHEMISTRY

Topics include:

- ▶ Students who choose Medicinal Chemistry & Chemical Biology as their main subject for second year also cover the requirements for Chemistry.

- ▶ Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

MEDICINAL CHEMISTRY & CHEMICAL BIOLOGY – Topics include:

- ▶ Chemical Biology of Natural Products
- ▶ Chemical Biology of Macromolecules
- ▶ Carbonyl Chemistry & Synthesis
- ▶ Medicinal Chemistry

- ▶ Structure Determination & Heterocyclic Chemistry
- ▶ Microbial Cell Factory/Chemists
- ▶ Mechanism & Stereochemistry
- ▶ Biochemist's Toolkit

- ▶ Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

MEDICINAL CHEMISTRY & CHEMICAL BIOLOGY – Topics include:

- ▶ Metals in Biology
- ▶ Methods in Organic Synthesis

- ▶ Modern Methods of Catalysis
- ▶ Research Project

- ▶ Special topics in Medicinal Chemistry and Chemical Biology

BSc (Honours) Medicinal Chemistry & Chemical Biology

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as Chemistry, Chemical Biology, Medicinal Chemistry, and Biochemistry

Industry

- ▶ Pharmaceuticals and Biopharmaceuticals
- ▶ Cosmetics Food Technology
- ▶ Fine Chemicals
- ▶ Chemical Development
- ▶ Patenting
- ▶ Science-based Sales, Marketing, Finance

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Graduate Veterinary Medicine
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



www.ucd.ie/myucd/medicinalchemistryandchemicalbiology

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Chemistry, Mathematics & Education

CAO code: DN200 Option: Chemistry & Chemical Sciences (CCS)

Sample pathway to become a Chemistry and Mathematics teacher *

YEAR
1

ENGAGE WITH THE PRINCIPLES

EDUCATION

Topics include:

- ▶ Introduction to Mathematics Pedagogy

CHEMISTRY

Topics include:

- ▶ Introductory Chemistry
- ▶ Organic Chemistry and Chemical Biology

MATHEMATICS

Topics include:

- ▶ Linear Algebra
- ▶ Calculus
- ▶ Statistical Modelling

SCIENCE

- ▶ Biology
- ▶ Physics

- ▶ One Small-Group Project
- ▶ Elective Modules

YEAR
2

CHOOSE YOUR SUBJECTS

EDUCATION

Topics include:

- ▶ Education Issues and Ideas
- ▶ Science and Mathematics Pedagogy

CHEMISTRY

Topics include:

- ▶ Physical Chemistry
- ▶ Organic Chemistry
- ▶ Inorganic Chemistry

MATHEMATICS

Topics include:

- ▶ Calculus of Several Variables
- ▶ Mathematical Modelling
- ▶ Analysis

- ▶ Elective Modules

YEAR
3

REFINE YOUR KNOWLEDGE

EDUCATION

Topics include:

- ▶ Collaborative Pedagogy in Mathematics Education
- ▶ Schools and Society

SCHOOL PLACEMENT

- ▶ Post-Primary Placement
- ▶ Peer-Assisted Tutoring
- ▶ Small Group Teaching

CHEMISTRY

Topics include:

- ▶ Instrumental Analysis
- ▶ Mechanism and Stereochemistry
- ▶ Main Group Chemistry and Bonding
- ▶ Chemical Thermodynamics
- ▶ Carbonyl Chemistry and Synthesis
- ▶ Organometallic and Solid State Chemistry

MATHEMATICS

Topics include:

- ▶ Algebraic Structures
- ▶ Probability Theory
- ▶ Geometry

YEAR
4

PREPARE FOR PROFESSIONAL PRACTICE

EDUCATION

Topics include:

- ▶ Pedagogical Approaches to Mathematics and Science
- ▶ Psychology for Teaching and Learning

SCHOOL PLACEMENT

- ▶ Year-Long Placement in Post-Primary School
- ▶ Classroom Teaching
- ▶ Broad Experience of Wider School Context

MATHEMATICS

Topics include:

- ▶ Differential Equations with Computer Algebra
- ▶ Geometry
- ▶ Complex Analysis
- ▶ History of Mathematics

BSc Chemistry, Mathematics & Education

YEAR
5

PREPARE FOR PROFESSIONAL PRACTICE

EDUCATION

Topics include:

- ▶ Research Methods
- ▶ Professional Dissertation

SCHOOL PLACEMENT

- ▶ Year-Long Placement in Post-Primary School
- ▶ Experience Both Teaching and Non-Teaching Activities
- ▶ Further Development of Professional Practice Portfolio

MSc Mathematics and Science Education

Post-Primary
School
Teacher

QUALIFIED TO TEACH

Chemistry
Leaving Certificate

Mathematics
Leaving Certificate

Science
Junior Certificate



Group work in an active learning environment classroom

“



This degree offers you the opportunity to explore and experience the two worlds of science and education in an integrated manner without compromising one for the other.

Associate Professor Maria Meehan, Staff

”

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

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www.ucd.ie/myucd/
chemmathed

Applied & Computational Mathematics

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)



- Discover how Applied and Computational Mathematics is fundamental in providing uniquely powerful ways to describe, analyse and advance the physical and life sciences, engineering, technology, business and finance

“

Applied and Computational Mathematics gave the perfect balance between physical problems, maths problems and programming. You also learn how to apply these methods to real life physical systems. As well as being interesting, one of the great things about studying a subject that you like so much is that you get to meet a lot of other people who share your passion for the subject.



Shane Walsh, Student ”

Sample pathway for a degree in Applied & Computational Mathematics *

YEAR 1

ENGAGE WITH THE PRINCIPLES

APPLIED & COMPUTATIONAL MATHEMATICS

Topics include:

- Applied Mathematics: Mechanics and Methods
- Applications of Differential Equations

MATHEMATICS

Topics include:

- Calculus in the Mathematical and Physical Sciences
- Mathematical Analysis
- Linear Algebra in the Mathematical and Physical Sciences
- Mathematical Modelling in the Sciences
- Introduction to Statistical Modelling
- Two Elective modules
- One Small-Group Project

YEAR 2

CHOOSE YOUR SUBJECTS

APPLIED & COMPUTATIONAL MATHEMATICS

Topics include:

- Computational Science
- Vector Integral and Differential Calculus
- Oscillations in Mechanical Systems
- Classical Mechanics and Special Relativity

MATHEMATICS

Topics include:

- Linear Algebra 2
- Groups, Rings & Fields
- Calculus of Several Variables
- Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

APPLIED & COMPUTATIONAL MATHEMATICS – Topics include:

- Analytic Mechanics
- Dynamical Systems
- Functions of One Complex Variable
- Partial Differential Equations
- Advanced Mathematical Methods
- Foundations of Fluid Mechanics
- Foundations of Quantum Mechanics
- Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

APPLIED & COMPUTATIONAL MATHEMATICS – Topics include:

- Differential Geometry
- General Relativity and Cosmology
- Numerical Algorithms
- Electrodynamics and Gauge Theory
- Environmental Fluid Mechanics
- Research Project
- Stochastic Methods
- Functional Analysis

BSc (Honours) Applied & Computational Mathematics

MSc (Taught)

- MSc Mathematical Science
- MSc Climate Change & Impact
- MSc Applied Mathematics & Theoretical Physics
- MSc Computational Physics
- MSc Data & Computational Science

PhD

Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as:

- Meteorology and Climate
- Mathematical Biology
- Fluid Mechanics
- Integrable Systems
- General Relativity
- Computational Science

Industry

A wide variety of career opportunities are open with new application areas discovered constantly. Technology areas include:

- Data Analytics
- Finance
- Energy
- Environment
- Communication
- Computing

Conversion Courses

- Professional Master of Education (PME)
- Graduate Engineering
- Masters in Management

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



www.ucd.ie/myucd/appliedandcomputationalmathematics

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Financial Mathematics

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for a degree in Financial Mathematics *

YEAR
1

ENGAGE WITH THE PRINCIPLES

MATHEMATICS

Topics include:

- ▶ Calculus in the Mathematical and Physical Sciences
- ▶ Linear Algebra in the Mathematical and Physical Sciences
- ▶ Numbers and Functions
- ▶ Mathematical Analysis

STATISTICS

Topics include:

- ▶ Statistical Modelling

APPLIED & COMPUTATIONAL MATHEMATICS

Topics include:

- ▶ Applications of Differential Equations

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

FINANCIAL MATHEMATICS

Topics include:

- ▶ Foundations of Financial Mathematics
- ▶ Business Economics
- ▶ Calculus of Several Variables
- ▶ Linear Algebra
- ▶ Theory of Games
- ▶ Principles of Finance

STATISTICS

Topics include:

- ▶ Inferential Statistics
- ▶ Probability Theory

APPLIED AND COMPUTATIONAL MATHEMATICS

Topics include:

- ▶ Computational Science
- ▶ Vector Integral & Differential Equations

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

FINANCIAL MATHEMATICS – Topics include:

- ▶ Fundamentals of Actuarial and Financial Mathematics
- ▶ Computational Finance
- ▶ Partial Differential Equations
- ▶ Metric Spaces
- ▶ Measure Theory and Integration
- ▶ Time Series
- ▶ Stochastic Models
- ▶ Advanced Corporate Finance
- ▶ Linear Models
- ▶ Dynamical Systems

YEAR
4

REFINE YOUR KNOWLEDGE

FINANCIAL MATHEMATICS – Topics include:

- ▶ Actuarial Reporting
- ▶ Statistical Data Mining
- ▶ Quantitative Methods
- ▶ Bayesian Analysis
- ▶ Advanced Computational Science
- ▶ Financial Economics
- ▶ Monte Carlo Inference
- ▶ Stochastic Analysis

BSc (Honours) Financial Mathematics

MSc (Taught)

- ▶ MSc Mathematics
- ▶ MSc Mathematical Science
- ▶ MSc Statistics
- ▶ MSc Actuarial Science
- ▶ MSc Business Analytics
- ▶ MSc Data Analytics
- ▶ MSc Quantitative Finance

PhD

- ▶ Graduates can pursue a PhD in algorithmic trading, or stochastic differential equations, for example.

Industry

- ▶ Quantitative positions in the financial sector
- ▶ Risk modelling in banking and insurance
- ▶ Computing in business, technology, research and academia
- ▶ Trainee Actuary

Conversion Courses

- ▶ Professional Master in Education (PME)
- ▶ MSc Computer Science (conversion)



- Develop strong mathematical, problem-solving and analytical skills used in banking and finance
- Learn the mathematical theories that underpin financial models, as well as computational expertise in the algorithms that price financial products

“ The course provides a thorough preparation on the main topics of Mathematical



Finance. The contents of the various modules do not neglect any aspect of the wide range of skills required to work in today's financial sector, from the rigour required by the purest Mathematical Theories to the most important applications of Bayesian Statistics, Stochastic Analysis and Numerical Methods needed by practitioners in the Financial Industry. According to the 2016 QS World University Rankings by Subject, Mathematics, Statistics and Operational Research at UCD are ranked 1st in Ireland

Dr Adamaria Perrotta,
Staff

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

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www.ucd.ie/myucd/financialmathematics

Mathematics

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)



- Master the language and concepts of modern mathematical thinking
- Develop a high level of competence in its applications

“

Maths requires a lot of critical thinking and rigorous understanding, and the lecturers in UCD certainly encourage this. Lecturers here are very good at transmitting their enthusiasm for their subject to the students. What's really great about UCD is that the maths lecturers are approachable, and are both willing and keen to answer any questions you may have.

Caitríona Byrne, Student

”

Sample pathway for a degree in Mathematics *

YEAR 1

ENGAGE WITH THE PRINCIPLES

MATHEMATICS

Topics include:

- ▶ Calculus in the Mathematical and Physical Sciences
- ▶ Numbers & Functions
- ▶ Linear Algebra in the Mathematical and Physical Sciences
- ▶ Mathematical Analysis
- ▶ Introduction to Applications of Differential Equations
- ▶ Introduction to Statistical Modelling
- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR 2

CHOOSE YOUR SUBJECTS

MATHEMATICS

Topics include:

- ▶ Linear Algebra 2
- ▶ Calculus of Several Variables
- ▶ Groups, Rings & Fields

APPLIED & COMPUTATIONAL MATHEMATICS (OPTIONAL)

Topics include:

- ▶ Computational Science
- ▶ Vector Integral and Differential Calculus
- ▶ Oscillations and Waves
- ▶ Classical Mechanics and Special Relativity

STATISTICS (OPTIONAL)

Topics include:

- ▶ Probability Theory
- ▶ Stochastic Models
- ▶ Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

MATHEMATICS – Topics include:

- ▶ Galois Theory
- ▶ Functions of One Complex Variable
- ▶ Cryptography
- ▶ Number Theory
- ▶ Metric Spaces
- ▶ Algorithms
- ▶ Set Theory
- ▶ Mathematical Logic
- ▶ Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

MATHEMATICS – Topics include:

- ▶ Differential Geometry
- ▶ Combinatorics
- ▶ Numerical Analysis
- ▶ Measure Theory
- ▶ Ring Theory
- ▶ Functional Analysis

BSc (Honours) Mathematics

MSc (Taught)

- ▶ MSc Mathematical Science
- ▶ MSc Actuarial Science

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad

Industry

- ▶ Banking & Finance
- ▶ Mathematical Modelling
- ▶ Information and Communications Technology
- ▶ Actuarial Science

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ Masters in Actuarial Science
- ▶ MSc Business Analytics
- ▶ MSc Quantitative Finance

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



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Statistics

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for a degree in Statistics *

YEAR
1

ENGAGE WITH THE PRINCIPLES

STATISTICS

Topics include:

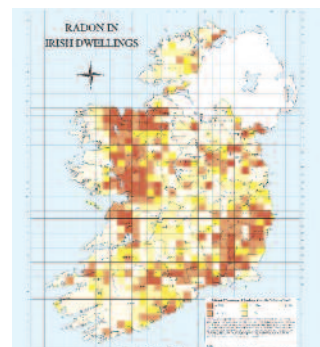
- Applications of Differential Equations
- Statistical Modelling
- Research Methods for Science

MATHEMATICS

Topics include:

- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences
- Mathematical Analysis
- Numbers & Functions

- Two Elective modules
- One Small-Group Project



A map of Ireland showing radon in Irish dwellings.

Map by the EPA's Office of Radiological Protection

YEAR
2

CHOOSE YOUR SUBJECTS

STATISTICS

Topics include:

- Probability Theory
- Inferential Statistics
- Linear Models

MATHEMATICS

Topics include:

- Calculus of Several Variables
- Computational Science

- Two Elective modules

- Learn how statistics is used in areas as diverse as biotechnology, finance, marketing, science, medicine and even psychology

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

STATISTICS – Topics include:

- Statistical Data Mining
- Survey Sampling
- Linear Algebra 2
- Data Structures & Algorithms

- Time Series
- Survival Models
- Bayesian Analysis
- Design of Experiments

- Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

STATISTICS – Topics include:

- Stochastic Models
- Multivariate Analysis
- Monte Carlo Inference

- Actuarial Statistics
- Applied Statistical Modelling
- Nonparametric Statistics

- Categorical Data Analysis
- Data Programming

BSc (Honours) Statistics

MSc (Taught)

- MSc Statistics
- MSc Actuarial Science
- MSc Meteorology

PhD

- Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as Bayesian Statistics, Pharmaceutical, Medical and Educational Statistics, Epidemiology, Econometrics, Environmental and ecological modelling

Industry

- Data Analytics and Business Analytics
- Data Science
- Pharmaceutical
- Actuarial Science
- Banking & Finance
- Insurance
- CSO

Conversion Courses

- Professional Master of Education (PME)
- Graduate Diploma in Actuarial Science
- MSc Quantitative Finance

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

“ The data analytics I have learned are currently some of the most highly sought after skills by employers, and can be applied to a broad range of areas including finance, insurance, marketing and pharmaceutical companies. If it wasn't for the flexibility of the UCD Science programme I would never have ventured into Statistics, and would have missed out on the chance to enter into the area of Mathematics I now love. **Melanie Dwayne, Student** ”



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statistics

Applied Mathematics, Mathematics & Education

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)

The Teaching Council
An Chomhairle Mhúinteoiríochta

APPROVED
DEGREE



Practical class and teaching mathematics

Sample pathway to become an Applied Mathematics and Mathematics teacher *

YEAR
1

ENGAGE WITH THE PRINCIPLES

EDUCATION

Topics include:

- ▶ Introduction to Mathematics Pedagogy

APPLIED MATHEMATICS

Topics include:

- ▶ Applied Mathematics: Mechanics and Methods
- ▶ Applications of Differential Equations

MATHEMATICS

Topics include:

- ▶ Linear Algebra
- ▶ Numbers and Functions
- ▶ Calculus
- ▶ Mathematical Analysis
- ▶ Statistical Modelling

- ▶ One Small-Group Project
- ▶ Elective Modules

YEAR
2

CHOOSE YOUR SUBJECTS

EDUCATION

Topics include:

- ▶ Education Issues and Ideas
- ▶ Science and Mathematics Pedagogy

APPLIED MATHEMATICS

Topics include:

- ▶ Computational Science
- ▶ Vector, Integral and Differential Calculus
- ▶ Oscillations in Mechanical Systems
- ▶ Classical Mechanics and Special Relativity

MATHEMATICS

Topics include:

- ▶ Calculus of Several Variables
- ▶ Groups, Rings and Fields
- ▶ Linear Algebra

- ▶ Elective Modules

YEAR
3

REFINE YOUR KNOWLEDGE

EDUCATION

Topics include:

- ▶ Collaborative Pedagogy in Mathematics Education
- ▶ Schools and Society

SCHOOL PLACEMENT

- ▶ Post-Primary Placement
- ▶ Peer-Assisted Tutoring
- ▶ Small Group Tutoring

APPLIED MATHEMATICS

Topics include:

- ▶ Analytical Mechanics
- ▶ Fluid Mechanics
- ▶ Partial Differential Equations

MATHEMATICS

Topics include:

- ▶ Probability Theory
- ▶ Financial Maths

YEAR
4

PREPARE FOR PROFESSIONAL PRACTICE

EDUCATION

Topics include:

- ▶ Pedagogical Approaches to Mathematics and Science
- ▶ Psychology for Teaching and Learning

SCHOOL PLACEMENT

- ▶ Year-Long Placement in Post-Primary School
- ▶ Classroom Teaching
- ▶ Broad Experience of Wider School Context

APPLIED MATHEMATICS AND MATHEMATICS

Topics include:

- ▶ Differential Equations with Computer Algebra
- ▶ Geometry
- ▶ Complex Analysis
- ▶ History of Mathematics

BSc Applied Mathematics, Mathematics & Education

YEAR
5

PREPARE FOR PROFESSIONAL PRACTICE

EDUCATION

Topics include:

- ▶ Research Methods
- ▶ Professional Dissertation

SCHOOL PLACEMENT

- ▶ Year-Long Placement in Post-Primary School
- ▶ Experience Both Teaching and Non-Teaching Activities
- ▶ Further Development of Professional Practice Portfolio

MSc Mathematics and Science Education

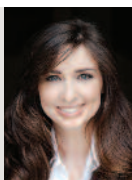
QUALIFIED TO TEACH

Post-Primary
School
Teacher

Applied Mathematics
Leaving Certificate

Mathematics
Leaving Certificate

“It is essential that there are more teachers of Mathematics and Science who are knowledgeable and passionate about their subjects. The Science and Mathematics Education pathways in DN200 will contribute to the next generation of well-qualified and innovative teachers.”



Dr Aoibhinn Ní Shúilleabháin, Staff

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Physics

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for a degree in Physics *

YEAR
1

ENGAGE WITH THE PRINCIPLES

PHYSICS

Topics include:

- ▶ Foundations of Physics
- ▶ Frontiers of Physics
- ▶ Thermal Physics and Materials
- ▶ Quanta, Particles and Relativity

MATHEMATICS

Topics include:

- ▶ Calculus in the Mathematical and Physical Sciences
- ▶ Linear Algebra in the Mathematical and Physical Sciences

APPLIED & COMPUTATIONAL MATHEMATICS

Topics include:

- ▶ Applied Mathematics: Mechanics and Methods

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

PHYSICS

Topics include:

- ▶ Electronics and Devices
- ▶ Introductory Quantum Mechanics
- ▶ Fields, Waves and Light
- ▶ Methods for Physicists

Physics students also study the following topics in Mathematics:

- ▶ Calculus of Several Variables
- ▶ Vector Integral & Differential Calculus
- ▶ Computational Science

PHYSICS WITH ASTRONOMY & SPACE SCIENCE

Topics include:

- Students who chose Physics as their main subject for second year may also cover the requirements for Physics with Astronomy and Space Science
- ▶ Astronomy & Space Science
 - ▶ Exploring the Solar System

- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

PHYSICS – Topics include:

- ▶ Classical Mechanics & Relativity
- ▶ Optics & Lasers
- ▶ Electromagnetism
- ▶ Advanced Laboratory

- ▶ Thermodynamics & Statistical Physics
- ▶ Nuclear Physics
- ▶ Quantum Mechanics
- ▶ Stellar Astrophysics & Astronomical Techniques

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

PHYSICS – Topics include:

- ▶ Applied Quantum Mechanics
- ▶ Advanced Quantum Mechanics
- ▶ Applied Optics
- ▶ General Relativity & Cosmology

- ▶ High Energy Particle Physics
- ▶ Advanced Laboratory
- ▶ Computational Biophysics
- ▶ Theoretical Astrophysics
- ▶ Condensed Matter Physics

- ▶ Medical Physics
- ▶ Galaxies & Observational Cosmology
- ▶ Quantum Field Theory
- ▶ Advanced Statistical Physics

BSc (Honours) Physics

MSc

- ▶ MSc NanoBio Science
- ▶ MSc Meteorology
- ▶ MSc Space Science & Technology
- ▶ MSc Research
- ▶ MSc Physics (NL)
- ▶ MSc Nanotechnology
- ▶ MSc Applied Mathematics & Computational Physics
- ▶ MSc Computational Physics

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as atomic physics, computational nanobio physics, particle physics, biophysics, nuclear physics, medical physics, theoretical physics and astrophysics

Industry

- ▶ Energy Technology Sector
- ▶ Medical Physics & Biotechnology
- ▶ Material Science & Nanotechnology
- ▶ Geoscience & Exploration
- ▶ ICT Industry
- ▶ Financial Sector
- ▶ Meteorology

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ MA Economics
- ▶ Graduate Medicine
- ▶ Master in Business Administration
- ▶ Master in Management



Physics students in the new undergraduate Physics laboratory.

- Learn how to investigate the physical world from the outermost reaches of the universe to the innermost parts of the atom
- Develop skills in how to interpret the physical world, carry out experiments and compare results critically with predictions from theory

“

I completed the Advanced Laboratory Development internship in the UCD School of Physics in the Summer of 2013 when I was in the third year of my degree. I tested new laboratories and modified them to make use of equipment already available in the lab. I spent a large part of the internship modifying third year electronics laboratories to include the use of Arduino.

Olivia Carrington, Student

”

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physics

Physics with Astronomy & Space Science

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)



Star Trails around Polaris on top of the IAC-80 telescope at Teide Observatory.

- Develop practical skills by learning how to design a satellite or make astronomical observations using a variety of telescopes

Sample pathway for a degree in Physics with Astronomy & Space Science *

YEAR 1

ENGAGE WITH THE PRINCIPLES

PHYSICS

Topics include:

- Foundations of Physics
- Frontiers of Physics
- Astronomy & Space Science
- Thermal Physics and Materials
- Quanta, Particles and Relativity

MATHEMATICS

Topics include:

- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences

APPLIED & COMPUTATIONAL MATHEMATICS

Topics include:

- Applied Mathematics: Mechanics and Methods

- Two Elective modules
- One Small-Group Project

YEAR 2

CHOOSE YOUR SUBJECTS

PHYSICS WITH ASTRONOMY & SPACE SCIENCE

Topics include:

- Electronics and Devices
- Introductory Quantum Mechanics
- Fields, Waves and Light
- Exploring the Solar System
- Methods for Physicists

Students also study the following topics in Mathematics:

- Calculus of Several Variables
- Vector Integral & Differential Calculus
- Computational Science

PHYSICS

Topics include:

- Students who choose Physics with Astronomy & Space Science as their main subject for second year also cover the requirements for Physics.

- Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

PHYSICS WITH ASTRONOMY & SPACE SCIENCE – Topics include:

- Classical Mechanics & Relativity
- Stellar Astrophysics & Astronomical Techniques
- Nuclear Physics

- Physics with Astronomy and Space Science Lab
- Quantum Mechanics
- Thermodynamics & Statistical Physics
- Electromagnetism

- Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

PHYSICS WITH ASTRONOMY & SPACE SCIENCE – Topics include:

- Galaxies & Obs. Cosmology
- Space Mission Design or Astronomy Field Trip to Tenerife
- Theoretical Astrophysics
- Physics with Astronomy and Space Science Lab

- General Relativity & Cosmology
- Applied Quantum Mechanics
- Condensed Matter Physics
- Optics & Lasers
- Computational Biophysics

- High Energy Particle Physics
- Advanced Quantum Mechanics
- Medical Physics
- Quantum Field Theory
- Advanced Statistical Physics

BSc (Honours) Physics with Astronomy & Space Science

MSc

- MSc NanoBio Science
- MSc Meteorology
- MSc Space Science & Technology
- MSc Research
- MSc Physics (NL)
- MSc Nanotechnology
- MSc Applied Mathematics & Computational Physics
- MSc Computational Physics

PhD

- Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as space science, astrophysics, atomic physics, computational nanobio physics, particle physics, biophysics, nuclear physics, medical physics and theoretical physics

Industry

- Space Industry
- Medical Physics & Biotechnology
- Energy Technology Sector
- Meteorology
- ICT Industry
- Financial Sector
- Geoscience & Exploration
- Material Science & Nanotechnology

Conversion Courses

- Professional Master of Education (PME)
- MA in Economics
- Graduate Medicine
- Master of Business Administration
- Master in Management

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.

“

I now carry out research in solar astrophysics and ‘space weather’ (the practical impacts of the Sun on human activities in space), using experiments on spacecraft and numerical models that I have helped to develop.

Dr Simon Plunkett, Graduate

”



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Theoretical Physics

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for a degree in Theoretical Physics *

YEAR
1

ENGAGE WITH THE PRINCIPLES

PHYSICS

Topics include:

- ▶ Foundations of Physics
- ▶ Frontiers of Physics
- ▶ Thermal Physics and Materials
- ▶ Quanta, Particles and Relativity

MATHEMATICS

Topics include:

- ▶ Calculus in the Mathematical and Physical Sciences
- ▶ Linear Algebra in the Mathematical and Physical Sciences

APPLIED & COMPUTATIONAL MATHEMATICS

Topics include:

- ▶ Applied Mathematics: Mechanics and Methods
- ▶ Applications of Differential Equations

- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

THEORETICAL PHYSICS – Topics include:

- ▶ Electronics and Devices
- ▶ Introductory Quantum Mechanics
- ▶ Fields, Waves and Light
- ▶ Methods for Physicists
- ▶ Calculus of Several Variables

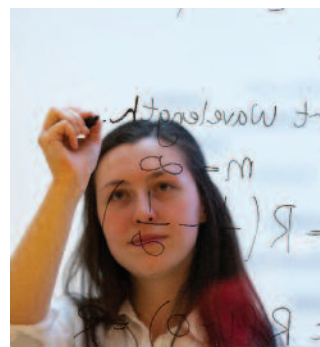
- ▶ Oscillations and Waves
- ▶ Classical Mechanics and Special Relativity
- ▶ Vector Integral and Differential Calculus
- ▶ Computational Science

- ▶ Students who choose Theoretical Physics as their main subject for second year also cover the requirements for Physics.

- ▶ Two Elective modules

PHYSICS

Topics include:



Physics student Lána writing the Rydberg formula for the wavelengths of Hydrogen atomic transitions.

- Learn to understand and predict the behaviour of physical systems ranging from subatomic to astronomical scales using advanced mathematics

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

THEORETICAL PHYSICS – Topics include:

- ▶ Analytical Mechanics
- ▶ Partial Differential Equations
- ▶ Electromagnetism
- ▶ Foundations of Fluid Mechanics

- ▶ Thermodynamics & Statistical Physics
- ▶ Quantum Mechanics
- ▶ Functions of One Complex Variable
- ▶ Advanced Laboratory

- ▶ Two Elective modules

YEAR
4

REFINE YOUR KNOWLEDGE

THEORETICAL PHYSICS – Topics include:

- ▶ Applied Quantum Mechanics
- ▶ Advanced Mathematical Methods
- ▶ High Energy Particle Physics
- ▶ Nuclear Physics

- ▶ General Relativity & Cosmology
- ▶ Quantum Theory of Condensed Matter
- ▶ Projects in Theoretical Physics

- ▶ Computational Biophysics
- ▶ Relativistic Quantum Mechanics
- ▶ Theoretical Astrophysics
- ▶ Quantum Field Theory
- ▶ Advanced Statistical Physics

BSc (Honours) Theoretical Physics

MSc

- ▶ MSc NanoBio Science
- ▶ MSc Meteorology
- ▶ MSc Space Science & Technology
- ▶ MSc Research
- ▶ MSc Physics (NL)
- ▶ MSc Nanotechnology
- ▶ MSc Applied Mathematics & Computational Physics
- ▶ MSc Computational Physics

PhD

- ▶ Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as theoretical physics, atomic physics, computational nanobio physics, particle physics, biophysics, nuclear physics, medical physics and astrophysics

Industry

- ▶ Financial Sector
- ▶ ICT industry
- ▶ Material Science & Nanotechnology
- ▶ Medical Physics and Biotechnology
- ▶ Geoscience & Exploration
- ▶ Energy Technology Sector
- ▶ Meteorology

Conversion Courses

- ▶ Professional Master of Education (PME)
- ▶ MA Economics
- ▶ Graduate Medicine
- ▶ Master of Business Administration
- ▶ Master in Management

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Physics, Mathematics & Education

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)



APPROVED
DEGREE



Students discussing how to prepare a Physics class.

Sample pathway to become a Physics and Mathematics teacher *

YEAR
1

ENGAGE WITH THE PRINCIPLES

EDUCATION

Topics include:

- ▶ Introduction to Mathematics Pedagogy

PHYSICS

Topics include:

- ▶ Foundations of Physics
- ▶ Frontiers of Physics

MATHEMATICS

Topics include:

- ▶ Linear Algebra
- ▶ Calculus
- ▶ Applications of Differential Equations
- ▶ Statistical Modelling

* SCIENCE

- ▶ Biology
- ▶ Chemistry
- ▶ One Small-Group Project
- ▶ Elective Modules

YEAR
2

CHOOSE YOUR SUBJECTS

EDUCATION

Topics include:

- ▶ Education Issues and Ideas
- ▶ Science and Mathematics Pedagogy

PHYSICS

Topics include:

- ▶ Quantum Mechanics
- ▶ Electromagnetism and Optics
- ▶ Fields, Waves and Light
- ▶ Methods for Physicists
- ▶ Thermal Physics

MATHEMATICS

Topics include:

- ▶ Vector Integral and Differential Calculus
- ▶ Calculus of Several Variables
- ▶ Analysis

- ▶ Elective Modules

YEAR
3

REFINE YOUR KNOWLEDGE

EDUCATION

Topics include:

- ▶ Collaborative Pedagogy in Mathematics Education
- ▶ Schools and Society

SCHOOL PLACEMENT

- ▶ Post-Primary Placement
- ▶ Peer-Assisted Tutoring
- ▶ Small Group Tutoring

PHYSICS

Topics include:

- ▶ Classical Mechanics and Relativity
- ▶ Quantum Mechanics
- ▶ Electromagnetism
- ▶ Nuclear Physics
- ▶ Laboratory Skills

MATHEMATICS

Topics include:

- ▶ Algebraic Structures
- ▶ Probability Theory

YEAR
4

PREPARE FOR PROFESSIONAL PRACTICE

EDUCATION

Topics include:

- ▶ Pedagogical Approaches to Mathematics and Science
- ▶ Psychology for Teaching and Learning

SCHOOL PLACEMENT

- ▶ Year-Long Placement in Post-Primary School
- ▶ Classroom Teaching
- ▶ Broad Experience of Wider School Context

PHYSICS AND MATHEMATICS

Topics include:

- ▶ Particle Physics
- ▶ Differential Equations with Computer Algebra
- ▶ Geometry
- ▶ Complex Analysis
- ▶ History of Mathematics

BSc Physics, Mathematics & Education

YEAR
5

PREPARE FOR PROFESSIONAL PRACTICE

EDUCATION

Topics include:

- ▶ Research Methods
- ▶ Professional Dissertation

SCHOOL PLACEMENT

- ▶ Year-Long Placement in Post-Primary School
- ▶ Experience Both Teaching and Non-Teaching Activities
- ▶ Further Development of Professional Practice Portfolio

MSc Mathematics and Science Education

Post-Primary
School
Teacher

QUALIFIED TO TEACH

Physics
Leaving Certificate

Mathematics
Leaving Certificate

Science
Junior Certificate

“ The Science DN200 course was a perfect option for me as it allowed me to study all the sciences in first year before concentrating on my chosen pathway of Physics, Maths & Education. I plan to further my studies to MSc level where I hope to qualify as a post-primary education teacher. Such is the flexibility of this course, however, that many other options are still available to me in both Maths and Physics. UCD offers many opportunities for students to get involved. I have been a member of UCD GAA club since first year and play with the Men's Gaelic Football Team. It is a good way of getting a break from time spent studying.

Jim Rossiter, Student



*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.



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Geology

CAO code: DN200 Option: Mathematical, Physical & Geological Sciences

Sample pathway for a degree in Geology *

YEAR
1

ENGAGE WITH THE PRINCIPLES

GEOLOGY – Topics include:

- ▶ Introduction to Earth Sciences
- ▶ Earth Science and Materials
- ▶ Earth And Humanity
- ▶ Mathematics for the Sciences

MATHEMATICS – Topics include:

- ▶ Geology and Earth Science involve applying 'traditional' science subjects to the study of the past, present and future of the Earth System
- ▶ Explore across the range of scientific disciplines available to study in UCD
- ▶ Two Elective modules
- ▶ One Small-Group Project

YEAR
2

CHOOSE YOUR SUBJECTS

GEOLOGY – Topics include:

- ▶ Earth Structure & Surface Processes
- ▶ Investigating Minerals
- ▶ Geomaterials and Geoenery
- ▶ Field Geology
- ▶ Global Environmental Change
- ▶ We do not require that students take a specific combination of additional modules
- ▶ Subject to regulations, students are free to select relevant Science modules that they are interested in
- ▶ Two Elective modules

YEAR
3

FOCUS ON YOUR CHOSEN SUBJECT

GEOLOGY – Topics include:

- ▶ Geological Structures
- ▶ Sedimentary Environments
- ▶ Igneous & Metamorphic Petrology
- ▶ Geological Fieldwork
- ▶ Applied Palaeontology
- ▶ Quantitative Geosciences
- ▶ Precambrian Geology & Geotectonics
- ▶ Low Temperature Geochemistry
- ▶ Two Elective modules
- ▶ Selected students have the opportunity to gain valuable workplace experience via an internship in commercial companies

YEAR
4

REFINE YOUR KNOWLEDGE

GEOLOGY – Topics include:

- ▶ Geobiology
- ▶ Basin Analysis
- ▶ Petrology & Ore Geology
- ▶ Geological Fieldwork
- ▶ Geophysics & GIS
- ▶ Research Seminars
- ▶ Field Mapping Research Project
- ▶ Emphasis on independent learning and research, including a field-based project
- ▶ Many modules contain laboratory-based projects and field-based research
- ▶ Breadth of course ensures graduates have a wide range of future career options within and outside the discipline

Other Options

MSc (Taught)	PhD	Industry	Conversion Courses
Our Geology graduates are routinely sought for careers outside Earth Science including: <ul style="list-style-type: none"> ▶ Management consultancy ▶ Education ▶ Financial services 	<ul style="list-style-type: none"> ▶ Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as hydrocarbon and mineral exploration, volcanic and earthquake hazards, palaeobiology, environmental geochemistry, geophysics and climate change 	<ul style="list-style-type: none"> ▶ Resources (oil and mineral exploration and development) ▶ Environmental consultancy companies ▶ Hydrogeology and water resources ▶ Geological Surveys, Environmental Protection Agencies ▶ Engineering Geology ▶ Oceanography and Marine Geology 	<ul style="list-style-type: none"> ▶ Master of Business Administration ▶ Master in Management

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Second year field class in the Doolough valley, Co. Mayo.

- ▶ A broadly-based BSc with emphasis on field courses and research projects in Ireland and abroad structured for a wide range of employment options in the Earth and Environmental Sectors.

“ I followed my Geology BSc degree with a Masters in Environment Engineering technology. I now work in Sydney with an international engineering consultancy on large-scale contaminated land remediation projects. **Aoife McKenna, Graduate** ”

“ My Geology BSc provided me with a great understanding of geological principles, and knowledge across the spectrum of the subject. Following my degree, I secured employment with a mineral exploration company in Ireland. The strong laboratory and field components were highly enjoyable parts of the learning experience at UCD, and have been vital as my job involves exploring and prospecting in a geologically diverse region. **Cian O'Meara, Graduate** ”

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www.ucd.ie/myucd/geology

How to apply to UCD

Depending on your country of origin there are a number of ways that you can apply for a place on UCD undergraduate degree programmes. This brochure details the application information for EU applicants who apply through the Central Applications Office, also known as the CAO. The CAO processes applications for undergraduate courses in Irish Higher Education Institutions (HEIs).

CAO Code & Degree Title	Minimum CAO Entry Points 2016	Minimum CAO Entry Points 2015	Minimum CAO Entry Points 2014
DN200 Science BSc (Hons)	510	510	515
DN201 Computer Science BSc (Hons)	485	470	470
DN230 Actuarial and Financial Studies BAFS (Hons)	560	570	560

Information on Subject Choices

DN200 Biological, Biomedical and Biomolecular Sciences (BBB) Subjects

- In Year 2, students must select a minimum of 2 subjects. If both subjects are selected from among Pharmacology, Neuroscience, Physiology and Genetics, students must then select an additional subject that is not in that list. The Year 2 subjects listed on each subject page illustrate the most popular subjects students combine.
- In first year, students may have to take introductory modules in Biology, Chemistry or Mathematics, depending on their secondary school results.

DN200 Chemistry and Chemical Sciences (CCS) Subjects

- In Year 2, students must select a minimum of 2 subjects. The Year 2 subjects listed on each subject page illustrate the most popular subjects students combine.
- In first year, students may have to take introductory modules in Biology, Chemistry or Mathematics, depending on their secondary school results.

DN200 Mathematical, Physical and Geological Sciences (MPG) Mathematical Subjects

- In Year 2, students must select a minimum of 2 subjects. The Year 2 subjects listed on each subject page illustrate the most popular subjects students combine.
- Important Advice: We recommend that all students studying any of the Mathematical subjects should have a minimum Grade H3 in Leaving Certificate Higher Level Mathematics, or equivalent.

Physics Subjects

- In Year 2, students must select a minimum of 2 subjects. The Year 2 subjects listed on each subject page illustrate the most popular subjects students combine.

Geology

- In Year 2, students must select a minimum of 2 subjects.
- In first year, students may have to take introductory modules in Biology, Chemistry or Mathematics, depending on their secondary school results.

DN200 Mathematics and Science Education Degrees

Biology, Mathematics & Education

- To teach Junior Certificate Science, students must also take modules in Chemistry and Physics. These modules can be taken in Years 1, 2 or 3.
- At the end of Year 2, students who decide not to follow a career in teaching can pursue a degree in one of the following:
 - Biochemistry and Molecular Biology
 - Environmental Biology
 - Genetics
 - Microbiology
 - Pharmacology
 - Plant Biology
 - Zoology

Chemistry, Mathematics & Education

- To teach Junior Certificate Science, students must also take modules in Biology and Physics. These modules can be taken in Years 1, 2 or 3.
- At the end of Year 2, students who decide not to follow a career in teaching can pursue a degree in Chemistry.

Physics, Mathematics & Education

- To teach Junior Certificate Science, students must also take modules in Biology and Chemistry. These modules can be taken in Years 1, 2 or 3.
- At the end of Year 2, students who decide not to follow a career in teaching can pursue a degree in Physics or Physics with Astronomy and Space Science, depending on the Physics modules they choose in Years 1 and 2.

Applied Mathematics, Mathematics & Education

- In Year 2, students must select a minimum of 2 subjects. The Year 2 subject combinations illustrate the most popular subject students choose to combine with Applied & Computational Mathematics.

DN201 Computer Science

- The topics shown indicate the course pathways for Computer Science and Computer Science with Data Science, listing some of the topics that students can study.
- No prior knowledge of programming is required.
- Small group work is facilitated in an active learning lab that encourages students to work in teams and build their problem-solving skills.
- The BSc Computer Science with Data Science follows the same first two years as the BSc Computer Science. At the end of Year 2, students must select either Computer Science or Computer Science with Data Science as their degree subject.

DN230 Actuarial and Financial Studies

- The topics shown indicate the course pathway for Actuarial and Financial Studies, listing some of the topics that students can study.
- In Years 1-3, students take 10 Science modules and 2 elective modules. A professional work placement in a financial institution or insurance company is integrated into third year and equates to half the year's work.
- Should a student achieve a sufficiently high standard in the degree, they will gain some (or all) exemptions from the Core Technical series examinations (CT1:8) as well as the Core Applications CA1 examination of the Institute of Actuaries, or the Faculty of Actuaries.

The information given is a guide only and does not bind the University in any way. Please visit www.ucd.ie/registry/admissions/ for further information on entry to UCD.

UCD Science



Events Calendar 2017/18



Create an account on
www.myucd.ie for further
information and booking

Event	Date & Time	Audience
UCD Science Open Evening	Tuesday 24 October 2017	6th Years, A-Level students, QQI-FET applicants, mature applicants, parents and teachers
UCD Mathematics and BAFS Open Night	Thursday 9 November 2017	6th Years, A-Level students, QQI-FET applicants, mature applicants, parents and teachers
UCD Physics Open Night	Tuesday 14 November 2017	6th Years, A-Level students, QQI-FET applicants, mature applicants, parents and teachers
UCD Chemistry Open Night	Tuesday 21 November 2017	6th Years, A-Level students, QQI-FET applicants, mature applicants, parents and teachers
UCD Computer Science Open Night	Tuesday 28 November 2017	6th Years, A-Level students, QQI-FET applicants, mature applicants, parents and teachers
UCD QQI-FET (FETAC) Entry to Science, Computer Science and Agriculture and Food Science Open Day	Tuesday 16 January 2018	QQI-FET applicants
Science Transition Year Workshop Week	Monday 12 February 2018 to Friday 16 February 2018	Transition Year students
6th Year Open Day	Saturday 17 February 2018	6th Years, A-Level students, QQI-FET applicants, mature applicants, parents and teachers
UCD Science Summer School	Wednesday 6 June 2018	5th years only
UCD Computer Science Summer School	Thursday 7 June 2018	5th years only

Tours of the UCD O'Brien Centre for Science can be arranged for individuals or groups by contacting gary.dunne@ucd.ie



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This booklet (Version 15 2018) is intended to assist prospective UCD students and the information is given in good faith. It is not, however, an official publication of the university and does not bind the university in any way. The information provided in this booklet is correct at the time of going to press but degree programmes are subject to continuing development and the university reserves the right to make changes at any time, before or after a student's admission.



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