UCD SCIENCE

UNDERGRADUATE COURSES ENTRY 2022 NON-EU EDITION

Science SCU1
Computer Science CSSA
Actuarial & Financial Studies BSS3
Sustainability STS1

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Welcome to UCD Science

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

UCD boasts the most innovative and diverse Science programme in the country, providing knowledge in disciplines encompassing biology, chemistry, physics, geology and earth science, mathematics and computer science. Our academic staff are not only expert teachers but are also highly reputed world-class researchers, and indeed our research interests and strengths inform our undergraduate and postgraduate degree programmes.

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

For international students, the choice of university is a daunting one, and this is something that we recognise at UCD. In order to ensure that our university and degree programmes are the right fit for your needs, UCD Science staff strive to get to know each international student personally, from the first point of contact until graduation and beyond. No problem is too trivial for us in this important phase of your career.

We look forward to welcoming you to UCD, proudly Ireland's Global University.

Professor Jeremy Simpson
Dean of Science,
UCD Science

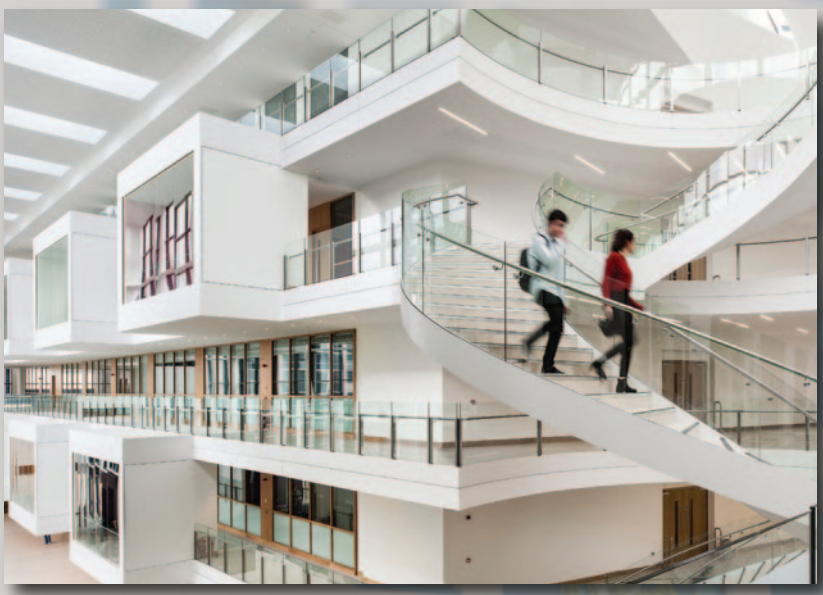
WHY UCD SCIENCE?

Flexible Curriculum

UCD offers the broadest and most diverse Science programme in Ireland, with degree courses in biological, environmental, 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.

World-Class Facilities

The UCD O'Brien Centre for Science is the largest capital investment in Science in the history of the Irish State with state-of-the-art labs, active learning environments, lecture theatres and classrooms.



Internship Opportunities

Professional Science Placements are available as Summer Internships or longer placements in industry for specific disciplines. All internships are secured on a competitive basis.

Dynamic Campus

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

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 SCU1 Science, your degree will eventually be in one of 22 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.

Trimester
The academic year in UCD is divided into Trimesters (Autumn, Spring, Summer). Undergraduate degree teaching takes place in the Autumn Trimester (September to December) and the Spring Trimester (January to May). This is normally 15 weeks of student activity: 12 weeks of teaching and learning, one week of revision and two weeks of revision and assessment.

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
SCU1 Science in UCD has 3 streams. The streams available in SCU1 Science are Biological, Biomedical & Biomolecular Sciences (BBB), Chemistry & Chemical Sciences (CCS) and Mathematical, Physical & Geological Sciences (MPG). Streams are used to categorise the 22 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 Trimester. 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, you can study Elective modules that either deepen your knowledge in your chosen programme or allow you to explore subjects outside of your area of study. 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.

Internships, Professional Experience and Field Trips

These are some of the main areas that students have gained experience in through internships or professional experience and reflect the sectors graduates go on to work in.

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

Degrees

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

Examples of Internships/Professional Experience

The internships/professional experience listed are examples of past placements and are a guide only. Not all degrees map to all companies. Placements are secured on a competitive basis.

Degree Subjects

- Biochemistry & Molecular Biology
- Cell & Molecular Biology
- Genetics
- Microbiology
- Neuroscience
- Pharmacology
- Physiology
- Chemistry
- Chemistry with Biophysical Chemistry
- Chemistry with Environmental & Sustainable Chemistry
- Medicinal Chemistry & Chemical Biology

Companies and Research Institutes

Teva Pharmaceuticals
APC Ltd
Teagasc
MSD
Takeda
Acclimatize
Merck
Pfizer

International: Max Planck Institute for Brain Research, Frankfurt
NSTDA-BIOTEC, Thailand
Institute for Brain Research, Netherlands
Karolinska Institutet, Sweden
Department of Agriculture, Food and the Marine

Energy, Natural Resources, Climate, Conservation & Environment

Degrees

• BSc Environmental Biology • BSc Geology • BSc Plant Biology • BSc Zoology • BSc Chemistry with Biophysical Chemistry • BSc Chemistry with Environmental & Sustainable Chemistry • BSc Physics

Examples of Internships/Professional Experience

The internships/professional experience listed are examples of past placements and are a guide only. Not all degrees map to all companies. Placements are secured on a competitive basis.

Degree Subjects	Companies/Professional Experience
• Environmental Biology • Plant Biology • Zoology	Dublin Zoo Tayto Park Sonairte Seal Rescue Ireland Tropical World WRI
• Geology	Geology students complete residential field training at the end of the summer vacation prior to their final year, followed by an independent field mapping research project during September-October, providing them with key technical and transferable skills needed in numerous geoscientific careers.

Internships, Professional Experience and Field Trips

Computing, Risk, Finance & Analytics

Degrees

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

Examples of Internships/Professional Experience

The internships/professional experience listed are examples of past placements and are a guide only. Not all degrees map to all companies. Placements are secured on a competitive basis.

Degree Subjects	Companies			
• Applied & Computational Mathematics • Financial Mathematics • Mathematics • Statistics • Physics • Physics with Astronomy & Space Science • Theoretical Physics	Deloitte Paddy Power EY PwC Mercer Susquehanna Deutsche Bank	Liberty Insurance Betfair Citibank KPMG Accenture Zurich Life		
• Computer Science • Computer Science with Data Science	Amazon Workday SAP Swoop	Dell Hubspot Bank of America Indeed	Ericsson Verizon Media Intel JP Morgan	Microsoft Aer Lingus Vodafone
• Actuarial & Financial Studies	Allianz Irish Life Susquehanna	Aon Mercer	Deloitte Zurich	

Semiconductor, Nanotechnology, Meteorology & Space Industry

Degrees

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

Examples of Internships/Professional Experience

The internships/professional experience listed are examples of past placements and are a guide only. Research Internships are secured on a competitive basis.

Degree Subjects	Research Internships
• Physics • Theoretical Physics • Physics with Astronomy & Space Science	Students have opportunities to complete Research Internships either within the UCD School of Physics or in external research institutes on topics across numerous research areas. These projects ensure students have a wide range of future career options within and outside the discipline.

Further Education & Research

Graduate Courses

Graduates from a science discipline often pursue graduate courses including:

- MSc/MA – Graduate Taught or Graduate Research
- PhD – Academia/Research
- Graduate Veterinary Medicine
- Graduate Medicine
- Graduate Entry Pharmacy

Internships, Professional Experience and Field Trips

Environmental Biology
Biological, Biomedical & Biomolecular Sciences

Sadhbh McCarrick

As part of the Environmental Biology Degree, I had the opportunity to travel to the Costa Rican Rainforest for a two-week field trip with my classmates and lecturers.

This field study served as a percentage of academic credit for a Fourth Year module. The trip to the rainforest truly allowed us to put the theory we had learned at UCD into practice.

Neuroscience
Biological, Biomedical & Biomolecular Sciences

Jodie Bermingham

I completed a 6-month internship at the Max Plank Institute for Brain Research (MPIBR) in Frankfurt whilst completing my Final Year Project. It was an incredible experience.

My project was based on the characterisation and morphology of NDNF-interneurons in layer 1 of the neocortex, comparing them with somatostatin interneurons, and lastly, quantifying the NDNF-interneurons throughout the entire brain.

Chemistry
Chemistry & Chemical Sciences

Niamh McKeever

I completed an internship with APC Ltd, a consulting company that provides process development for pharmaceutical companies. My role involved assisting scientists and engineers by analysing samples from their processes and determining various properties of the materials such as purity, water content and thermal characteristics.

My internship gave me an understanding of what the pharmaceutical industry and a lab-based job entails.

Geology
Mathematical, Physical & Geological Sciences

Maria Noone

Choosing the Field Geology module in First Year inspired me to pursue the subject of Geology by giving me the opportunity to apply real practical geological work outside of the UCD campus and giving me a feel for what it would be like to be a real life Geologist.

My Field Mapping project in Fourth Year was on "The Solid Geology of the Ord Window, Isle of Skye". I am currently working as an Engineering Geologist with Arup.

Physics with Astronomy & Space Science
Mathematical, Physical & Geological Sciences

Lána Salmon

I completed the 8-week UCD Physics Summer Internship Programme. My project focused on Gamma-Ray Bursts – the most powerful electromagnetic explosions in the Universe that occur when a star collapses.

Using data from the Swift and XMM Newton satellites, I used X-Ray data to try and understand these bursts. This experience allowed me to think about my future career and I'm currently a PhD student in the UCD Space Science Group.

Financial Mathematics
Mathematical, Physical & Geological Sciences

Joseph Mulligan

I completed an internship in the summer between Third and Fourth Year at the global investment bank Credit Suisse in their Dublin office.

I was able to earn credits for this as part of the professional placement module. After I graduated, I returned to work at that same firm full time.

Computer Science

Clíodhna Connolly

I completed a Summer Internship with Deloitte Ireland in their Technology Consulting department. It highlighted how to apply the skills from my degree. The problem-solving and software development skills really stood to me when I was adapting my existing knowledge to working with a new language.

After graduating I took up a position with Deloitte Ireland and since then I've worked on different delivery teams in a full stack development role.

Actuarial & Financial Studies

George Harding

I completed my 6-month work placement in a consultancy company in Dublin. Every day was quite varied, and I worked on projects in life and non-life insurance as well as in pensions.

I spent a lot of time using Excel working on different actuarial models. It was great to see what life is like in an actuarial company.

The Business of Science and IT in Ireland

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

Over 1000

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

5 of the top 10

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

More than 250

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

Top Global financial institutions

6 OF THE TOP 10

Worldwide security software companies are located in Ireland

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

9 OF THE TOP 10 GLOBAL PHARMACEUTICAL COMPANIES ARE LOCATED IN IRELAND

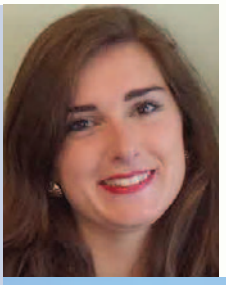
The Top Ten

"Born on the Internet" companies are based in Ireland

My Internship Experience

Béga Murray

Genetics



As part of a new initiative within the Science SCU1 programme, Genetics student Béga Murray completed a six-month research internship at the European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany. This research internship replaced the standard research project that final year SCU1 students usually complete.

I had already intended carrying out a summer internship in order to develop my laboratory skills. I decided to take this option, as extending an internship to six months seemed like an excellent learning opportunity as well as offering valuable insight into the lifestyle that working as a scientific researcher entails.

> ***The following months went by in a whirlwind of learning, meeting new people, and gaining a lot of new experiences... as well as introducing me to the various machinery, such as a flow cytometer and a cell observer microscope.***

My application to EMBL was to work within the Korbel group of the Genome Biology Unit of this institute. This group focuses on genomic structural variants, both the underlying mechanisms and resulting phenotypic effects. I was interested in this group due to their combined use of computational and laboratory techniques for performing their research, as I have wanted to also expand my bioinformatics skills for quite a while. I was delighted to be offered a Skype interview in early March, and as a result I was thrilled to be offered a place.

The following months went by in a whirlwind of learning, meeting new people, and gaining a lot of new experiences. This involved a lot of cell culture; learning how to expand cell lines, and the correct treatment and storage of cells, as well as introducing me to the various machinery, such as a flow cytometer and a cell observer microscope. Subsequently I focused more on bioinformatics, as I was involved in analysing proteomic data, which had been produced prior to my arrival at EMBL. Through this, I learned how to code using R, as well as developing my skills in various annotation and pathway analysis tools. The internship has definitely broadened my horizons, and I feel that I learned just as much outside of the lab as in it.

Why I Chose UCD Science

Courtney Greene

Pharmacology

I'm from Boston, Massachusetts, USA and fell in love with UCD following a family visit to Ireland. The community feel of the university alongside the modern academic facilities really appealed to me. The size of the university was very crucial to my decision as I always sought a large campus and school. I think the large close knit community feel of UCD has shaped my experience the last 5 years by providing me with numerous academic and social opportunities in UCD, as well as Dublin.

I chose to study Science because I was passionate about research and the human body. UCD Science's flexible curriculum allowed me to try out a range of modules in First Year from Organic Chemistry to Cell Biology, in an effort to help me narrow my science interests and desires. I focused my second year on Pharmacology, Neuroscience, Microbiology and Physiology. Early in second year I knew I would eventually choose Pharmacology as my degree subject. I chose it because I'm infatuated with the research of drugs and the treatment of diseases.

After graduation the options were varied. Many of my classmates went directly into a fully funded PhD, some into a research masters, and some into work and graduate programmes. A few even went on to pursue Graduate Entry Medicine. I went on to pursue the MSc Biotechnology & Business which is a combined programme between the UCD College of Science and the UCD Michael Smurfit Graduate Business School.

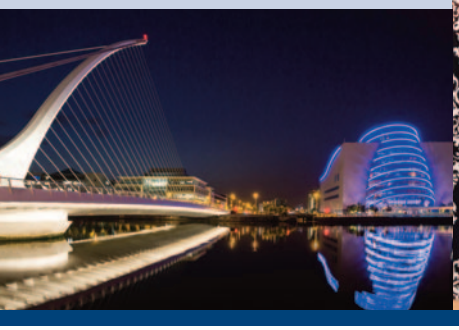
> *The campus, faculty, and student life in UCD have been so welcome over the past few years that Dublin ended up feeling like home.*

I am currently employed by the National Children's Research Centre where I work alongside Children's Health Ireland (CHI) as a Clinical Research Coordinator. I work as part of a multidisciplinary team of researchers, consultants and nursing staff on both clinical trials and investigator led research studies in cystic fibrosis.

Why I Chose UCD Computer Science

Anushkha Vadhera

Computer Science



As an English speaking country in the EU, Ireland is becoming an IT hub. Many global companies are establishing their regional headquarters in Dublin which provides a good base and foundation for the future. I like that UCD provides support centres including: Maths Support Centre, Computer Science Support Centre and the Writing Support Centre.

Special occasions and festivals from various parts of the world are celebrated here and greatly enjoyed.

UCD's reputation for excellence in industry helped me find employment after I graduated with Amazon Web Services. I work with the Analytics team in Amazon Premium Support. As a Cloud Support Associate, I have experience of Amazon's consistently growing set of cloud services and features. Moreover, I get to interact with globally leading companies and help them with their infrastructure in the cloud. Ireland is a beautiful place with friendly and helpful people. Dublin has a great culture similar to ours back home. I feel coming to Ireland was the right decision.

Raman Prasad

Computer Science with Data Science

Coming from Jamshedpur, India, I was proud to move to UCD to study Computer Science with Data Science. With its well-structured coursework, the multicultural society in UCD is bliss for me. I chose UCD because of its excellence in Data Science and Computing.

I hope to be a competent Computer Scientist – ready to innovate and contribute to the industry through my ventures.

I have been able to visit the Google headquarters in Dublin, which was a good learning experience. As a Student Digital Ambassador and Science Student Leader, I have an opportunity to mentor my peers and helped the new students get settled with their college life. In Third Year, I went to the University of California San Diego as an exchange student. Through these experiences I hope to be a competent Computer Scientist – ready to innovate and contribute to the industry.

Why I Chose UCD Actuarial & Financial Studies

Sze Wai Ho

Actuarial & Financial Studies

Mathematics was always my passion. I enjoyed Accounting in school and especially Financial Mathematics. This led me to Actuarial & Financial Studies. The class size is around 50 people, which helps students get more attention from the lecturers in class. The course also offers the maximum exemptions from the professional exams to become a qualified actuary. It sounded challenging at first but as I read more about the career opportunities, I became convinced that it was the course for me. UCD is a very well facilitated campus with many areas for both studying and leisure.

> *It was very beneficial for me to learn that students can balance their academic life with their social life in UCD.*

I play sports quite often so I was especially attracted to all the equipment and facilities in the UCD Sports Centre as well as the sports clubs and societies I could join. It was very beneficial for me to learn that students can balance their academic life with their social life in UCD. I joined the Actuarial and Financial Society and each year they organise many events such as the Actuarial Ball. I was also in the Japanese Society which ran weekly tea evenings, anime nights, karaoke nights and occasional restaurant trips. The St Vincent De Paul Society also organizes soup runs, flat decorations, bake sales and much more to help people in need.

The Mathematics is of course challenging but when you truly understand a concept and are able to solve questions, it is a very rewarding experience. The material in lectures and tutorials really helped us understand the work of actuaries. Lecturers use real-life examples and current events to prepare us. After my 6-month internship in Third Year, I learned a lot about coding and modelling. The active learning experience was both enjoyable and challenging and it helped me understand the industry. Final year was challenging and required a lot of patience and dedication, but the hard work paid off in the end. After graduating, I will be studying for the professional actuarial exams whilst working as a trainee actuary in industry.

Actuarial & Financial Studies

BSS3

The BSS3 Actuarial & Financial Studies course will prepare you for a professional career in the actuarial or financial professions.

Exams of the Institute and Faculty of Actuaries, UK

The Actuarial and Financial Studies degree at UCD offers potential exemptions from the Core subjects CS1, CS2, CM1, CM2, CB1, CB2 and CP1 of the professional examinations of the Institute and Faculty of Actuaries, UK.

Professional work placement in Third Year

Students have completed their work placement in a variety of companies and locations. The companies include Allianz, Aon, Deloitte, Irish Life, Mercer, Susquehanna (SIG) and Zurich. The locations include Dublin, London, Boston and New York.

There is a wide choice of placements that last for 6-8 months, and these are secured through a competitive process.

Frequently Asked Questions

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

A: Students must successfully complete 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.

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 on the Society of Actuaries website at web.actuaries.ie

Actuarial & Financial Studies

BSS3

Sample pathway for Actuarial & Financial Studies*

YEAR 1

Engage with the principles

In First Year (Stage 1), students engage with the principles of Actuarial & Financial Studies with modules in Mathematics, Economics, Statistics, Accounting and Computer Science.

Actuarial & Financial Studies

Modules include:

- Linear Algebra
- Advanced Calculus
- Statistical Modelling
- Numbers and Functions
- Introduction to Actuarial Financial Studies
- Fundamentals of Actuarial Business Theory
- Introduction to Programming
- Financial Accounting
- Differential & Difference Equations
- Principles of Finance

- One elective module

YEAR 2

Broaden your knowledge

In Second Year (Stage 2), students broaden their knowledge of Actuarial & Financial Studies with modules in Finance, Statistics, Actuarial Mathematics and Economic History.

Actuarial & Financial Studies

Modules include:

- Economic History
- Professional & Classical Ethics
- Probability Theory
- Inferential Statistics
- Advanced Corporate Finance
- Bayesian Analysis
- Predictive Analysis
- Fundamentals of Actuarial Mathematics

- Two elective modules

YEAR 3

Refine Your Knowledge

In Third Year (Stage 3), students refine their knowledge of Actuarial & Financial Studies with modules in Investment & Trading, Actuarial Statistics, Information Management, Workplace Skills and a six-month professional placement in an insurance or financial institution.

Actuarial & Financial Studies

Modules include:

- Investing and Trading
- Stochastic & Survival Models
- Time Series Analysis
- Information Management for Actuaries
- Workplace Skills
- BAFS Professional Work Placement (at least 6 months)

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies in Actuarial & Financial Studies.

Actuarial & Financial Studies

Modules include:

- Actuarial Statistics
- Core Actuarial Principles
- Financial and Actuarial Mathematics
- Actuarial Mathematics

- Two option modules

Career & Study Opportunities

BAFS (Honours) Actuarial and Financial Studies

PhD

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

Industry

Actuarial Trainee in the following areas:

- Life Insurance
- Pensions
- Investment
- Health Insurance
- General Insurance
- Banking or Finance
- Trading

Conversion Courses

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

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

Contact Us internationalenquiries@ucd.ie www.ucd.ie/global

V1 2022 Non-EU Edition Non-EU Edition

Computer Science

CSSA

Degrees Available:
Computer Science
Computer Science with Data Science

CSSA Computer Science is designed for students who wish to specialise in computer science or data science, and want to pursue careers in software engineering, data analytics, the tech industry or research and development.

Years 1 and 2 are common to Computer Science and Computer Science with Data Science

70% Software Engineering

30% Mathematics in First Year

At the end of **Year 2,** you choose to major in either Computer Science or Computer Science with Data Science

Learn programming languages such as Java, Python and Ruby; software development tools and methodologies such as Git and Scrum; web technologies such as JavaScript; and the latest techniques in Big Data programming.

Frequently Asked Questions

Q: What is Data Science?
A: Data science is about extracting insights from data that can transform the way a company operates. For example, understanding data can match millions of businesses with new customers around the world in the areas of advertising and e-commerce.

Q: Do I need to have prior experience of programming?
A: No. CSSA Computer Science 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?
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

CSSA

Sample pathway for Computer Science*

YEAR 1

Engage with the principles

In First Year (Stage 1), students engage with the principles. Students complete modules in Computer Science and Mathematics.

Computer Science

Modules include:

- Algorithmic Problem-Solving
- Computer Programming
- Introduction to Computer Architecture
- Formal Foundations
- Computer Science in Practice
- Software Engineering Project I
- Statistics with Python
- Introduction to Functional Programming

Mathematics

Modules include:

- Matrix Algebra
- Foundations of Mathematics for Computer Science

- One elective module

YEAR 2

Broaden your knowledge

In Second Year (Stage 2), students broaden their knowledge before choosing their degree subject at the end of the year.

Computer Science

Modules include:

- Data Structures & Algorithms
- Introduction to Java
- Discrete Mathematics for Computer Science
- Software Engineering Project II
- Linear Algebra II
- Databases and Information Systems I
- Digital Systems
- Introduction to Operating Systems

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students refine their knowledge of Computer Science.

Computer Science

Modules include:

- Foundations of Computing
- Networks and Internet Systems
- Object-Oriented Programming
- Software Engineering Project III
- Introduction to Artificial Intelligence
- Program Construction I
- Computer Graphics I
- Web Development
- Programming for Big Data
- Computer Systems
- Algorithms for Graphs and Networks
- Industry Internship

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Computer Science this will include a research project.

Computer Science

Modules include:

- Computer Science Project
- Spatial Information Systems
- Distributed Systems
- Advances in Wireless Networking
- Cloud Computing
- Mobile App Development
- Computer & Network Security
- Human Computer Interaction
- Contemporary Software Development
- Programming for IOT
- Information Theory
- Multi-Agent Systems
- Performance of Computer Systems

Career & Study Opportunities

BSc (Honours) Computer Science

MSc (Taught)

- MSc Computer Science (Negotiated Learning)
- MSc Business Analytics
- MSc Cognitive Science

Research

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

- Artificial Intelligence
- Software and Systems Engineering
- Networks and Distributed Systems

Industry

- High-Tech Sector
- Financial Sector
- Consultancy
- Software Development
- Tech Start-ups
- Education (Third Level)

Conversion Courses

- UCD Michael Smurfit Graduate Business School postgraduate degrees, e.g., Master of Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Computer Science with Data Science

CSSA

Sample pathway for Computer Science with Data Science*

YEAR 1

Engage with the principles

In First Year (Stage 1), students engage with the principles. Students complete modules in Computer Science and Mathematics.

Computer Science

Modules include:

- Algorithmic Problem-Solving
- Computer Programming
- Introduction to Computer Architecture
- Formal Foundations
- Computer Science in Practice
- Software Engineering Project I
- Introduction to Functional Programming

Mathematics

Modules include:

- Matrix Algebra
- Foundations of Mathematics for Computer Science

- One elective module

YEAR 2

Broaden your knowledge

In Second Year (Stage 2), students broaden their knowledge of Computer Science and Data Science before choosing their degree subject at the end of the year.

Computer Science with Data Science

Modules include:

- Data Structures & Algorithms
- Introduction to Java
- Discrete Mathematics for Computer Science
- Software Engineering Project II
- Linear Algebra II
- Databases and Information Systems I
- Digital Systems
- Introduction to Operating Systems

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students refine their knowledge of Computer Science with Data Science.

Computer Science with Data Science

Modules include:

- Data Science in Python
- Networks and Internet Systems
- Probability Theory
- Introduction to Artificial Intelligence
- Network Analysis
- Data Science in Practice
- Industry Internship
- Information Visualisation
- Programming for Big Data

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Computer Science with Data Science this will include a research project.

Computer Science with Data Science

Modules include:

- Data Science Project
- Machine Learning
- Deep Learning
- Data Mining
- Cloud Computing
- Connectionist Computing
- Parallel and Cluster Computing
- Text Analytics
- Human Language Technology
- Spatial Information Systems
- Information Security
- Linear Models
- Human Computer Interaction
- Information Theory
- Unix Programming
- Ethical Computer Hacking
- Information Ethics

Career & Study Opportunities

BSc (Honours) Computer Science with Data Science

MSc (Taught)

- MSc Computer Science (Negotiated Learning)
- MSc Business Analytics
- MSc Cognitive Science

Research

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

- Artificial Intelligence
- Software and Systems Engineering
- Networks and Distributed Systems

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

- UCD Michael Smurfit Graduate Business School postgraduate degrees, e.g., Master of Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

Contact Us internationalenquiries@ucd.ie www.ucd.ie/global

V1 2022 Non-EU Edition

Sustainability

STS1

Degrees Available:
Sustainability with Environmental Sciences
Sustainability with Social Sciences, Policy and Law
Sustainability with Business and Economics

This unique 4-year multidisciplinary course combines the economic, environmental and social dimensions of sustainability, enabling specialisation in one of those dimensions complemented by knowledge and skills from the others. First Year is structured so that students can progress into their preferred degree option in Second Year.

Global perspective on sustainability

Unique multidisciplinary **course**

4 Year Honours BSc **course**

Core modules provide a global perspective on sustainability and include interdisciplinary research, a professional placement, field work in Ireland and Europe and guest lectures from leading researchers, advocates and practitioners.

Frequently Asked Questions

Q: Will there be an opportunity to complete an internship or study abroad?

A: Students will have the opportunity to study abroad as part of international internships with relevant industries and employers. Placements are secured through a competitive process. There will also be opportunities to apply for the Erasmus Study Abroad Programmes and there will be opportunities for overseas field trips.

Q: What could my career involve after graduating?

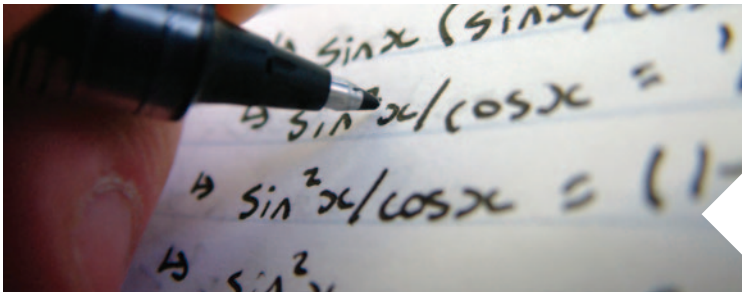
A: Graduates will enjoy careers as consultants, managers and advisers in large organisations and private businesses. An interdisciplinary education in sustainability theory, policy and practise will equip you to work in areas such as renewables, clean technology management and energy efficiency, or advise industries on social and environmental strategies. Many opportunities also exist in organisations such as the UN, the European Environment Agency and the European Commission, government departments and state agencies.

Science
SCU1

22 Degrees available from the following streams:
Biological, Biomedical & Biomolecular Sciences (BBB)
Chemistry & Chemical Sciences (CCS)
Mathematical, Physical & Geological Sciences (MPG)

The first year of the SCU1 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 SCU1 Science students are guaranteed a degree from within a stream of their choice. All students may change their choice of stream during First Year.

COMMON ENTRY:
1 Course Code, 22 different degrees



Did You Know?
All SCU1 Science students are guaranteed a degree from within a stream of their choice.

TIME
Time to change your mind in First Year

4 Year
Honours BSc course

Frequently Asked Questions

Q: Is SCU1 Science a General Science degree?

A: No. The SCU1 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 22 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.

First Year (Stage 1)

- We recommend that all incoming First Year Science students read the Stage 1 (First Year) Guide and Science Student Handbook for information on the module combinations available in First Year.
- Each stream has a set number of compulsory modules you must take in First Year in order to pursue a subject or group of subjects in Second Year and to degree level.
- The number of compulsory modules has been kept low to allow you 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.
- The flexible curriculum allows you to focus on an area from First Year or keep your options open, depending on your preference. Plenty of advice is available during the application process and when you arrive at UCD on the module combinations to study in First Year.

Second Year (Stage 2)

- Depending on the modules you studied in First Year, you choose a minimum of 2 subjects in Second Year. Students who choose modules for the Biological, Biomedical & Biomolecular stream in First Year could combine Zoology with Biochemistry & Molecular Biology or Chemistry and Genetics, for example.
- Each subject pathway on pages 20 to 46 in this brochure illustrates common subject combinations for Second Year in SCU1 Science. These are illustrative of the choices a student could make but other combinations are possible.

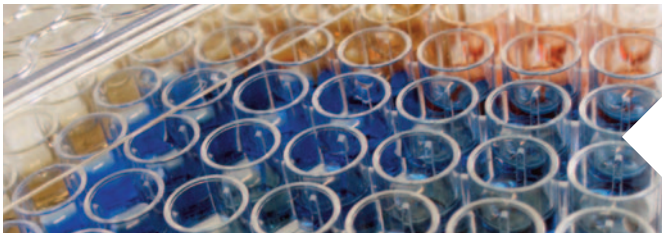
Third and Fourth Year (Stages 3 and 4)

- In Third and Fourth Year, you study your degree subject in depth. Sample modules from both these years are listed on each degree subject pathway page. Many subjects will include a research project which you complete in your final year. Opportunities to apply for internships or professional placements are usually at the end of Third Year.

Student Testimonials

No Preference

SCU1 Science is a flexible course with a diverse range of options available to students. Students who want to sample a number of degree options in First Year can do so.



No Preference

Georgie Xistris-Songpanya

I'm from Wisconsin, USA. In First Year, I was able to try a diverse range of classes as the flexible structure allowed for a personalised education whilst filling degree requirements. This freedom to curate modules allowed me to explore subjects that I was curious about. In second year, I focused my studies on Neuroscience, Biochemistry, Cell & Molecular Biology, Plant Biology, and Pharmacology.

Currently, I am in my Third Year and have chosen to pursue Cell & Molecular Biology. This course delivers graduates with an extensive amount of career options. In the future I plan to apply to postgraduate programmes in Dublin, Berlin, and Madison, Wisconsin.

No Preference

Eimear Madden

I had always intended to study science at third level, however, I was unsure as to which science I was best suited. UCD Science allowed me to sample subjects from across Biology, Chemistry, Physics and Geology, and so I built my knowledge of these subjects throughout my first two years.

Science at UCD ensures all students have a broad understanding of each of the sciences and allows you to focus on your favourite in the final two years. After careful deliberation, I decided Chemistry was the subject for me. I was drawn to the laboratory aspect of the degree, and the small class sizes offered.

No Preference

Ruth Moore

I chose the No Preference option as I wasn't sure after secondary school if I wanted to do a degree in Physics or Biology. In First Year, I studied Mathematics, Biology, Physics and Chemistry, and in Second Year I focused on Physics and Maths modules while being able to keep up with some biology content as electives.

I eventually decided to study Physics with Astronomy & Space Science as I found the subject material to be the most interesting. I loved how varied studying Physics is; we learn everything from how the fabric of our universe is made, to how stars are formed.

No Preference

Maria Noone

In Fifth and Sixth Year in school, I loved Geography and Physical Geography. I really liked Science in general, so I decided to study SCU1 Science. Since I loved Geography in school, I decided to take a Geology module as an elective.

I liked Geology so much that I kept it up in Second Year. Halfway through Second Year I just knew I had to pick Geology in Third Year - I absolutely loved it. I loved the field trips and learning about the Earth. It was more interesting for me to learn about Geology as it clicked with me.

Student Testimonials

Biological, Biomedical & Biomolecular Science
Chemistry & Chemical Sciences
Mathematical, Physics & Geological Sciences

The flexible curriculum allows students to specialise in First Year should they know what they want to study. The number of compulsory modules has been kept low to allow you 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.

Biological, Biomedical & Biomolecular Science

Emma Cullen

I have always had a passion for Microbiology, fascinated by this invisible, ubiquitous community of organisms present throughout our world and beyond. SCU1 was the perfect choice for me.

This gave me the opportunity to try out a variety of subjects including Neuroscience and Biochemistry before deciding on my favourite - Microbiology. Microbiology offers numerous opportunities, in fields as diverse as the environment, food, medical and pharmaceutical sectors. I currently working as a QA Food Science associate in Glanbia Ireland.

Chemistry & Chemical Sciences

Liam Jowett

I am fascinated by the world around me, from the fundamental laws of our universe to the mechanisms of life itself. I have found Chemistry in UCD to be a place where my own curiosities and my passion to make a difference have been nurtured and developed.

The lecturers are all kind, helpful and supportive, and their passion for their work is something I continue to find inspiring. Through UCD I was lucky enough to be awarded a scholarship to study for a term in the US, where I made many friends and grew as a chemist, and as a person.

Mathematical, Physics & Geological Sciences

Joseph Mulligan

In school I always enjoyed Mathematics and Physics, but after taking some First Year modules, I knew that I wanted to pursue a Mathematics subject. When I learned about the Financial Mathematics degree subject, it sounded like the perfect way to continue to study maths while also combining it with my interest in financial markets.

I was also lucky enough to get to go abroad for my third year to UC Berkeley in California, which was an amazing experience. Studying at a different institution gave me another perspective and I think it's really helped me in my final year.

Mathematical, Physics & Geological Sciences

Lána Salmon

After studying Physics, Chemistry and Technology in school, I wanted to know more about the science behind the stars. The UCD community and campus were very exciting, but it was the course that made me choose UCD. The flexibility of UCD Science meant that I could focus entirely on the subject I wanted via the MPG stream– Physics with Astronomy & Space Science. The experience that comes out on top in my degree is the final-year Astronomy field trip to Teide Observatory.

I felt that the whole experience of proposing a complex project to study a binary star system and then learning how to use a world class telescope to conduct this research was really rewarding.

Biochemistry & Molecular Biology

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Biochemistry & Molecular Biology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Biochemistry & Molecular Biology must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One small-group project
- Optional Science modules
- One elective module

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Biochemistry & Molecular Biology in Second Year.

Biochemistry & Molecular Biology

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

Microbiology

Modules include:
- Microbiology in Medicine, Biotechnology and the Environment
- Research Methods for Science

Pharmacology

Modules include:
- Biomedical Science of Drugs

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Biochemistry & Molecular Biology

Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Biochemistry & Molecular Biology this will include a research project.

Biochemistry & Molecular Biology

Modules include:
- Biochemistry Research Project
- Biochemistry Career Skills
- Advanced Neurochemistry
- Advanced Cell Signalling
- Biochemical Research Strategies
- Protein Structure & Analysis
- Three optional modules on topics such as cancer, genetics, microbiology and pharmacology

Career & Study Opportunities

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
- Clinical biochemist in hospital
- Clinical trials sector

Conversion Courses
- Professional Master of Education (PME)
- Graduate Veterinary Medicine
- Graduate Medicine
- Master of Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Cell & Molecular Biology

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Cell & Molecular Biology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Cell & Molecular Biology must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Cell & Molecular Biology in Second Year.

Cell & Molecular Biology

Modules include:
- Scientific Communication
- Principles of Cell Biology
- Chemistry for Biologists
- Biomolecular Laboratory Skills

Microbiology

Modules include:
- Metabolic and Immune Systems
- Microbiology in Medicine, Biotechnology and the Environment

Genetics

Modules include:
- Principles of Genetics
- Molecular Genetics and Biotechnology

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Cell & Molecular Biology

Modules include:
- Advanced Cell Biology
- Hot Topics 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Cell & Molecular Biology this will include a research project.

Cell & Molecular Biology

Modules include:
- Cell Biology Research Project
- Membrane Trafficking
- Programmed Cell Death
- Cell Signalling
- The RNA World
- Biological Imaging
- Human Genetics & Disease
- Cell Biology of Cancer
- Cell Biology of Ageing

Career & Study Opportunities

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
- Genetic Counselling
- Forensic Science

Conversion Courses
- Professional Master of Education (PME)
- Graduate Veterinary Medicine
- Graduate Medicine
- Master of Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Environmental Biology

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Environmental Biology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Environmental Biology must study modules in Biology, Chemistry and Mathematics.

Modules available include:

- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Environmental Biology in Second Year.

Environmental Biology

Modules include:

- Principles of Environmental Biology and Ecology
- Scientific Communication
- Evolutionary Biology
- Microbial Interactions
- Global Environmental Change
- Forests, Climate and Carbon
- Applied Plant Biology

Zoology

Modules include:

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

Plant biology

Modules include:

- Principles of Plant Biology and Biotechnology

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Environmental Biology

Modules include:

- Systems Ecology
- Biogeography and Field Biology
- Diversity of Vertebrates
- Diversity of Plant Form & Function
- Ecology & Environmental Microbiology
- Wildlife and Fisherie Management

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Environmental Biology this will include a research project.

Environmental Biology

Modules 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

Career & Study Opportunities

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 Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Genetics

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Genetics*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Genetics must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Genetics in Second Year.

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

Microbiology
Modules include:
- Microbiology in Medicine, Biotechnology and the Environment

Zoology
Modules include:
- Principles of Zoology
- Animal Behaviour
- Evolutionary Biology

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Genetics
Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Genetics this will include a research project.

Genetics
Modules include:
- Genetics Research Project
- Genetics Disease & Behaviour
- Gene Regulation
- Systems Microbiology
- Model Organism Genetics

Career & Study Opportunities

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
- Forensic Science labs
- Agribiotech and horticulture

Conversion Courses
- Professional Master of Education (PME)
- Graduate Veterinary Medicine
- Graduate Medicine
- Master of Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Microbiology

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Microbiology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Microbiology must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Microbiology in Second Year.

Microbiology

Modules include:
- Chemistry for Biologists
- Molecular Genetics and Biotechnology
- Biomolecular Laboratory Skills
- Metabolic and Immune Systems
- Microbiology in Medicine, Biotechnology and the Environmentent

Cell & Molecular Biology

Modules include:
- Principles of Cell and Molecular Biology

Genetics

Modules include:
- Principles of Genetics

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Microbiology

Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Microbiology this will include a research project.

Microbiology

Modules include:
- Microbiology Research Project/Internship
- Ecological & Environmental Microbiology
- Systems Microbiology
- Foodborne Pathogens
- Microbial Pathogenicity
- Bioprocessing
- Enzyme Technology & Protein Engineering
- Natural Product Synthesis
- Host Defense Mech. In Health

Career & Study Opportunities

BSc (Honours) Microbiology

MSc (Taught)
- MSc Biotechnology
- MSc Biotechnology & Business
- MSc Environmental Management
- MSc Regulatory Affairs & Toxicology
- 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

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

Contact Us internationalenquiries@ucd.ie www.ucd.ie/global

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Neuroscience

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Neuroscience*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Neuroscience must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Neuroscience in Second Year.

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

Biochemistry & Molecular Biology
Modules include:
- Principles of Biochemistry

Pharmacology
Modules include:
- Biomedical Science of Drugs

Genetics
Modules include:
- Principles of Genetics

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Neuroscience
Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Neuroscience this will include a research project.

Neuroscience
Modules include:
- Neuroscience Research Project
- Synaptic Plasticity
- Advanced Topics in Neural Development
- Advanced Neuropharmacology
- Advanced Neurochemistry
- Molecular Neuroimmunology
- Genetics of Disease & Behaviour
- Synaptic Signalling
- Emerging Therapies

Career & Study Opportunities

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
- Forensic Science laboratories
- Pharmaceutical companies

Conversion Courses
- Professional Master of Education (PME)
- Graduate Veterinary Medicine
- Graduate Medicine
- Master of Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Pharmacology

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Pharmacology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Pharmacology must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Pharmacology in Second Year.

Pharmacology

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

Physiology

Modules include:
- Introduction to Physiology
- Organs and Systems Physiology

Microbiology

Modules include:
- Microbiology in Medicine, Biotechnology and the Environment

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Pharmacology

Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Pharmacology this will include a research project.

Pharmacology

Modules include:
- Pharmacology Research Project
- Advanced Neuropharmacology
- Adv. Cardiovascular Pharmacology
- Finding new Pharmaceuticals
- Adv. Pharmacology of Cancer
- Emerging Therapies
- Advanced Renal Pharmacology
- Gene Regulation
- Drug Discovery & Development

Career & Study Opportunities

BSc (Honours) Pharmacology

MSc (Taught)
- MSc Biotechnology
- MSc Biotechnology & Business
- MSc Biotherapeutics
- MSc Regulatory Affairs & Toxicology

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 Management

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V1 2022 Non-EU Edition

Physiology

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Physiology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Physiology must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Physiology in Second Year.

Physiology
Modules include:
- Chemistry for Biologists
- Molecular Genetics and Biotechnology
- Biomolecular Laboratory Skills
- Introduction to Physiology
- Organs and Systems Physiology
- Metabolic and Immune systems

Neuroscience
Modules include:
- Principles of Neuroscience

Microbiology
Modules include:
- Principles of Microbiology: Medicine, Environment and Biotechnology

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Physiology
Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Physiology this will include a research project.

Physiology
Modules include:
- Research Project
- Lung Function Under Stress
- Control of Vascular Resistance
- Haemostasis and Thrombosis
- Adaptation to Hypoxia
- Physiological Genomics
- The Physiology of Disease
- Fundamentals of Physiological Research

Career & Study Opportunities

BSc (Honours) Physiology

MSc (Taught)
- 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

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Plant Biology

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Plant Biology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Plant Biology must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Plant Biology in Second Year.

Plant Biology

Modules include:
- Chemistry for Biologists
- Scientific Communication
- Principles of Plant Biology
- Biomolecular Lab Skills
- Principles of Cell and Molecular Biology

Environmental Biology

Modules include:
- Principles of Environmental Biology and Ecology

Zoology

Modules include:
- Principles of Zoology
- Animal Behaviour
- Molecular Genetics and Biotechnology

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Plant Biology

Modules include:
- Plant Diseases
- Plant Form & Function
- Plant Biotechnology
- Experimental Plant Physiology
- Plant Cell Biology
- Working with Biological Data
- Genetics
- Systems Ecology

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Plant Biology this will include a research project.

Plant Biology

Modules include:
- Plant Biology Research Project
- Biology and Ecology of Coastal Wetlands
- Environmental Impact Assessments
- Developmental Plant Genetics
- Cell Signalling in Plants
- Plants and Stress
- Plant Phenotyping
- Programmed Cell Death
- Plant Biotechnology and Entrepreneurship

Career & Study Opportunities

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 Management
- Graduate Veterinary Medicine

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V1 2022 Non-EU Edition

Zoology

SCU1

Stream: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for Zoology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Zoology must study modules in Biology, Chemistry and Mathematics.

Modules available include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences
- The Basis of Organic and Biological Chemistry
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of BBB students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Zoology in Second Year.

Zoology

Modules include:
- Principles of Zoology
- Scientific Communication
- Animal Behaviour
- Molecular Genetics and Biotechnology
- Chemistry for Biologists

Environmental Biology

Modules include:
- Principles of Environmental Biology and Ecology

Genetics

Modules include:
- Principles of Genetics
- Metabolic and Immune Systems
- Biomolecular Laboratory Skills

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Zoology

Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Zoology this will include a research project.

Zoology

Modules include:
- Zoology Research Project
- Biological Invasions
- Marine Community Ecology
- Bioassessent of Freshwaters
- Biodiversity
- Molecular Phylogenetics and Evolution
- Physiology of Epithelial Transport

Career & Study Opportunities

BSc (Honours) Zoology

MSc (Taught)
- MSc Applied Environmental Science
- MSc World Heritage Management
- MSc Biological & Biomolecular Science (Negotiated Learning)

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 Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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V1 2022 Non-EU Edition

Chemistry

SCU1

Stream: Chemistry & Chemical Sciences (CCS)

Sample pathway for Chemistry*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Chemistry must study modules in Chemistry and Mathematics

Modules available include:
- The Basis of Organic and Biological Chemistry
- The Basis of Physical Chemistry
- The Molecular World
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of CCS students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Chemistry in Second Year.

Chemistry

Modules include:
- The Basis of Inorganic Chemistry
- Organic Chemistry
- Physical Chemistry
- Inorganic Chemistry

Medicinial Chemistry & Chemical Biology

Modules 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

In Third Year (Stage 3), students focus their studies on one degree subject.

Chemistry

Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Chemistry this will include a research project.

Chemistry

Modules include:
- Chemistry Research Project
- Methods in Organic Synthesis
- Chemical Thermodynamics
- Electrochemistry
- Reactivity & Change
- Nanochemistry
- Advanced Inorganic Chemistry
- Methods in Organic Synthesis 2
- Modern Methods and Catalysis

Career & Study Opportunities

BSc Chemistry

PhD

Chemistry graduates also pursue PhDs in Ireland or abroad in areas as diverse as:
- Total synthesis of natural products
- Biological aspects of nanoscience
- Novel material synthesis
- Energy generation
- Synthetic organic chemistry methodology development
- Polymer chemistry

Industry

Most graduates work in the pharmaceutical or chemical industries. Positions include the following:
- Manufacturing
- Process Chemists
- Quality Control, Analysis or Assurance
- Research and Development
- Raw Materials/Product Analysis

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Chemistry with Biophysical Chemistry

SCU1

Stream: Chemistry & Chemical Sciences (CCS)

Sample pathway for Chemistry with Biophysical Chemistry*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Chemistry with Biophysical Chemistry must study modules in Chemistry, Biology and Mathematics.

Modules available include:
- The Basis of Organic and Biological Chemistry
- The Basis of Physical Chemistry
- The Molecular World
- Cell Biology & Genetics
- Mathematics for the Biological & Chemical Sciences
- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of CCS students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Chemistry with Biophysical Chemistry in Second Year.

Chemistry with Biophysical Chemistry

Modules include:
- Biophysical Chemistry
- Physical Chemistry
- Inorganic Chemistry
- Organic Chemistry

Chemistry

Modules 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

In Third Year (Stage 3), students focus their studies on one degree subject.

Chemistry with Biophysical Chemistry

Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Chemistry with Biophysical Chemistry this will include a research project.

Chemistry with Biophysical Chemistry

Modules include:
- Biophysical Chemistry Research Project
- Metals in Biology
- Electrochemistry
- Biophysical Chemistry
- Advanced Kinetics and Thermodynamics
- Nanochemistry
- Optional modules in Biomolecular, Organic and Inorganic Chemistry

Career & Study Opportunities

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 development

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 Management

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V1 2022 Non-EU Edition

Chemistry with Environmental & Sustainable Chemistry

SCU1

Stream: Chemistry & Chemical Sciences (CCS)

Sample pathway for Chemistry with Environmental & Sustainable Chemistry*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Chemistry with Environmental & Sustainable Chemistry must study modules in Chemistry and Mathematics.

Modules available include:
- The Basis of Organic and Biological Chemistry
- The Basis of Physical Chemistry
- The Molecular World
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of CCS students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Chemistry with Environmental & Sustainable Chemistry in Second Year.

Chemistry with Environmental & Sustainable Chemistry

Modules include:
- Environmental and Sustainable Chemistry
- Inorganic Chemistry
- Physical Chemistry
- Environmental Geology

Chemistry

Modules include:
- The Basis of Inorganic Chemistry
- Organic Chemistry
- Chemical Biology
- Biophysical Chemistry

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Chemistry with Environmental & Sustainable Chemistry

Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Chemistry with Environmental & Sustainable Chemistry this will include a research project.

Chemistry with Environmental & Sustainable Chemistry

Modules include:
- Environmental & Sustainable Chemistry Research Project
- Green and Sustainable Chemistry
- Methods in Organic Synthesis
- Chemical Thermodynamics
- Nanochemistry
- Electrochemistry
- Reactivity & Change
- Modern Methods and Catalysis
- Advanced Inorganic Chemistry
- Methods in Organic Synthesis 2
- Industrial Internship

Career & Study Opportunities

BSc (Honours) Chemistry with Environmental & Sustainable Chemistry

Apart from the positions that a chemistry degree would qualify a student for, 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

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Medicinal Chemistry & Chemical Biology

SCU1

Stream: Chemistry & Chemical Sciences (CCS)

Sample pathway for Medicinal Chemistry & Chemical Biology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond.

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email orla.donoghue@ucd.ie if you have any questions about how First Year works.

In First Year, students interested in Medicinal Chemistry & Chemical Biology must study modules in Chemistry, Biology and Mathematics.

Modules available include:

- The Basis of Organic and Biological Chemistry
- The Basis of Physical Chemistry
- The Molecular World
- Cell Biology & Genetics
- Mathematics for the Biological & Chemical Sciences

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of CCS students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Medicinal Chemistry & Chemical Biology in Second Year.

Medicinial Chemistry & Chemical Biology

Modules 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

Modules 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

In Third Year (Stage 3), students focus their studies on one degree subject.

Medicinial Chemistry & Chemical Biology

Modules 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

In Fourth Year (Stage 4), students complete their undergraduate studies and in Medicinal Chemistry & Chemical Biology this will include a research project.

Medicinial Chemistry & Chemical Biology

Modules include:

- Research Project
- Metals in Biology
- Methods in Organic Synthesis
- Modern Methods of Catalysis
- Special topics in Medicinal Chemistry and Chemical Biology

Career & Study Opportunities

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 Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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V1 2022 Non-EU Edition

Applied & Computational Mathematics

SCU1

Stream: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for Applied & Computational Mathematics*

YEAR 1

Engage with the principles

First Year (Stage 1), students interested in Applied & Computational Mathematics must study modules in Mathematics, Applied & Computational Mathematics and Statistics. The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email gary.dunne@ucd.ie if you have any questions.

Modules available include:

- Applied Mathematics: Mechanics and Methods
- Applications of Differential Equations
- Calculus in the Mathematical and Physical Sciences
- Mathematical Analysis
- Linear Algebra in the Mathematical and Physical Sciences
- Introduction to Statistical Modelling

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of MPG students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Applied & Computational Mathematics in Second Year.

Applied & Computational Mathematics

Modules include:

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

Mathematics

Modules include:

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

Statistics

Modules include:

- Probability Theory
- Inferential Statistics

- One elective module

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Applied & Computational Mathematics

Modules include:

- Mathematical Biology
- Dynamical Systems
- Functions of One Complex Variable
- Partial Differential Equations
- Advanced Mathematical Methods
- Mathematical Fluid Dynamics I
- Foundations of Quantum Mechanics
- Metric Spaces

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Applied & Computational Mathematics this will include a research project.

Applied & Computational Mathematics

Modules include:

- Applied & Computational Mathematics Research Project
- Differential Geometry
- General Relativity and Black Holes
- Advanced Computational Science
- Electrodynamics and Gauge Theory
- Mathematical Fluid Dynamics II
- Maths of Machine Learning
- Maths of Complex Networks
- Survey of Applied & Computational Mathematics

Career & Study Opportunities

BSc (Honours) Applied & Computational Mathematics

MSc (Taught)

- MSc Data & Computational Science
- MSc Mathematical Science
- MSc Applied Mathematics & Theoretical Physics
- MSc Computational Physics

PhD

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

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

Industry

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

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

Conversion Courses

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

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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V1 2022 Non-EU Edition

Financial Mathematics

SCU1

Stream: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for Financial Mathematics*

YEAR 1

Engage with the principles

First Year (Stage 1), students interested in Financial Mathematics must study modules in Mathematics, Applied & Computational Mathematics and Statistics. The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email gary.dunne@ucd.ie if you have any questions.

Modules available include:

- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences
- Numbers and Functions
- Mathematical Analysis
- Statistical Modelling
- Applications of Differential Equations
- Economics

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of MPG students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Financial Mathematics in Second Year.

Financial Mathematics

Modules include:

- Calculus of Several Variables
- Linear Algebra 2
- Theory of Games
- Business Economics
- Foundations in Finance

Statistics

Modules include:

- Inferential Statistics
- Introduction to Probability
- Predictive Analytics

Applied & Computational Mathematics

Modules include:

- Computational Science
- Vector Calculus

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Financial Mathematics

Modules include:

- Foundations for Financial Mathematics
- Partial Differential Equations for Financial Mathematics
- Metric Spaces
- Fundamentals of Actuarial and Financial Mathematics
- Optimization in Finance
- Corporate Finance
- Statistical Machine Learning
- Advanced Computational Finance
- Stochastic Models

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Financial Mathematics this will include a research project.

Financial Mathematics

Modules include:

- Measure Theory and Integration
- Probability Theory
- Financial and Actuarial Mathematics 1 & 2
- Investment and Trading
- Advanced Risk Management
- Time Series Analysis
- Monte Carlo Inference
- Advanced Topics in Computational Science

Career & Study Opportunities

BSc (Honours) Financial Mathematics

MSc (Taught)

- MSc Financial Mathematics
- MSc Mathematical Science
- MSc Statistics
- MSc Actuarial Science
- MSc Business Analytics
- MSc Data Analytics

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)

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Mathematics

SCU1

Stream: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for Mathematics*

YEAR 1

Engage with the principles

First Year (Stage 1), students interested in Mathematics must study modules in Mathematics, Applied & Computational Mathematics and Statistics. The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email gary.dunne@ucd.ie if you have any questions.

Modules available include:

- Applied Mathematics: Mechanics and Methods
- Calculus in the Mathematical and Physical Sciences
- Numbers & Functions
- Linear Algebra in the Mathematical and Physical Sciences
- Mathematical Analysis
- Applications of Differential Equations
- Statistical Modelling
- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of MPG students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Mathematics in Second Year.

Mathematics

Modules include:

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

Applied & Computational Mathematics (Optional)

Modules include:

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

Statistics (Optional)

Modules include:

- Probability Theory
- Stochastic Models
- Inferential Statistics

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Mathematics

Modules include:

- Advanced Linear Algebra
- Metric Spaces
- Fourier Analysis
- Measure Theory & Integration
- Functions of One Complex Variable
- Topology
- Number Theory
- Coding Theory

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Mathematics this will include a research project.

Mathematics

Modules include:

- Mathematics Research Project
- Differential Geometry
- Set Theory
- Combinatorics
- Functional Analysis
- Cryptography
- Ring Theory
- Stochastic Analysis
- Numerical Algorithms
- History of Mathematics
- Predictive Analytics
- Advanced Mathematical Methods

Career & Study Opportunities

BSc (Honours) Mathematics

MSc (Taught)

- MSc Financial Mathematics
- MSc Mathematical Science
- MSc Statistics
- MSc Actuarial Science
- MSc Business Analytics
- MSc Data Analytics

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)
- MSc Computer Science (Conversion)
- MSc Quantitative Finance

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Statistics

SCU1

Stream: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for Statistics*

YEAR 1

Engage with the principles

First Year (Stage 1), students interested in Statistics must study modules in Mathematics, Applied & Computational Mathematics and Statistics. The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email gary.dunne@ucd.ie if you have any questions.

Modules available include:
- Statistical Modelling
- Research Methods for Science
- Calculus (MPG)
- Linear Algebra 1 (MPG)
- Mathematical Analysis
- Numbers & Functions
- Applications of Differential Equations

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of MPG students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Statistics in Second Year.

Statistics

Modules include:
- Probability
- Inferential Statistics
- Bayesian Statistics
- Predictive Analysis

Mathematics

Modules include:
- Calculus of Several Variables
- Computational Science
- Linear Algebra 2

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Statistics

Modules include:
- Statistical Machine Learning
- Advanced Predictive Analytics
- Data Programming with R
- Data Programming with Python
- Time Series
- Stochastic Models
- Design of Experiments
- Survey Sampling

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Statistics this will include a research project.

Statistics

Modules include:
- Actuarial Statistics
- Applied Statistical Modelling
- Survival Models
- Monte Carlo Inference
- Nonparametric Statistics
- Machine Learning & AI
- Statistical Network Analysis
- Multivariate Analysis

Career & Study Opportunities

BSc (Honours) Statistics

MSc (Taught)
- MSc Statistics
- MSc Actuarial Science
- MSc Meteorology
- MSc Data Analytics

PhD
- Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as methodological and applied statistics, machine learning and data science, medical and pharmaceutical 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 Medicine
- Master of Management
- Graduate Veterinary Medicine

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Physics

SCU1

Stream: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for Physics*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond. The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email gary.dunne@ucd.ie if you have any questions about how First Year works. In First Year, students interested in Physics must study modules in Physics, Applied & Computational Mathematics and Mathematics.

Modules available include:

- Foundations of Physics
- Frontiers of Physics
- Thermal Physics and Materials
- Quanta, Particles and Relativity
- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences
- Applied Mathematics: Mechanics and Methods

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of MPG students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Physics in Second Year.

Physics

Modules include:

- Electronics and Devices
- Introductory Quantum Mechanics
- Fields, Waves and Light
- Methods for Physicists
- Thermodynamics & Statistical Physics

Physics students also study the following topics in Mathematics:

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

Physics with Astronomy & Space Science

Modules include:

Students who choose Physics as their main subject for Second Year may also cover the requirements for Physics with Astronomy & Space Science

- Astronomy & Space Science
- Exploring the Solar System
- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Physics

Modules include:

- Classical Mechanics & Relativity
- Optics & Lasers
- Electromagnetism
- Advanced Laboratory
- Nuclear Physics
- Quantum Mechanics
- Stellar Astrophysics & Astronomical Techniques
- Condensed Matter Physics

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Physics this will include a research project.

Physics

Modules include:

- Advanced Laboratory
- Applied Quantum Mechanics
- Applied Optics
- General Relativity & Cosmology
- High Energy Particle Physics
- Computational Biophysics
- Theoretical Astrophysics
- Medical Physics
- Galaxies & Observational Cosmology
- Quantum Field Theory
- Advanced Statistical Physics

IOP Institute of Physics Accredited

APPROVED DEGREE

Career & Study Opportunities

BSc (Honours) Physics

MSc (Taught)

- 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 of Management

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Physics with Astronomy & Space Science

SCU1

Stream: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for Physics with Astronomy & Space Science*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond. The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email gary.dunne@ucd.ie if you have any questions about how First Year works.
In First Year, students interested in Physics with Astronomy & Space Science must study modules in Physics, Applied & Computational Mathematics and Mathematics.

Modules available include:
- Foundations of Physics
- Frontiers of Physics
- Astronomy & Space Science
- Thermal Physics and Materials
- Quanta, Particles and Relativity
- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences
- Applied Mathematics: Mechanics and Methods
- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of MPG students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Physics with Astronomy & Space Science in Second Year.

Physics with Astronomy & Space Science

Modules 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

Modules include:
- Students who choose Physics with Astronomy & Space Science as their main subject for Second Year also cover the requirements for Physics
- Thermodynamics & Statistical Physics
- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Physics with Astronomy & Space Science

Modules include:
- Classical Mechanics & Relativity
- Stellar Astrophysics & Astronomical Techniques
- Optics and Lasers
- Physics with Astronomy and Space Science Lab
- Quantum Mechanics
- Electromagnetism
- Condensed Matter Physics

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Physics with Astronomy & Space Science this will include a research project.

Physics with Astronomy & Space Science

Modules include:
- Physics with Astronomy & Space Science Lab
- Galaxies & Obs. Cosmology
- Astronomy Field Trip to Tenerife
- Theoretical Astrophysics
- General Relativity & Cosmology
- Applied Quantum Mechanics
- Nuclear Physics
- Computational Biophysics
- High Energy Particle Physics
- Medical Physics
- Quantum Field Theory
- Advanced Statistical Physics

IOP Institute of Physics Accredited

APPROVED DEGREE

Career & Study Opportunities

BSc (Honours) Physics with Astronomy & Space Science

MSc (Taught)
- 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 Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Theoretical Physics

SCU1

Stream: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for Theoretical Physics*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond. The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email gary.dunne@ucd.ie if you have any questions about how First Year works. In First Year, students interested in Theoretical Physics must study modules in Physics, Applied & Computational Mathematics and Mathematics.

Modules available include:

- Foundations of Physics
- Frontiers of Physics
- Thermal Physics and Materials
- Quanta, Particles and Relativity
- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences
- Applied Mathematics: Mechanics and Methods
- Applications of Differential Equations

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of MPG students study a minimum of two subjects but many students will study three subjects. The following is just one example of subjects you could combine with Theoretical Physics in Second Year.

Theoretical Physics

Modules 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

Physics

Modules include:

- Students who choose Theoretical Physics as their main subject for Second Year also cover the requirements for Physics.
- Thermodynamics & Statistical Physics

- Two elective modules

YEAR 3

Focus on your chosen subject

In Third Year (Stage 3), students focus their studies on one degree subject.

Theoretical Physics

Modules include:

- Analytical Mechanics
- Partial Differential Equations
- Electromagnetism
- Foundations of Fluid Mechanics
- Quantum Mechanics
- Functions of One Complex Variable
- Advanced Laboratory
- Quantum Theory of Condensed Matter

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Theoretical Physics this will include a research project.

Theoretical Physics

Modules include:

- Theoretical Physics Project
- Applied Quantum Mechanics
- Advanced Mathematical Methods
- High Energy Particle Physics
- Nuclear Physics
- General Relativity & Cosmology
- Computational Biophysics
- Relativistic Quantum Mechanics
- Theoretical Astrophysics
- Quantum Field Theory
- Advanced Statistical Physics

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APPROVED DEGREE

Career & Study Opportunities

BSc (Honours) Theoretical Physics

MSc (Taught)

- 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 Management

**This pathway is an example only and is not guaranteed by UCD. Modules are subject to change each year.*

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Geology

SCU1

Stream: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway for Geology*

YEAR 1

Engage with the principles

In First Year (Stage 1), students choose modules to meet the requirements for the subjects they are considering studying in Second Year and beyond. The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email gary.dunne@ucd.ie if you have any questions about how First Year works.

Modules available include:

- Introduction to Earth Sciences
- Earth Science and Materials
- Field Geology
- Earth, Environment and Society
- Earth and Humanity
- Mathematics for the Biological & Chemical Sciences
- Scientific Enquiry
- 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
- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), students can choose to focus on Geology only. However, students also have the option to study Geology with other subjects, depending on what they studied in First Year. The following is an example of what students can study in Second Year Geology.

Geology

Modules include:

- Crystals to Sedimentary Rocks
- Dynamic Earth
- Field Geology and Mapwork
- Global Environmental Change
- Geoscience for Sustainability
- History of Life on Earth
- Medical Geology
- 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

In Third Year (Stage 3), students focus their studies on one degree subject.

Geology

Modules include:

- Geological Structures
- Sedimentary environments
- Igneous Petrology
- Geological Mapping
- Geobiology and Applied Palaeontology
- Geomaterials and Geoenergy
- Geological Fieldwork
- Metamorphic Petrology
- Low Temperature Geochemistry
- Geosynthesis
- Digital Geology and GIS
- Professional Placement
- Geosciences
- Geoscience Research Project

- Two elective modules

YEAR 4

Refine your knowledge

In Fourth Year (Stage 4), students complete their undergraduate studies and in Geology this will include a research project.

Geology

Modules include:

- Igneous and Ore Geology
- Advanced Geological Mapping
- Geological Mapping Research
- Geobiology and Applied Palaeontology
- Applied Geophysics
- Geological Fieldwork
- Basin Analysis
- Quaternary Geology
- 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

Career & Study Opportunities

BSc (Honours) Geology

MSc (Taught)

- MSc Subsurface Characterisation and Geomodelling
- MSc courses in the UK and elsewhere include hydrogeology, engineering geology and mineral exploration.

PhD

- 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

Industry

- 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

Conversion Courses

- Master of Management

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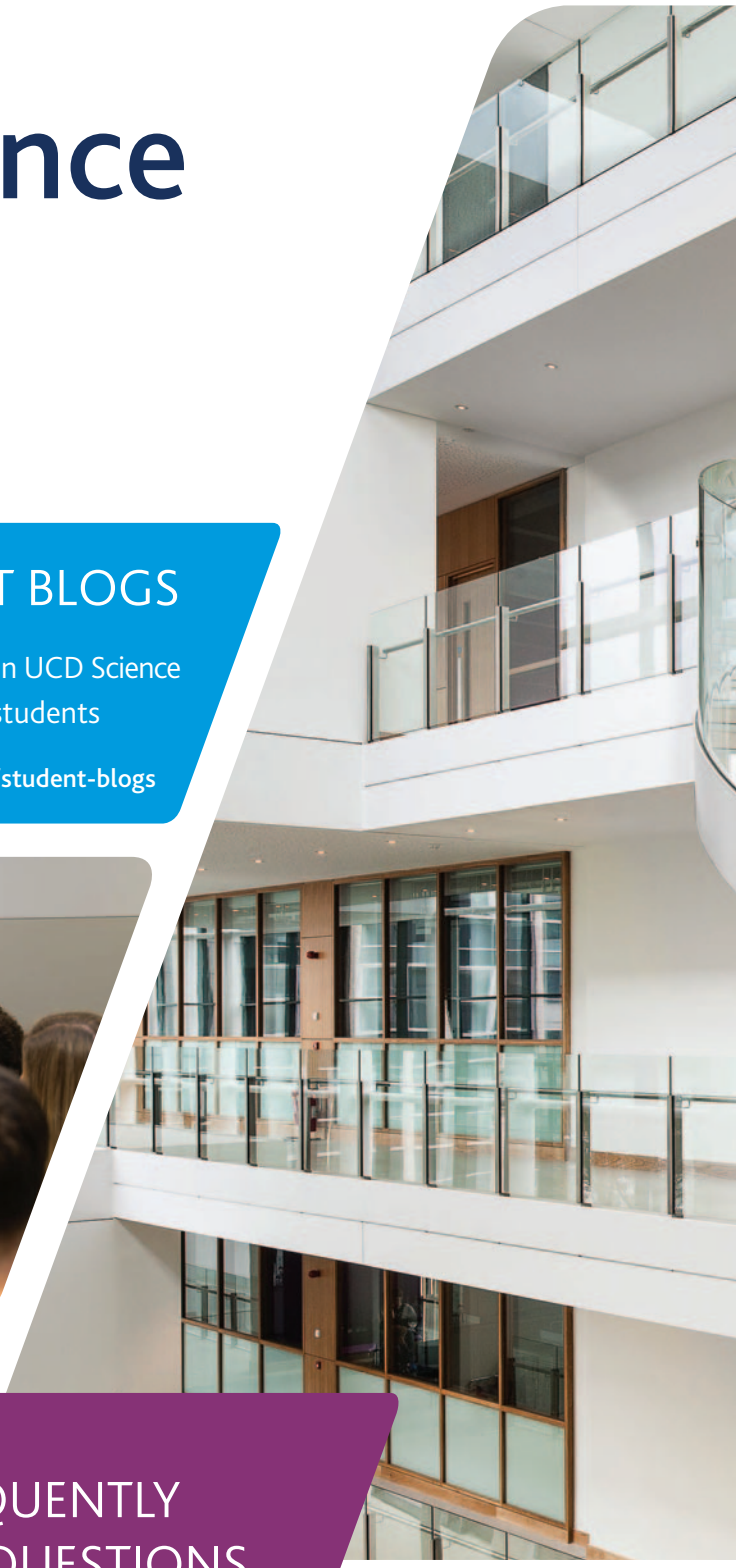
UCD Science



STUDENT BLOGS

Learn about life in UCD Science from our students

www.ucd.ie/science/study/student-blogs

FREQUENTLY ASKED QUESTIONS

Visit our YouTube channel at youtube.com/c/ucdscience/ for answers to common questions.

SOCIAL MEDIA

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IRELAND'S GLOBAL UNIVERSITY

29% of UCD students are from outside of Ireland, making UCD a truly global community

www.ucd.ie/global/

RISING TO THE FUTURE
UCD Strategy 2020-2024

UCD Science

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