UCD SCIENCE

UNDERGRADUATE COURSES ENTRY 2023

Science
Sustainability
Computer Science
Actuarial & Financial Studies

CONTENTS

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. In addition, we offer a unique programme in Sustainability combining the disciplines of Science, Social Sciences and Business. Our academic staff are expert teachers and are highly reputed world-class researchers, and indeed our research interests and strengths inform our undergraduate and postgraduate degree courses.

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

The choice of university and course can be a daunting one, and this is something that we recognise at UCD. In order to ensure that our university and degree courses are the right fit for your needs, we encourage all prospective students to engage with our series of events and to feel free to contact us if you have any queries. No problem is too trivial for us in this important phase of your career.

We look forward to welcoming you to UCD.

Jeremy C. Simpson

Professor Jeremy Simpson
Dean of Science

Professor Jeremy Simpson

"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."

APPLYING TO UCD

UCD offers the following undergraduate courses:

- Science (27 degree subjects)
- Computer Science (2 degree subjects)
- Sustainability (3 degree subjects)
- Actuarial & Financial Studies (1 degree subject)

EU APPLICANTS

EU applicants apply through the CAO at www.cao.ie for the following courses:

- Science DN200
- Computer Science DN201
- Actuarial & Financial Studies DN230
- Sustainability DN240

Applicants can apply with qualifications including the Irish Leaving Certificate, A-Levels and the European Baccalaureate.
The CAO Handbook entry for the Science courses for entry 2023 is on page 5 and includes the change to the Science DN200 streams.
If you are applying as an EU applicant, please visit www.myucd.ie for more information. UCD has a range of educational opportunities for students of all ages and backgrounds to pursue their studies at UCD, including the following pathways:

- University Access Courses
- DARE (Disability Access Route to Education)
- HEAR (Higher Education Access Route)
- Lifelong Learning
- Open Learning
- Mature Years
- QQI-FET

NON-EU APPLICANTS

Non-EU applicants apply directly to UCD for the following courses:

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

We welcome applications from students worldwide and if you are applying to UCD as a non-EU applicant, our UCD Global team will be able to advise you on your application.

The best place to start your search is on the UCD Global website at www.ucd.ie/global. We have global centres worldwide so please submit your query through the form at www.ucd.ie/global/enquire and our Global team will be in contact with you.

All non-EU applicants apply through our online application portal at www.ucd.ie/apply.

WHY UCD?

World-Class Facilities

The UCD O'Brien Centre for Science has state-of-the-art labs, active learning environments, lecture theatres and classrooms. The laboratories are designed for groups of 24-32 students, ensuring that students get individual attention in the modern facilities.

UCD Ranked No.1 for Graduate Employability

UCD has maintained its position at number 1 in Ireland in the QS World University Graduate Employability Rankings (2018-2022).

Dynamic Campus

UCD has 60 official sports clubs, over 100 active student societies, as well as student residences, gym, 50-metre swimming pool, all located on the parkland campus in South Dublin.

CAO Handbook for 2023

EU applicants apply via the Central Applications Office www.cao.ie

<table>
<tr><th>Code</th><th colspan="3">Title (NOT to be entered on Application Form) Honours Bachelor Degrees - Level 8</th></tr>
<tr><td>DN 200</td><td colspan="3">Science
This is a common entry course, leading to a BSc degree in one of 27 degree subjects. Students can study subjects from different streams in First Year. You must select ONE of the following Science streams (Students can change their stream in First Year):</td></tr>
<tr><td></td><td>Explore Multiple Streams

Students who want to sample a number of streams can choose Explore Multiple Streams.
Students who choose this option are offered the same First Year module guarantees as students who choose one of the other streams.</td><td>Earth & Environmental Sciences

Degree Subjects:
• Environmental Biology
• Geology
Students interested in Earth & Environmental Sciences and Biological, Biomedical & Biomolecular Sciences can study both streams in First Year.</td><td>Mathematics (includes Applied/Financial/Statistics)

Degree Subjects:
• Applied & Computational Mathematics
• Mathematics
• Financial Mathematics
• Statistics
Students interested in Mathematics and Physics can study both streams in First Year.</td></tr>
<tr><td></td><td>Biological, Biomedical & Biomolecular Sciences

Degree Subjects:
• Biochemistry & Molecular Biology
• Cell & Molecular Biology
• Environmental Biology
• Genetics
• Microbiology
• Neuroscience
• Pharmacology
• Physiology
• Plant Biology
• Zoology

Students interested in Biological, Biomedical & Biomolecular Sciences and Chemistry can study both streams in First Year.</td><td>Chemistry (includes Medicinal/Sustainable/Biophysical)

Degree Subjects:
• Chemistry
• Chemistry with Biophysical Chemistry
• Chemistry with Environmental & Sustainable Chemistry
• Medicinal Chemistry & Chemical Biology
Students interested in Chemistry and Biological, Biomedical & Biomolecular Sciences can study both streams in First Year.

Physics (includes Theoretical/Astronomy & Space Science)

Degree Subjects:
• Physics
• Physics with Astronomy & Space Science
• Theoretical Physics
Students interested in Physics and Mathematics can study both streams in First Year.</td><td>Science, Mathematics & Education

Degree Subjects:
• Applied Mathematics, Mathematics & Education
• Biology, Mathematics & Education
• Chemistry, Mathematics & Education
• Computer Science, Mathematics & Education
• Physics, Mathematics & Education

These degree subjects are 5 year courses. Students graduate with a 4-Year Level 8 BSc and then continue to a 1-Year MSc in Mathematics & Science Education.</td></tr>
<tr><td>DN 201</td><td colspan="3">Computer Science
Common entry with guaranteed choice (selected at the end of second year) to pursue ONE of the following degree subjects:
• Computer Science
• Computer Science with Data Science</td></tr>
<tr><td>DN 230</td><td colspan="3">Actuarial & Financial Studies</td></tr>
<tr><td>DN 240</td><td colspan="3">Sustainability
Common entry with guaranteed choice to pursue ONE of the following degree subjects (selected at the end of First Year):
• Sustainability with Environmental Sciences
• Sustainability with Social Sciences, Policy & Law
• Sustainability with Business & Economics</td></tr>
</table>

Science

The First Year of the Science course is designed to enable you to sample a number of subjects in your chosen area(s). You can focus on your preferred stream immediately or explore a range of subjects. All students may change their choice of stream during First Year.

COMMON ENTRY:

27 DEGREE SUBJECTS, 7 STREAMS

- Explore Multiple Streams
- Biological, Biomedical & Biomolecular Sciences
- Earth & Environmental Sciences
- Chemistry (includes Medicinal/Sustainable/ Biophysical)
- Mathematics (includes Applied/Financial/ Statistics)
- Physics (includes Theoretical/Astronomy & Space Science)
- Science, Mathematics & Education

DID YOU KNOW?

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

4 YEAR
Honours BSc course

EXPLORE MULTIPLE STREAMS

Students who want to sample a number of degree options from different streams can choose Explore Multiple Streams.

FREQUENTLY ASKED QUESTIONS

Q: Is Science a General Science degree?

A: No. The 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 27 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.

Science

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 in this brochure illustrates common subject combinations for Second Year in Science. These are illustrative of the choices a student could make but other combinations are possible.

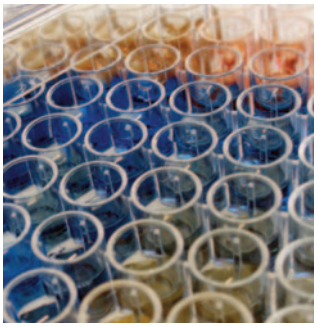
THIRD AND FOURTH YEAR (STAGES 3 AND 4)

- 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

Explore Multiple Streams

Students who want to sample a number of degree options in First Year from different streams can choose Explore Multiple Streams.



Explore Multiple Streams

Aisling Benson

I was attracted to UCD for two reasons: the broad Science course and the incredibly active clubs and societies. I chose Explore Multiple Streams as I always wanted to go into teaching but knew that I could find something else along the way that could pique my interest.

It is deeply rewarding and satisfying to help young people with what is daunting and challenging for them. The course coordinators care about your teacher training greatly, providing school placements in Years 3 and 4 and helping you to become an effective teacher.

Explore Multiple Streams

Eimear Madden

I had always intended to study Science at third level, however, I was unsure as to which Science subject best suited me. Explore Multiple Streams 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.

Explore Multiple Streams

Ruth Moore

I chose the Explore Multiple Streams 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.

Explore Multiple Streams

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 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

If you know which subject area you would like to specialise in, you can select one of six streams. Each degree subject is part of a stream and each stream has a set number of compulsory modules you must take in First Year in order to pursue a degree subject in Second Year. Students can also study subjects from outside their stream. The following are examples of students who knew their preferred area of interest from the start of the course:

Biological, Biomedical & Biomolecular Sciences

Grace Pender

I have a lifelong passion for Science, so choosing UCD Science was the perfect choice for me. Being able to study so many different subjects in Biological, Biomedical & Biomolecular Sciences was a brilliant way to learn about diverse subject matter and discover the area that best suited me. Genetics was by far my favourite subject because it is such a fundamental area of study for all of Biology.

Earth & Environmental Sciences

Stephen Akien

I chose Geology because I sought hands-on learning, both in the classroom and in the field, about the Science of the planet we call home. The modules I have been able to take in Geology have varied incredibly from studying fossils and ancient life, crystals and minerals, to understanding the structure and geometries of our planet. I believe that this degree provides an incredibly well rounded and practical education in Earth Sciences.

Chemistry (includes Medicinal, Sustainable, Biophysical)

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.

Mathematics (includes Applied/ Financial/ Statistics)

Emer Clune

I decided to study at UCD as I have always loved Mathematics and knew I wanted to study it in College. UCD gave me the flexibility to see which Maths subject I enjoyed the most. I was able to try Mathematics, Statistics and even Chemistry, before deciding on Statistics as my degree subject. I love getting to see Mathematics applied to real-world data and establishing patterns and reasonings behind different outcomes.

Physics (includes Theoretical/ Astronomy & Space Science)

Owen Johnson

Choosing to study at UCD Science allowed me to explore all aspects of Physics during my first two years of study. I chose to specialise in Physics with Astronomy & Space Science because it places me firmly on the known universe's frontiers. When I graduate, the toolbox of skills Science has provided will let me to pursue a career in the space sector.

Science, Mathematics & Education

Conor Sievwright

I had teaching at the back of my mind for a while, and the flexibility that came with choosing UCD Science gave me the time I needed to make sure that's the path I wanted to take. By choosing Computer Science, Mathematics & Education, I could continue to study the subjects that I'm passionate about, while also training to be a secondary school teacher.

Biochemistry & Molecular Biology

Stream: Biological, Biomedical & Biomolecular Sciences

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 askscience@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 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
- Science communication

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.*

Contact Us Associate Professor Siobhán McClean askscience@ucd.ie www.ucd.ie/myucd/bioandmolbio

V1 2023

Cell & Molecular Biology

Stream: Biological, Biomedical and Biomolecular Sciences

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 askscience@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 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 and Molecular 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 and Molecular Biology
- Genetics
- Regulation of Gene Expression
- Developmental Biology
- Cell Biology of Disease
- Plant Cell Biology
- 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
- 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.*

Contact Us Associate Professor Antoinette Perry askscience@ucd.ie www.ucd.ie/myucd/cellandmolecularbiology

V1 2023

Environmental Biology

Streams:
Biological, Biomedical & Biomolecular Sciences
Earth & Environmental Sciences

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 askscience@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 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
- Climate Change and Agriculture
- Forests, Climate and Carbon

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
- Ecological & Environmental Microbiology
- Wildlife and Fisheries 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
- Ecological Modelling and QGIS
- Foodborne Pathogens
- Tropical Field Ecology
- Environmental Impact Assessment
- Peatlands and Environmental Change
- Ornithology
- Conservation of Biodiversity

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 & Wildlife Service
- 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.*

Contact Us Associate Professor Tom Wilkinson askscience@ucd.ie www.ucd.ie/myucd/environmentalbiology

V1 2023

Genetics

Stream: Biological, Biomedical & Biomolecular Sciences

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 askscience@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 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 laboratories
- Agribiotech and horticulture
- 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.*

Contact Us Associate Professor Peadar Ó Gaora askscience@ucd.ie www.ucd.ie/myucd/genetics

V1 2023

Microbiology

Stream: Biological, Biomedical & Biomolecular Sciences

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 askscience@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 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 Dr Jennifer Mitchell askscience@ucd.ie www.ucd.ie/myucd/microbiology

V1 2023

Neuroscience

Stream: Biological, Biomedical & Biomolecular Sciences

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 askscience@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 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.*

Contact Us Dr Derek Costello askscience@ucd.ie www.ucd.ie/myucd/neuroscience

V1 2023

Pharmacology

Stream: Biological, Biomedical & Biomolecular Sciences

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 askscience@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 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

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

Contact Us Associate Professor Carmel Hensey askscience@ucd.ie www.ucd.ie/myucd/pharmacology

V1 2023

Physiology

Stream: Biological, Biomedical & Biomolecular Sciences

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 askscience@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
- Foundations of Physics

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of 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.*

Contact Us Associate Professor John Baugh askscience@ucd.ie www.ucd.ie/myucd/physiology

V1 2023

Plant Biology

Stream: Biological, Biomedical & Biomolecular Sciences

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 askscience@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 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 and Entrepreneurship
- 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 Assessment
- Developmental Plant Genetics
- Cell Signalling in Plants
- Plants and Stress
- Plant Phenotyping
- Programmed Cell Death
- Plant Biology Field Course

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 & Wildlife Service
- 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

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

Contact Us Associate Professor Carl Ng askscience@ucd.ie www.ucd.ie/myucd/plantbiology

V1 2023

Zoology

Stream: Biological, Biomedical & Biomolecular Sciences

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 askscience@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 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
- Biomolecular Laboratory Skills
- 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.

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
- Molecular Phylogenetics
- Epithelial Transport in Animal Physiology
- Tropical Field Ecology
- Ornithology
- Conservation of Biodiversity

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 & Wildlife Service
- 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.*

Contact Us Associate Professor Jens Carlsson askscience@ucd.ie www.ucd.ie/myucd/zoology

V1 2023

Geology

Stream: Earth & Environmental Sciences

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 askscience@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

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

Contact Us Dr Conrad Childs askscience@ucd.ie www.ucd.ie/myucd/geology

V1 2023

Chemistry

Stream: Chemistry (includes Medicinal/Sustainable/Biophysical)

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 askscience@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 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 (Honours) 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

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

Contact Us Professor Pat Guiry askscience@ucd.ie www.ucd.ie/myucd/chemistry

V1 2023

Chemistry with Biophysical Chemistry

Stream: Chemistry (includes Medicinal/Sustainable/Biophysical)

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 askscience@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 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 or 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.*

Contact Us Associate Professor Vitaly Buckin askscience@ucd.ie www.ucd.ie/myucd/biophysicalchemistry

V1 2023

Chemistry with Environmental & Sustainable Chemistry

Stream: Chemistry (includes Medicinal/Sustainable/Biophysical)

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 askscience@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 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 for which a chemistry degree would qualify a student, graduates of this degree would be uniquely qualified to work in fields related to Environmental Protection, Sustainable Production and Renewable 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, materials or chemical industries. Positions range from life cycle analyses, to manufacturing chemists, research and development and raw materials/product analysis.
- 2nd level or 3rd level teaching
- State Labs such as the Forensic laboratory
- Electric Ireland and Bord Gáis
- Materials industries such as Intel
- Medical device industry

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

Contact Us Professor James Sullivan askscience@ucd.ie www.ucd.ie/myucd/environmentalandsustainablechemistry

V1 2023

Medicinal Chemistry & Chemical Biology

Stream: Chemistry (includes Medicinal/Sustainable/Biophysical)

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 askscience@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 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 or 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.*

Contact Us Assistant Professor Marina Rubini askscience@ucd.ie www.ucd.ie/myucd/medicinalchemistryandchemicalbiology

V1 2023

Applied & Computational Mathematics

Stream: Mathematics (includes Applied/Financial/Statistics)

Sample pathway for Applied & Computational Mathematics*

YEAR 1

Engage with the principles

In 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 askscience@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 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.*

Contact Us Assistant Professor Conor Sweeney askscience@ucd.ie www.ucd.ie/myucd/appliedandcomputationalmathematics

V1 2023

Financial Mathematics

Stream: Mathematics (includes Applied/Financial/Statistics)

Sample pathway for Financial Mathematics*

YEAR 1

Engage with the principles

In 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 askscience@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
- Microeconomics for Business

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of 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
- Foundations in Finance

Statistics

Modules include:
- Inferential Statistics
- Introduction to Probability
- Modern Regression Analysis

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

- 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
- International Finance Management

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.*

Contact Us Dr Adamaria Perrotta askscience@ucd.ie www.ucd.ie/myucd/financialmathematics

V1 2023

Mathematics

Stream: Mathematics (includes Applied/Financial/Statistics)

Sample pathway for Mathematics*

YEAR 1

Engage with the principles

In 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 askscience@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 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
- Mathematics of Quantum Computation

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.*

Contact Us Associate Professor Mark Dukes askscience@ucd.ie www.ucd.ie/myucd/mathematics

V1 2023

Statistics

Stream: Mathematics (includes Applied/Financial/Statistics)

Sample pathway for Statistics*

YEAR 1

Engage with the principles

In 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 askscience@ucd.ie if you have any questions.

Modules available include:
- Statistical Modelling
- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences
- 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 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:
- Introduction to Probability
- Inferential Statistics
- Bayesian Statistics
- Modern Progression 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

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

Contact Us Assistant Professor Michael Fop askscience@ucd.ie www.ucd.ie/myucd/statistics

V1 2023

Physics

Stream: Physics (includes Theoretical/Astronomy & Space Science)

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 askscience@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
- Computation for Scientists

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of 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

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

Contact Us Professor Emma Sokell askscience@ucd.ie www.ucd.ie/myucd/physics

V1 2023

Physics with Astronomy & Space Science

Stream: Physics (includes Theoretical/Astronomy & Space Science)

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 askscience@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
- Computation for Scientists
- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of 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.*

Contact Us Associate Professor John Quinn askscience@ucd.ie www.ucd.ie/myucd/physicswithastronomyandspacescience

V1 2023

Theoretical Physics

Stream: Physics (includes Theoretical/Astronomy & Space Science)

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 askscience@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
- Computation for Scientists

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), the majority of 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

IOP Institute of Physics Accredited

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.*

Contact Us Associate Professor Vladimir Lobaskin/Professor Adrian Ottewill askscience@ucd.ie www.ucd.ie/myucd/theoreticalphysics

V1 2023

Science: Science, Mathematics & Education

The Science common entry course offers 5 Science, Mathematics & Education degrees, all approved by the Teaching Council of Ireland.

The Teaching Council
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APPROVED DEGREES

DEGREE SUBJECTS

- Biology, Mathematics & Education
- Chemistry, Mathematics & Education
- Physics, Mathematics & Education
- Applied Mathematics, Mathematics & Education
- Computer Science, Mathematics & Education

Your first core Education module will be in the Spring of First Year, where you will learn about theories in formal and informal STEM education.

4 YEAR BSc

1 YEAR MSc

You choose one of the Science, Mathematics & Education degree subjects at the end of Second Year.

Frequently Asked Questions

Q: Are there any teaching placements?

A: In First and Second Year you will get a taste of what it might be like to be a teacher, with short placements. In Third Year you will participate in Peer-Assisted Tutoring, tutoring First Year undergraduate students. In Third Year you will also participate in a post-primary school placement over one term. In both Fourth and Fifth Year you will participate in a year-long school placement. All placements are organised by the UCD School of Mathematics and Statistics.

Q: What if I finish my four year BSc and then decide I don't want to teach?

A: For all the Science and Mathematics Education degrees, you study Mathematics and another Science subject, providing you with a qualification as a Science graduate and potential future Educator. You can pursue other options after your BSc. For example, some of our students have progressed to PhD research or to the working environment.

Applied Mathematics, Mathematics & Education

Stream: Science, Mathematics & Education

Sample pathway to become an Applied Mathematics and Mathematics teacher*

YEAR 1

Engage with the principles

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email askscience@ucd.ie if you have any questions about how First Year works.
In First Year, students interested in Applied Mathematics, Mathematics & Education must study modules in Applied Mathematics, Education and Mathematics.

Modules available include:
- Mathematics & Science Education & Communication
- Applied Mathematics: Mechanics and Methods
- Applications of Differential Equations
- Linear Algebra
- Numbers and Functions
- Calculus
- Mathematical Analysis
- Statistical Modelling

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), students study modules in Applied Mathematics, Education and Mathematics to meet the requirements of two subjects.

Education
Modules include:
- Education for Democracy
- Science and Mathematics Pedagogy

Applied Mathematics
Modules include:
- Computational Science
- Vector, Integral and Differential Calculus
- Oscillations in Mechanical Systems
- Classical Mechanics and Special Relativity

Mathematics
Modules include:
- Calculus of Several Variables
- Groups, Rings and Fields
- Linear Algebra

- Two elective modules

YEAR 3

Refine your knowledge

In Third Year (Stage 3), students refine their knowledge of Applied Mathematics, Mathematics & Education.

Education
Modules include:
- Schools and Society

School Placement
- Post-Primary Placement
- Peer-Assisted Tutoring

Applied Mathematics
Modules include:
- Analytical Mechanics
- Fluid Mechanics
- Partial Differential Equations

Mathematics
Modules include:
- Probability Theory
- Financial Maths

YEAR 4

Prepare for professional practice

Education
Modules include:
- Pedagogical Approaches to Mathematics and Science
- Psychology for Teaching and Learning

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

Mathematics
Modules include:
- Group Theory
- Geometry
- Complex Analysis
- History of Mathematics

BSc Applied Mathematics, Mathematics & Education

The Teaching Council
An Chomhairle Mhúinteoireachta
APPROVED DEGREE

YEAR 5

Prepare for professional practice

EDUCATION
Modules include:
- Research Methods
- Professional Dissertation

SCHOOL PLACEMENT
- Year-Long Placement in Post- Primary School
- Continuous Professional Development Activities
- Further Development of Professional Practice Portfolio

MSc Mathematics & Science Education

QUALIFIED TO TEACH

Post-Primary School Teacher

Applied Mathematics
Leaving Certificate

Mathematics
Leaving Certificate

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

Contact Us Assistant Professor Aoibhinn Ní Shúilleabháin askscience@ucd.ie www.ucd.ie/myucd/amathed

V1 2023

Biology, Mathematics & Education

Stream: Science, Mathematics & Education

Sample pathway to become a Biology and Mathematics teacher*

YEAR 1

Engage with the principles

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email askscience@ucd.ie if you have any questions about how First Year works. In First Year, students interested in Biology, Mathematics & Education must study modules in Biology, Chemistry, Education, Mathematics and Physics.

Modules available include:
- Mathematics & Science Education & Communication
- Biology in Action
- Life on Earth
- Cell Biology and Genetics
- Linear Algebra
- Calculus
- Statistical Modelling
- Physics
- Chemistry

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), students study modules in Biology, Education and Mathematics to meet the requirements of two subjects.

Education
Modules include:
- Education for Democracy
- Science and Mathematics Pedagogy

Biology
Modules include:
- Principles of Plant Biology and Biotechnology
- Principles of Environmental Biology and Ecology
- Laboratory Skills
- Molecular Genetics and Biotechnology

Mathematics
Modules include:
- Calculus of Several Variables
- Differential & Difference Equations
- Analysis

- Two elective modules

YEAR 3

Refine your knowledge

In Third Year (Stage 3), students refine their knowledge of Biology, Mathematics & Education.

Education
Modules include:
- Teaching Second-Level Science
- Schools and Society

School Placement
- Post-Primary Placement
- Peer-Assisted Tutoring

Biology
Modules include:
- Systems Ecology
- Functional Morphology
- Regulation of Gene Expression
- Evolutionary Biology
- Ecological and Environmental Microbiology

Mathematics
Modules include:
- Algebraic Structures
- Probability Theory

YEAR 4

Prepare for professional practice

Education
Modules include:
- Pedagogical Approaches to Mathematics and Science
- Psychology for Teaching and Learning

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

Mathematics
Modules include:
- Geometry
- Complex Analysis
- History of Mathematics
- Group Theory

BSc Biology, Mathematics & Education

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APPROVED DEGREE

YEAR 5

Prepare for professional practice

EDUCATION
Modules include:
- Research Methods
- Professional Dissertation

SCHOOL PLACEMENT
- Year-Long Placement in Post- Primary School
- Continuous Professional Development Activities
- Further Development of Professional Practice Portfolio

MSc Mathematics & Science Education

QUALIFIED TO TEACH

Post-Primary School Teacher

Biology
Leaving Certificate

Mathematics
Leaving Certificate

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

Contact Us Assistant Professor Aoibhinn Ní Shúilleabháin askscience@ucd.ie www.ucd.ie/myucd/biomathed

V1 2023

Chemistry, Mathematics & Education

Stream: Science, Mathematics & Education

Sample pathway to become a Chemistry and Mathematics teacher*

YEAR 1

Engage with the principles

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email askscience@ucd.ie if you have any questions about how First Year works. In First Year, students interested in Chemistry, Mathematics & Education must study modules in Chemistry, Education, Mathematics, Biology and Physics

Modules available include:
- Mathematics & Science Education & Communication
- Introductory Chemistry
- Organic Chemistry and Chemical Biology
- Linear Algebra
- Calculus
- Statistical Modelling
- Biology
- Physics

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), students study modules in Chemistry, Education and Mathematics to meet the requirements of two subjects.

Education
Modules include:
- Education for Democracy
- Science and Mathematics Pedagogy

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

Mathematics
Modules include:
- Calculus of Several Variables
- Differential & Difference Equations
- Analysis

- Two elective modules

YEAR 3

Refine your knowledge

In Third Year (Stage 3), students refine their knowledge of Biology, Mathematics & Education.

Education
Modules include:
- Teaching Second-Level Science
- Schools and Society

School Placement
- Post-Primary Placement
- Peer-Assisted Tutoring

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

Mathematics
Modules include:
- Algebraic Structures
- Probability Theory
- Geometry

YEAR 4

Prepare for professional practice

Education
Modules include:
- Pedagogical Approaches to Mathematics and Science
- Psychology for Teaching and Learning

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

Mathematics
Modules include:
- Group Theory
- Geometry
- Complex Analysis
- History of Mathematics

BSc Chemistry, Mathematics & Education

The Teaching Council
An Chomhairle Mhúinteoireachta
APPROVED DEGREE

YEAR 5

Prepare for professional practice

EDUCATION
Modules include:
- Research Methods
- Professional Dissertation

SCHOOL PLACEMENT
- Year-Long Placement in Post- Primary School
- Continuous Professional Development Activities
- Further Development of Professional Practice Portfolio

MSc Mathematics & Science Education

QUALIFIED TO TEACH

Post-Primary School Teacher

Chemistry
Leaving Certificate

Mathematics
Leaving Certificate

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

Contact Us Assistant Professor Aoibhinn Ní Shúilleabháin askscience@ucd.ie www.ucd.ie/myucd/chemmathed

V1 2023

Computer Science, Mathematics & Education

Stream: Science, Mathematics & Education

Sample pathway to become a Computer Science and Mathematics teacher*

YEAR 1

Engage with the principles

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email askscience@ucd.ie if you have any questions about how First Year works. In First Year, students interested in Computer Science, Mathematics & Education must study modules in Computer Science, Education and Mathematics.

Modules available include:

- Mathematics & Science Education & Communication
- Mathematics & Science Education & Communication
- Computer Programming I
- Computer Programming II
- Linear Algebra
- Calculus
- Applications of Differential Equations
- Statistical Modelling

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), students study modules in Computer Science, Education and Mathematics to meet the requirements of two subjects.

Education

Modules include:

- Education for Democracy
- Science and Mathematics Pedagogy

Computer Science

Modules include:

- Introduction to Java
- Introduction to Computer Architecture

Mathematics

Modules include:

- Calculus of Several Variables
- Groups, Rings and Fields
- Linear Algebra
- Computational Science
- Vector Calculus

- Two elective modules

YEAR 3

Refine your knowledge

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

Education

Modules include:

- Schools and Society

School Placement

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

Computer Science

Modules include:

- Data Structures and Algorithms
- Databases and Information Systems
- Web Design
- Introduction to Operating Systems

Mathematics

Modules include:

- Probability Theory

YEAR 4

Prepare for professional practice

Education

Modules include:

- Pedagogical Approaches to Mathematics
- Computer Science Pedagogy
- Psychology for Teaching and Learning

School Placement

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

Computer Science and Mathematics

Modules include:

- Information Ethics
- Networks and Internet Systems
- Geometry
- Complex Analysis
- History of Mathematics

The Teaching Council
An Chomhairle Mhúinteoireachta
APPROVED DEGREE

BSc Computer Science, Mathematics & Education

YEAR 5

Prepare for professional practice

EDUCATION

Modules include:

- Research Methods
- Professional Dissertation

SCHOOL PLACEMENT

- Year-Long Placement in Post- Primary School
- Continuous Professional Development Activities
- Further Development of Professional Practice Portfolio

MSc Mathematics & Science Education

QUALIFIED TO TEACH

Post-Primary School Teacher

Computer Science
Leaving Certificate

Mathematics
Leaving Certificate

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

Contact Us Assistant Professor Aoibhinn Ní Shúilleabháin askscience@ucd.ie www.myucd.ie/courses/science/computer-science-mathematics-education/

V1 2023

Physics, Mathematics & Education

Stream: Science, Mathematics & Education

Sample pathway to become a Physics and Mathematics teacher*

YEAR 1

Engage with the principles

The Stage 1 (First Year) Guide details the modules required for each degree subject. Please email askscience@ucd.ie if you have any questions about how First Year works. In First Year, students interested in Physics, Mathematics & Education must study modules in Physics, Education, Mathematics, Biology and Chemistry.

Modules available include:
- Mathematics & Science Education & Communication
- Foundations of Physics
- Frontiers of Physics
- Linear Algebra
- Calculus
- Applications of Differential Equations
- Statistical Modelling
- Biology
- Chemistry

- One elective module
- One small-group project

YEAR 2

Choose your subjects

In Second Year (Stage 2), students study modules in Physics, Education and Mathematics to meet the requirements of two subjects.

Education
Modules include:
- Education for Democracy
- Science and Mathematics Pedagogy

Physics
Modules include:
- Quantum Mechanics
- Electromagnetism and Optics
- Fields, Waves and Light
- Methods for Physicists
- Thermal Physics

Mathematics
Modules include:
- Vector Integral and Differential Calculus
- Calculus of Several Variables
- Analysis

- Two elective modules

YEAR 3

Refine your knowledge

In Third Year (Stage 3), students refine their knowledge of Physics, Mathematics & Education.

Education
Modules include:
- Teaching Second-Level Science
- Schools and Society

School Placement
- Post-Primary Placement
- Peer-Assisted Tutoring

Physics
Modules include:
- Classical Mechanics and Relativity
- Quantum Mechanics
- Electromagnetism
- Nuclear Physics
- Laboratory Skills

Mathematics
Modules include:
- Algebraic Structures
- Probability Theory

YEAR 4

Prepare for professional practice

Education
Modules include:
- Psychology for Teaching and Learning
- Pedagogical Approaches to Mathematics and Science

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

Mathematics
Modules include:
- Particle Physics
- Group Theory
- Geometry
- Complex Analysis
- History of Mathematics

BSc Physics, Mathematics & Education

The Teaching Council
An Chomhairle Mhúinteoireachta
APPROVED DEGREE

YEAR 5

Prepare for professional practice

EDUCATION
Modules include:
- Research Methods
- Professional Dissertation

SCHOOL PLACEMENT
- Year-Long Placement in Post- Primary School
- Continuous Professional Development Activities
- Further Development of Professional Practice Portfolio

MSc Mathematics & Science Education

QUALIFIED TO TEACH

Post-Primary School Teacher

Physics
Leaving Certificate

Mathematics
Leaving Certificate

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

Contact Us Assistant Professor Aoibhinn Ní Shúilleabháin askscience@ucd.ie www.ucd.ie/myucd/physmathed

V1 2023

Sustainability

Sustainability is a unique 4-year multidisciplinary course that 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.

DEGREE SUBJECTS

- Sustainability with Environmental Sciences
- Sustainability with Social Sciences, Policy & Law
- Sustainability with Business & Economics

UNIQUE MULTIDISCIPLINARY COURSE

4 YEAR HONOURS BSc

GLOBAL PERSPECTIVE ON SUSTAINABILITY

Core modules provide a global perspective on sustainability and include interdisciplinary research, a professional placement, field work in Ireland and Europe and engagement with 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.

Sustainability with Environmental Sciences

Sample pathway for Sustainability with Environmental Sciences *

YEAR 1

Engage with the principles

In First Year (Stage 1), students complete modules in key aspects of each of the disciplines and in the principles of Sustainability before choosing their degree subject at the end of the year.

Modules include:
- Introduction to Sustainability
- Sustainability Challenges
- Scientific Enquiry
- Statistics
- Cell Biology and Genetics
- Life on Earth
- Mapping a Sustainable World
- Anthropology: An Introduction
- People, Places and Regions
- Law in Europe
- Economics and Society
- Business in Society

YEAR 2

Choose your subjects

In Second Year (Stage 2), students broaden their knowledge of Sustainability with a focus on Environmental Sciences.

Modules include:
- Sustainability: Research Tools
- Innovation, Communication and Careers in Sustainability
- Principles of Environmental Biology and Ecology
- Earth, Environment and Society
- Global Environmental Change
- Weather, Climate and Climate Change
- Chemistry for Biology
- Introduction to GIS for Sustainability
- Principles of Microeconomics

YEAR 3

Refine your knowledge

In Third Year (Stage 3), students refine their knowledge, skills and experience of Sustainability with Environmental Sciences.

Modules include:
- Sustainability in Action (field trip)
- Working with Biological Data
- Wildlife Conservation and Fisheries Management
- Life Cycle Assessment
- Sustainable Chemistry
- Waste Management
- Global Inequalities
- Marketing: An Introduction

YEAR 4

Focus on your chosen subject

In Fourth Year (Stage 4), students complete their undergraduate studies in Sustainability with Environmental Sciences, which includes a research project.

Modules include:
- Environmental Assessment
- Advanced Air Pollution
- Global Change Ecology
- Energy Systems and Climate Change
- Marine Community Ecology
- The Urban Environment
- Economics of the Environment

Career & Study Opportunities

BSc (Honours) Sustainability with Environmental Sciences

MSc (Taught)
- MSc Applied Environmental Science
- MSc World Heritage Management
- MSc Plant Biology
- MSc Climate Change: Science and Impacts
- MSc Environmental Sustainability
- MSc Environmental Technology
- MSc (Agr) Rural Environmental Conservation and Management
- MSc (Agr) Sustainable Agriculture and Rural Development
- MSc Sustainable Energy and Green Technology
- MSc Wildlife Conservation and Management
- MEngSc Water, Waste and Environmental Engineering

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
- Careers as consultants, managers and advisers in large organisations and private businesses.
- International organisations such as the UN, the European Environment Agency and the European Commission, Government Departments, State agencies and Conservation Organisations.
- Diverse areas such as renewables, clean technology management and energy efficiency
- Advise industries on social and environmental strategies.

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

Contact Us Professor Tasman Crowe askscience@ucd.ie www.myucd.ie/courses/sustainability/sustainability-with-environmental-sciences/

V1 2023

Sustainability with Social Sciences, Policy & Law

Sample pathway for Sustainability with Social Sciences, Policy & Law*

YEAR 1

Engage with the principles

In First Year (Stage 1), students complete modules in key aspects of each of the disciplines and in the principles of Sustainability before choosing their degree subject at the end of the year.

Modules include:
- Introduction to Sustainability
- Sustainability Challenges
- Mapping a Sustainable World
- Anthropology: An Introduction
- People, Places and Regions
- Law in Europe
- Making the Irish Landscape
- Scientific Enquiry
- Statistics
- Introduction to Earth Sciences
- Economics and Society
- Business in Society

YEAR 2

Choose your subjects

In Second Year (Stage 2), students broaden their knowledge of Sustainability with a focus on Social Sciences, Policy & Law.

Modules include:
- Sustainability: Research Tools
- Innovation, Communication and Careers in Sustainability
- Introduction to GIS for Sustainability
- Environment and Sustainability
- Cultural Heritage
- Sustainable Wellbeing
- Human Rights and Social Justice
- Introductory Chemistry or Basis of Organic and Biological Chemistry
- Principles of Microeconomics

YEAR 3

Refine your knowledge

In Third Year (Stage 3), students refine their knowledge, skills and experience of Sustainability with Social Sciences, Policy & Law.

Modules include:
- Sustainability in Action (field trip)
- Policy-Making, Implementation & Evaluation
- Social Inclusion Law
- Environmental Management
- Environment and Sustainability
- Global Risks and Resilience
- Principles of Environmental Biology and Ecology
- Marketing: An Introduction

YEAR 4

Focus on your chosen subject

In Fourth Year (Stage 4), students complete their undergraduate studies in Sustainability with Social Sciences & Law.

Modules include:
- The Urban Environment
- Development Geographies
- International Human Rights Law
- Tools for Sustainable Development
- Climate Politics and Policy
- Waste Management
- Environmental Assessment
- Advanced Air Pollution
- Economics of the Environment

Career & Study Opportunities

BSc (Honours) Sustainability with Social Sciences, Policy & Law

MSc (Taught)
- MSc Behavioural Economics
- MSc Equality Studies
- Masters Public Policy (MPP)
- MSc Sustainability
- MEconSc European Public Affairs and Law
- MSc International Development
- MSc Planning, Development and Urban Design
- MA Politics and International Relations
- MSc Risk, Resilience & Sustainability
- MSc Critical Geographies: Power & Inequalities

PhD
- Students can pursue a PhD in universities in Ireland or abroad in areas such as geography, social policy, international development, planning and environmental policy, environmental law

Industry
- Careers as consultants, managers and advisers in large organisations and private businesses.
- International organisations such as the UN, the European Environment Agency and the European Commission, Government Departments, State agencies and Conservation Organisations.
- Diverse areas such as renewables, clean technology management and energy efficiency
- Advise industries on social and environmental strategies.

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

Contact Us Professor Jacky Croke askscience@ucd.ie www.myucd.ie/courses/sustainability/sustainability-with-social-sciences-policy-and-law/

V1 2023

Sustainability with Business & Economics

Sample pathway Sustainability with Business & Economics*

YEAR 1

Engage with the principles

In First Year (Stage 1), students complete modules in key aspects of each of the disciplines and in the principles of Sustainability before choosing their degree subject at the end of the year.

Modules include:
- Introduction to Sustainability
- Sustainability Challenges
- Economics and Society
- Business in Society
- Business Plan
- Introduction to Economics
- Mapping a Sustainable World
- Anthropology: An Introduction
- People, Places and Regions
- Law in Europe
- Scientific Enquiry
- Statistics
- Introduction to Earth Sciences

YEAR 2

Choose your subjects

In Second Year (Stage 2), students broaden their knowledge of Sustainability with a focus on Business and Economics.

Modules include:
- Sustainability: Research Tools
- Innovation, Communication and Careers in Sustainability
- Marketing: An Introduction
- Principles of Microeconomics
- Introduction to Quantitative Economics
- Introduction to Accounting
- Introduction to GIS for Sustainability
- Introductory Chemistry or Basis of Organic and Biological Chemistry

YEAR 3

Refine your knowledge

In Third Year (Stage 3), students refine their knowledge, skills and experience of Sustainability with Business and Economics.

Modules include:
- Sustainability in Action (field trip)
- Economics of the Environment
- Intermediate Microeconomics
- Irish Economy
- Business Across Borders
- Economic Policy Analysis
- Business and Social Enterprise
- Global Inequalities
- Principles of Environmental Biology and Ecology

YEAR 4

Focus on your chosen subject

In Fourth Year (Stage 4), students complete their undergraduate studies in Sustainability with Business & Economics.

Modules include:
- Green Ventures
- Behavioural Economics
- Responsible Marketing
- European Economy
- Entrepreneurship in Action
- Economics of Innovation
- The Urban Environment
- Waste Management
- Environmental Assessment
- Advanced Air Pollution

Career & Study Opportunities

BSc (Honours) Sustainability with Business & Economics

MSc (Taught)
- MSc Supply Chain Management
- MSc Management Consulting
- MSc Renewable Energy and Environmental Finance
- MSc Food Business
- MSc Strategic Management
- MSc Project Management
- MSc Management

PhD
- Students can pursue a PhD in universities in Ireland or abroad in broad or specialised areas in business and economics.

Industry
- Careers as consultants, managers and advisers in large organisations and private businesses.
- International organisations such as the UN, the European Environment Agency and the European Commission, Government Departments, State agencies and Conservation Organisations.
- Diverse areas such as renewables, clean technology management and energy efficiency
- Advise industries on social and environmental strategies.

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

Contact Us Associate Professor Maeve Houlihan askscience@ucd.ie www.myucd.ie/courses/sustainability/sustainability-business-economics/

V1 2023

Actuarial & Financial Studies

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

DEGREE SUBJECT

- Actuarial & Financial Studies

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: Where can I find out more information about the actuarial profession?

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

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 & 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 Dr Adrian O'Hagan askscience@ucd.ie www.ucd.ie/myucd/actuarialandfinancialstudies

V1 2023

Computer Science

The Computer Science course is for students who are interested in specialising in Computer Science or Computer Science with Data Science and are interested in a career in software engineering, data analytics, working in the ICT sector and in research and development.

DEGREE SUBJECTS

- Computer Science
- Computer Science with Data Science

COMMON FIRST YEAR

70% Software Engineering
30% Mathematics

END OF SECOND YEAR

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

This course includes 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. 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

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
- 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:

- Computer Networking
- 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
- 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
- Industry Internship
- Information Security

- 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.*

Contact Us Associate Professor Chris Bleakley askscience@ucd.ie www.ucd.ie/myucd/computerscience

V1 2023

Computer Science with Data Science

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:

- Computer Networking
- 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
- Probability Theory
- Introduction to Artificial Intelligence
- Network Analysis
- Data Science in Practice
- Industry Internship
- Information Visualisation
- Programming for Big Data
- Information Security

- 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
- 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 Meta
- 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 Dr Derek Greene askscience@ucd.ie www.myucd.ie/courses/science/computer-science-data-science

V1 2023

The Business of Science and IT in Ireland

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

430+

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

14 OF THE TOP 15

Medical Technology Companies have Irish operations according to IDA Ireland

6 OF THE TOP 6

Worldwide security software companies are located in Ireland

THE TOP 5

Global Software Companies are based in Ireland

Over 1200 multinational corporations have chosen Ireland as their strategic European base

- Accenture
- Airbnb
- Apple
- Dell
- eBay
- Google
- HP
- IBM
- Intel
- LinkedIn
- Meta
- Microsoft
- Salesforce
- Stripe
- Twitter

20 of the top 25 global institutions for the financial sector are based in Ireland

- AIG
- Allianz
- Bank of America
- Barclays
- Citco
- Citi
- HSBC
- J.P. Morgan
- PayPal
- Zurich

9 of the top 10 global pharmaceutical 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.

- Abbott
- AbbVie
- Allergan
- Amgen
- Eli Lilly and Co
- GSK
- Johnson & Johnson
- Medtronic
- MSD
- Novartis
- Pfizer
- Roche
- Sanofi

Science Careers
www.ucd.ie/science

Science, Computer Science, Sustainability and Actuarial & Financial Studies graduates work in a range of sectors in different roles. Each role will have specific requirements in terms of the degree and skills required and some roles will require a postgraduate qualification. The following are examples of some of the sectors and role types available:

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

Examples of Role Types

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

Energy, Climate, Conservation & Environment

Examples of Role Types

- Environmental Consultant
- Environmental Officer
- Plant Scientist
- Conservation Scientist
- Environmental Manager

Geoscience & Natural Resources

Examples of Role Types

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

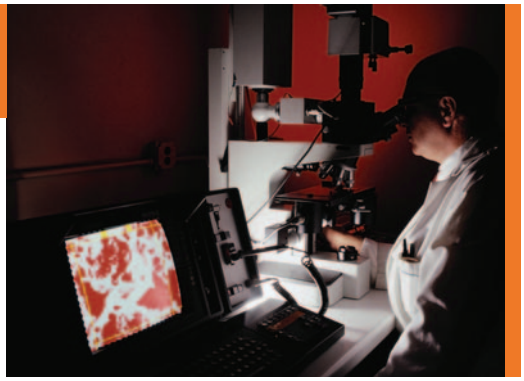
For more information on how degree subjects map to sectors, please visit pages 50 and 51.

Computing, Risk, Finance & Analytics

Examples of Role Types

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

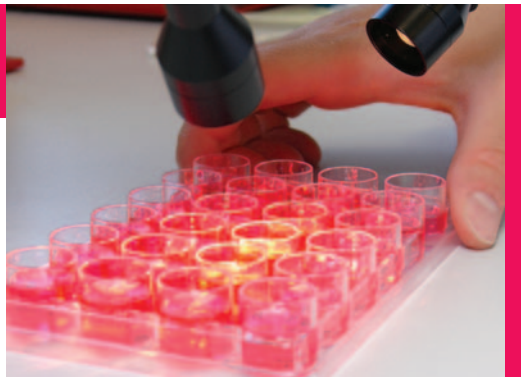
Semiconductor, Nanotechnology, Meteorology & Space Industry



Examples of Role Types

- Semiconductor Engineer
- Meteorologist
- Medical Device Engineer
- Materials Scientist
- Radiation Protection Officer

Further Education & Research



Examples of Role Types

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

Internships, Professional Experience and Field Trips

The following are some of the main areas that students have gained experience in through internships or professional experience:

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	Companies and Research Institutes
• 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	Acclimatize Alexion APC Ltd Department of Agriculture, Food and the Marine Max Planck Institute for Human Cognitive and Brain Sciences Pfizer Teva Pharmaceuticals Ulysses Neuroscience Royal College of Surgeons in Ireland

Geoscience, 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 • All BSc Sustainability 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	Companies/Professional Experience
• Environmental Biology • Plant Biology • Zoology	Dublin Zoo Tayto Park Sonairte Seal Rescue Ireland Tropical World Wildlife Rehabilitation Ireland
• 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 Assurance		
• Computer Science • Computer Science with Data Science	Amazon Workday SAP Swoop Funding	Dell Hubspot Bank of America Indeed	Ericsson Verizon Media Intel J.P. Morgan	Microsoft Aer Lingus Vodafone Toast
• 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

Degree Subjects

- Biology, Mathematics & Education
- Chemistry, Mathematics & Education
- Physics, Mathematics & Education
- Applied Mathematics, Mathematics & Education
- Computer Science, Mathematics & Education

- Students studying one of the five Science, Mathematics & Education subjects complete year-long placements at two different post-primary schools. These pathways lead to an MSc Mathematics and Science Education.

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

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 allowed us to put the theory we had learned at UCD into practice.

Neuroscience

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

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

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 Group.

Physics with Astronomy & Space Science

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 have recently graduated with a PhD from the UCD Space Science Group.

Financial Mathematics

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.

UCD Science Events Calendar 2022/2023

DATE	EVENT	LOCATION & AUDIENCE
From August 2022	INTERNATIONAL FAIRS: MEET THE DEAN OF SCIENCE, PROFESSOR JEREMY SIMPSON, THE VP (INTERNATIONAL) FOR THE COLLEGE OF SCIENCE, PROFESSOR ELENI MANGINA AND UCD GLOBAL OFFICE STAFF AT WORLDWIDE FAIRS.	WORLDWIDE EVENTS FOR ENTRY 2023 AND ENTRY 2024 NON-EU APPLICANTS
25 October 2022	UCD SCIENCE, SUSTAINABILITY, COMPUTER SCIENCE AND ACTUARIAL & FINANCIAL STUDIES VIRTUAL Q&A SESSION	VIRTUAL EVENT FOR ENTRY 2023 AND 2024 EU AND NON-EU APPLICANTS
12 November 2022	UCD OPEN DAY	UCD EVENT FOR EU AND NON-EU APPLICANTS
10 January 2023	UCD QQI-FET ENTRY TO SCIENCE, SUSTAINABILITY, COMPUTER SCIENCE AND AGRICULTURE AND FOOD SCIENCE VIRTUAL INFORMATION SESSION	VIRTUAL EVENT FOR ENTRY 2023 QQI-FET EU APPLICANTS
25 February 2023	UCD SCIENCE, SUSTAINABILITY, COMPUTER SCIENCE AND ACTUARIAL & FINANCIAL STUDIES TASTER LECTURE EVENT	UCD EVENT FOR ENTRY 2023 EU AND NON-EU APPLICANTS
22 April 2023	UCD SCIENCE, SUSTAINABILITY, COMPUTER SCIENCE, ACTUARIAL & FINANCIAL STUDIES: MEET OUR STUDENT & GRADUATES EVENT	UCD EVENT FOR ENTRY 2023 EU AND NON-EU APPLICANTS
7 June 2023	UCD SCIENCE, SUSTAINABILITY, ACTUARIAL & FINANCIAL STUDIES SUMMER SCHOOL FOR ENTRY 2024 APPLICANTS	UCD EVENT FOR ENTRY 2024 EU AND NON-EU APPLICANTS
8 June 2023	UCD COMPUTER SCIENCE SUMMER SCHOOL FOR ENTRY 2024 APPLICANTS	UCD EVENT FOR ENTRY 2024 EU AND NON-EU APPLICANTS

We recommend that all students interested in studying at UCD set up their own account on the myUCD website at www.myucd.ie so they can keep up to date with all upcoming events. Please contact gary.dunne@ucd.ie if you have any queries.

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 Science, your degree will eventually be in one of 27 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
Streams are used to categorise the 27 different subjects available in the common entry Science Course. By meeting the requirements of a particular stream in First Year, the subjects within that stream remain available to choose in Second Year. The streams available are as follows:

- Biological, Biomedical & Biomolecular Sciences
- Earth & Environmental Sciences
- Chemistry (includes Medicinal/Sustainable/Biophysical)
- Mathematics (includes Applied/Financial/Statistics)
- Physics (includes Theoretical/Astronomy & Space Science)
- Science, Mathematics & Education

Students interested in degree subjects from more than one stream can select **Explore Multiple Streams**.

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 100 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.

UCD DUBLIN

RISING TO THE FUTURE
UCD Strategy 2020-2024

UCD Science

Mr Gary Dunne
+353 1 716 2637
askscience@ucd.ie

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

Ms Amanda Prinsloo
+353 1 716 2687
askscience@ucd.ie

www.ucd.ie/science
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This booklet (Version 1 Entry 2023) is intended to assist prospective UCD students and the information is given in good faith.
It is not, however, an official publication of the university and does not bind the university in any way. The information provided in this booklet is correct at the time of going to press but degree programmes are subject to continuing development and the university reserves the right to make changes at any time, before or after a student's admission.