UNDERGRADUATE COURSES ENTRY 2020

UCD SCIENCE

SCIENCE DN200
COMPUTER SCIENCE DN201
ACTUARIAL & FINANCIAL STUDIES DN230

MAIN EVENTS
22 October 2019
15 February 2020

Register at
www.myucd.ie

University College Dublin
Ireland’s Global University
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This booklet (Version 17 2020) 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.
WHY UCD SCIENCE?

Flexible Curriculum
UCD offers the broadest and most diverse Science programme in Ireland, with degree courses in biological, biomedical, chemical, geological, mathematical, physical and computer sciences, all delivered by lecturers at the forefront of teaching and research. The curriculum can be adapted to your personal preferences through the unique flexibility of UCD Horizons.

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

Internship Opportunities
Professional Science Placements are available as Summer Internships or longer placements in industry for specific disciplines.

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

BSc
Bachelor of Science.

BAFS
Bachelor of Actuarial and Financial Studies.

Degree Subject
Examples of degree subject areas are Microbiology, Physics with Astronomy & Space Science or Chemistry. In DN200 Science, your degree will eventually be in one of 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
DN200 Science in UCD has 4 streams. The streams available in DN200 Science are Biological, Biomedical & Biomolecular Sciences (BBB), Chemistry & Chemical Sciences (CCS), Mathematical, Physical & Geological Sciences (MPC) and No Preference (NPF). Streams are used to categorise the 27 different subjects available as degree options available in the common entry programme. By meeting the requirements of a particular stream in first year, the subjects within that stream remain available to choose in second year.
Module
A self-contained unit of teaching and learning, which is usually studied over one Trimester. Undergraduate modules are normally 5 credits. A standard 5-credit UCD module represents 100-125 hours of student effort including time spent in class, studying and assessment. Modules in UCD are divided into core, option and elective modules.

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

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

Elective Module
As well as Core and Option modules, you can study Elective modules that either deepen your knowledge in your chosen programme or allow you to explore subjects outside of your area of study. For example, a student in Computer Science could take a Business or Language module.

Timetable
Each student will have their own personalised timetable based on their individual module selection. The timetable will be filled with a variety of class types such as lectures, practicals, tutorials etc. An average first year timetable will have 30 hours of class time per week including lectures, practicals and tutorials. Sample timetables for first year are available on the UCD Science website at www.ucd.ie/science/.

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

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

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

Student Life

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

Societies
Student societies are a great way to explore your interests or develop new ones. UCD currently has over 70 active societies so there really is something for everyone, from fun events to guest speakers, plays to debates and comedy nights. An example is the UCD Science Society (SciSoc). SciSoc is one of UCD’s biggest societies and it is responsible for a range of events such as the annual “Cycle to Galway”, Science Day festival, the Science Ball and many more.

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

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

- **Pharmaceuticals, Biotechnology, Medical Devices, Clinical Trials, Chemical Industry & Hospitals**
  - **Degrees**
    - BSc Biochemistry & Molecular Biology
    - BSc Cell & Molecular Biology
    - BSc Genetics
    - BSc Microbiology
    - BSc Neuroscience
    - BSc Pharmacology
    - BSc Physiology
  - **Careers**
    - Depending on the degree, careers include:
      - QA/QC Analyst
      - Analytical Chemist
      - Microbiologist
      - Environmental Scientist
      - Clinical Research Associate
      - Biochemist
      - Medical Physicist

- **Energy, Climate Conservation & Environment**
  - **Degrees**
    - BSc Environmental Biology
    - BSc Plant Biology
    - BSc Zoology
    - BSc Chemistry with Biophysical Chemistry
  - **Careers**
    - Depending on the degree, careers include:
      - Environmental Consultant
      - Environmental Officer
      - Plant Scientist
      - Conservation Scientist
      - Environmental Manager
      - Emissions Control Manager
      - Photovoltaic Engineer

- **Natural Resources**
  - **Degrees**
    - BSc Geology
    - BSc Environmental Biology
    - BSc Physics
  - **Careers**
    - Depending on the degree, careers include:
      - Hydrogeologist
      - Mineral Geologist
      - Environmental Consultant
      - Geophysicist
      - Marine Geologist
      - Petroleum Geologist

The information given is a guide only and does not bind the University in any way.
Science Careers Map

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

**Computing, Risk, Finance & Analytics**

**Degrees**
- BSc Computer Science
- BSc Applied & Computational Mathematics
- BAFS Actuarial & Financial Studies
- BSc Financial Mathematics
- BSc Mathematics

**Careers**
- BSc Statistics
- BSc Physics
- BSc Theoretical Physics
- BSc Physics with Astronomy & Space Science
- PME Science/Maths Teacher
- MSc, PhD – Academia/Research
- Graduate Veterinary Medicine
- Graduate Medicine
- Graduate Entry Pharmacy
- Software Engineer
- Database Administrator
- Trainee Actuary
- Investment Banker
- Risk Analyst
- Business Analyst
- Financial Analyst

**Semiconductor, Nanotechnology, Meteorology & Space Industry**

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

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

**Further Education & Research**

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

**Careers**
- Science Teacher
- Medical Doctor
- Vet
- Pharmacist

The information given is a guide only and does not bind the University in any way.
Internships & Professional Experience

We are committed to helping our students prepare for their careers throughout their time studying at UCD. DN200 Science, DN201 Computer Science and DN230 Actuarial & Financial Studies provide opportunities for undergraduate students to apply for internships or professional placements.

Internships

Over 200 students took up internships on 25 of our undergraduate degree subjects in 2018/19. The internships below are a guide to potential placements and not all degree subjects map to all companies. Placements are secured through a competitive process.

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<td>Genetics</td>
<td>LEO Pharma</td>
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<tr>
<td>Microbiology</td>
<td>International: Max Planck Institute for Brain Research Frankfurt</td>
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<td>Neuroscience</td>
<td>NSTDA-BIOTEC Thailand</td>
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<tr>
<td>Pharmacology</td>
<td>Donders</td>
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<tr>
<td>Physiology</td>
<td>Institute for Brain Research Netherlands</td>
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<td></td>
<td>Karolinska Institutet</td>
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Ireland at a Glance

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

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

5 of the top 10 Companies on Forbes’ list of The World’s Most Innovative Companies have Irish operations according to IDA Ireland.

More than 250 Global financial institutions have established operations in Ireland, located in Dublin’s International Financial Services Centre.

Top Global financial institutions

ALL 10 OF THE TOP 10 GLOBAL PHARMACEUTICAL CORPORATIONS

AMGEN Lilly Roche Johnson & Johnson (IRELAND LTD)

Allergan abbvie Wyeth Pfizer

GlaxoSmithKline Abbott MSD

Novartis Sanofi gsk

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

The Top Ten “Born on the Internet” companies are based in Ireland
The DN230 Actuarial & Financial Studies course will prepare you for a professional career in the actuarial or financial professions.

**Exams of the Institute and Faculty of Actuaries, UK**

The Institute and Faculty of Actuaries, which accredits this course, has made changes to the syllabus. The Actuarial and Financial Studies degree at UCD covers the Core Principles subjects (CS1, CS2, CM1, CM2, CB1, CB2) and Core Practicals subject CP1 of the examinations of the Institute and Faculty of Actuaries, UK.

**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 are secured through a competitive process.

**Frequently Asked Questions**

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

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

**Q: How can I find out more information?**

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

Further information on becoming an actuary is available at the Society of Actuaries at web.actuaries.ie
Actuarial & Financial Studies
CAO code: DN230

Sample pathway for a degree in Actuarial & Financial Studies *

**YEAR 1**

**ENGAGE WITH THE PRINCIPLES**

**ACTUARIAL & FINANCIAL STUDIES**
Topics 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**

**ACTUARIAL & FINANCIAL STUDIES**
Topics 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**

**ACTUARIAL & FINANCIAL STUDIES**
Topics 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**

**ACTUARIAL & FINANCIAL STUDIES**
Topics include:
- Actuarial Statistics
- Core Actuarial Principles
- Financial and Actuarial Mathematics
- Actuarial Mathematics
- One Optional Module

**BAFS (Honours) Actuarial and Financial Studies**

- **Industry**
  - Insurance
  - Actuarial Trainee in the following areas:
    - Life
    - Pensions
    - Investment
    - Health
    - General Insurance
    - Banking or Finance
    - Trading

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

- **Conversion Courses**
  - MSc Data & Computational Science
  - MSc Mathematical Sciences
  - MSc Mathematics
  - MSc Statistics

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

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Learn how actuaries understand the nature of risk and find ways to manage it.

- Develop the analytical skills and business knowledge necessary to design and manage programmes that control risk for the insurance and pension sectors.

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

Sean Roe, Graduate

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www.ucd.ie/myucd/actuarialandfinancialstudies
DN201 Computer Science
Computer Science with Data Science

DN201 Computer Science is designed for students who wish to specialise in computer science or data science, and want to pursue careers in software engineering, data analytics, the tech industry or research and development.

**Frequently Asked Questions**

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

A: No. DN201 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 to see if I enjoy it?**

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

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

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

**Total immersion software engineering degree**

- **70%** Software Engineering
- **30%** Mathematics in first year
Sample pathway for a degree in Computer Science *

**YEAR 1**

**COMPUTER SCIENCE**
Topics include:
- Algorithmic Problem-Solving
- Computer Programming
- Introduction to Computer Architecture
- Formal Foundations
- Computer Science in Practice
- Software Engineering Project I
- Statistics with Python

**MATHMATICS**
Topics include:
- Formal Foundations
- Computer Science in Practice
- Software Engineering Project I
- Statistics with Python

**YEAR 2**

**BROADEN YOUR KNOWLEDGE**

**COMPUTER SCIENCE**
Topics include:
- Data Structures & Algorithms
- Introduction to Java
- Discrete Mathematics for Computer Science
- Software Engineering Project II
- Linear Algebra II
- Linear Algebra II
- Discrete Structures and Information Systems I
- Digital Systems
- Introduction to Operating Systems
- Introduction to Functional Programming

**YEAR 3**

**FOCUS ON YOUR CHOSEN SUBJECT**

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

**YEAR 4**

**REFINE YOUR KNOWLEDGE**

**COMPUTER SCIENCE**
Topics 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

**BSc (Honours) Computer Science**

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

**Research**
- Many graduates pursue MSc and PhD studies 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 Smurfit Business School postgraduate degrees, e.g., Master of Management

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

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

Ryan Kane, Student

www.ucd.ie/myucd/computerscience
Computer Science with Data Science

CAO code: DN201

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

**YEAR 1**

**COMPUTER SCIENCE**

Topics include:
- Algorithmic Problem-Solving
- Computer Programming
- Introduction to Computer Architecture

**MATHMATICS**

Topics include:
- Formal Foundations
- Computer Science in Practice
- Software Engineering Project I
- Matrix Algebra
- Foundations of Mathematics for Computer Science
- One Elective module

**YEAR 2**

**COMPUTER SCIENCE WITH DATA SCIENCE**

Topics include:
- Data Structures & Algorithms
- Introduction to Java
- Discrete Mathematics for Computer Science
- Software Engineering Project II

**BROADEN YOUR KNOWLEDGE**

Topics include:
- Linear Algebra II
- Databases and Information Systems I
- Digital Systems
- Introduction to Operating Systems
- Introduction to Functional Programming

**YEAR 3**

**COMPUTER SCIENCE WITH DATA SCIENCE**

Topics include:
- Data Science in Python
- Networks and Internet Systems
- Probability Theory

**FOCUS ON YOUR CHOSEN SUBJECT**

Topics include:
- Introduction to Artificial Intelligence
- Network Analysis
- Data Science in Practice
- Industry Internship
- Information Visualisation

**YEAR 4**

**COMPUTER SCIENCE WITH DATA SCIENCE**

Topics include:
- Data Science Project
- Machine Learning
- Deep Learning
- Data Mining
- Cloud Computing
- Connectionist Computing

**REFINE YOUR KNOWLEDGE**

Topics include:
- Parallel and Cluster Computing
- Text Analytics
- Human Language Technology
- Spatial Information System
- Information Security
- Linear Models

### BSc (Honours) Computer Science with Data Science

**MSc (Taught)**

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

**Research**

Many graduates pursue MSc and PhD studies as well as postdoctoral research in Ireland and abroad in diverse areas such as:
- Artificial Intelligence
- Software and Systems Engineering
- Networks and Distributed Systems

**Industry**

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

**Conversion Courses**

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

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

---

**Lily Burke, Student**

Technology has always fascinated me and I knew the field would offer many career options. I researched a lot of courses but DN201 stood out. I completed two software engineering internships with Intel during the summers of first and second year, as well as a five month data science internship worth 15 credits in third year. The industry experience allows you to apply your skills and having the chance to work in teams with highly talented engineers is an incredibly challenging yet rewarding experience. When I graduate, I hope to work in technical project management, or similar software engineering leadership roles.

---

**Dr Derek Greene**

UCD School of Computer Science

Dr Derek Greene

Lily Burke, Student

"Technology has always fascinated me and I knew the field would offer many career options. I researched a lot of courses but DN201 stood out. I completed two software engineering internships with Intel during the summers of first and second year, as well as a five month data science internship worth 15 credits in third year. The industry experience allows you to apply your skills and having the chance to work in teams with highly talented engineers is an incredibly challenging yet rewarding experience. When I graduate, I hope to work in technical project management, or similar software engineering leadership roles."

---

**Lily Burke, Student**

---

**Dr Derek Greene**

---

**Lily Burke, Student**

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

**COMMON ENTRY:**
1 CAO Code, 27 different degrees

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

**TIME**
Time to change your mind in First Year

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

**Frequently Asked Questions**

**Q: Is DN200 Science a General Science degree?**

A: No. The DN200 Science course is a Level 8 BSc Honours degree of four years. Students enter by a single route and graduate with a BSc Honours degree in one of 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.
I chose the DN200 No Preference option and in my first year had the opportunity to study Maths, Chemistry, Physics and Biology. After completing modules in Biochemistry, Neuroscience, Physiology, Pharmacology and Genetics in second year, I chose to specialise in Biochemistry & Molecular Biology. Biochemistry is at the core of all the biological sciences and provides an excellent foundation for a career in the field of biomolecular and biomedical sciences. During my degree, I have delved into key components of Biochemistry such as metabolism, molecular basis of diseases, proteins and enzymes while also being able to maintain my love of Spanish and music through elective modules.

Alison Howett, Student
# Cell & Molecular Biology

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

<table>
<thead>
<tr>
<th>Sample pathway for a degree in Cell &amp; Molecular Biology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>YEAR 1</strong></td>
</tr>
<tr>
<td><strong>BIOLOGY</strong></td>
</tr>
<tr>
<td>Topics include:</td>
</tr>
<tr>
<td>- Biology in Action</td>
</tr>
<tr>
<td>- Life on Earth</td>
</tr>
<tr>
<td>- Cell Biology &amp; Genetics</td>
</tr>
<tr>
<td>- Biomedical Sciences</td>
</tr>
<tr>
<td><strong>CHEMISTRY</strong></td>
</tr>
<tr>
<td>Topics include:</td>
</tr>
<tr>
<td>- The Basis of Organic and Biomedical Chemistry</td>
</tr>
<tr>
<td><strong>MATHEMATICS</strong></td>
</tr>
<tr>
<td>Topics include:</td>
</tr>
<tr>
<td>- Mathematics for the Biological &amp; Chemical Sciences</td>
</tr>
<tr>
<td>- One Elective module</td>
</tr>
<tr>
<td>- One Small-Group Project</td>
</tr>
</tbody>
</table>

| **YEAR 2**                                              |
| **CELL & MOLECULAR BIOLOGY**                           |
| Topics include:                                         |
| - Scientific Communication                             |
| - Principles of Cell Biology                            |
| - Principles of Genetics                                |
| - Chemistry for Biologists                              |
| - Biomolecular Laboratory Skills                        |
| **MICROBIOLOGY**                                        |
| Topics include:                                         |
| - Metabolic and Immune Systems                          |
| - Principles of Microbiology                            |
| **GENETICS**                                            |
| Topics include:                                         |
| - Principles of Genetics                                |
| - Molecular Genetics & Biotechnology                    |
| - Two Elective modules                                  |

| **YEAR 3**                                              |
| **FOCUS ON YOUR CHOSEN SUBJECT**                        |
| **CELL & MOLECULAR BIOLOGY**                           |
| - Regulation of Gene Expression                         |
| - Developmental Biology                                 |
| - Plant Cell Growth and Signalling                      |
| - Molecular Basis of Disease                            |
| - Working with Biological Data                          |
| - Two Elective modules                                  |

| **YEAR 4**                                              |
| **REFINE YOUR KNOWLEDGE**                              |
| **CELL & MOLECULAR BIOLOGY**                           |
| - Advanced Cell Biology                                 |
| - Research Methods in Cell Biology                      |
| - Genetics                                              |
| - Cell Signalling                                       |
| - Epithelial Transport                                 |
| - Biological Imaging                                   |
| - Human Genetics & Disease                              |
| - Cell Biology of Cancer                                |
| - Cell Biology of Ageing                                |

<table>
<thead>
<tr>
<th><strong>BSc (Honours) Cell &amp; Molecular Biology</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MSc (Taught)</strong></td>
</tr>
<tr>
<td>- MSc Biological &amp; Biomolecular Science (NL)</td>
</tr>
<tr>
<td>- MSc Molecular Medicine</td>
</tr>
<tr>
<td>- MSc Biotechnology</td>
</tr>
<tr>
<td>- MSc Biotechnology &amp; Business</td>
</tr>
<tr>
<td>- MSc Plant Biology &amp; Biotechnology</td>
</tr>
<tr>
<td><strong>PhD</strong></td>
</tr>
<tr>
<td>- Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as cell &amp; molecular biology, biochemistry, genetics, systems biology and biomolecular science</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
</tr>
<tr>
<td>- Pharmaceutical and Biotechnology companies</td>
</tr>
<tr>
<td>- Semi-State bodies such as BIM, Teagasc</td>
</tr>
<tr>
<td>- Hospital laboratories</td>
</tr>
<tr>
<td>- Genetic Counselling</td>
</tr>
<tr>
<td>- Forensic Science</td>
</tr>
<tr>
<td><strong>Conversion Courses</strong></td>
</tr>
<tr>
<td>- Professional Master of Education (PME)</td>
</tr>
<tr>
<td>- Graduate Veterinary Medicine</td>
</tr>
<tr>
<td>- Graduate Medicine</td>
</tr>
<tr>
<td>- Master of Management</td>
</tr>
</tbody>
</table>

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"Learn why healthy cells become cancerous, what happens at a cellular level in diseases and the basic concept of genetics. Develop practical skills in microscopy, cellular assays and diagnostic techniques used in industry, hospitals and research labs. Complete a research project in diverse areas such as cancer biology, drug delivery, genetic analysis and molecular imaging.

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

Paula Burke, Graduate

---

www.ucd.ie/myucd/cellandmolecularbiology
### Sample pathway for a degree in Environmental Biology *

#### YEAR 1

**BIOLOGY**
- Topics include:
  - Biology in Action
  - Life on Earth
  - Cell Biology & Genetics
  - Biomedical Sciences

**CHEMISTRY**
- Topics include:
  - The Basis of Organic and Biological Chemistry

**MATHEMATICS**
- Topics include:
  - Mathematics for the Biological & Chemical Sciences

* One Elective module  
* One Small-Group Project

#### YEAR 2

**ENVIRONMENTAL BIOLOGY**
- Topics include:
  - Principles of Environmental Biology and Ecology
  - Scientific Communication
  - Evolutionary Biology
  - Microbial Interactions
  - Global Environmental Change
  - Forests, Climate and Carbon
  - Applied Plant Biology

**ZOÖLOGY**
- Topics include:
  - Principles of Zoology
  - Animal Behaviour
  - Molecular Genetics and Biotechnology

**PLANT BIOLOGY**
- Topics include:
  - Principles of Plant Biology and Biotechnology

* Two Elective modules

#### YEAR 3

**FOCUS ON YOUR CHOSEN SUBJECT**

**ENVIRONMENTAL BIOLOGY** – Topics include:
- Systems Ecology
- Biogeography and Field Biology
- Diversity of Vertebrates

**ENVIROMENTAL BIOLOGY**
- Diversity of Plant Form & Function
- Ecology & Environmental Microbiology
- Wildlife and Fisheries Management

* Two Elective modules

#### YEAR 4

**REFINE YOUR KNOWLEDGE**

**ENVIRONMENTAL BIOLOGY** – Topics include:
- Environmental Biology Research Project
- Marine Community Ecology
- Bioassessment of Freshwaters
- Biological Invasions
- Insect-Plant Interactions
- Ecological Modelling and QGIS
- Biodiversity
- Foodborne Pathogens
- Tropical Field Ecology
- Ecological Impact Assessment
- Peatlands and Environmental Change

<table>
<thead>
<tr>
<th>MSc (Taught) Environmental Biology</th>
<th>PhD</th>
<th>Industry</th>
<th>Conversion Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSc Applied Environmental Science</td>
<td>National Parks and Wildlife Services</td>
<td>Environmental Management with State agencies, companies or consultancies</td>
<td></td>
</tr>
<tr>
<td>MSc World Heritage Management</td>
<td></td>
<td></td>
<td>Professional Master of Education (PME)</td>
</tr>
<tr>
<td>MSc Plant Biology &amp; Biotechnology</td>
<td>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</td>
<td>Semi-State bodies such as the EPA and BIM and NGOs such as An Taisce</td>
<td>Graduate Veterinary Medicine</td>
</tr>
</tbody>
</table>

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---

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

Olga Lastovetsky, Graduate

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www.ucd.ie/myucd/environmentalbiology

---

Associate Professor Tom Wilkinson
UCD School of Biology and Environmental Science

tom.wilkinson@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience
These are transgenic zebrafish larvae (5 days old, 3 mm long) that express green fluorescent protein in all their blood vessels. The zebrafish is our animal model to study retinal development and disease. Image by Dr Yolanda Alvarez © UCD

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

One of the things I loved about the DN200 course is the huge amount of flexibility. The course structure meant that I actually got to experience each subject area early on, allowing me to make informed decisions on my area of interest as the course progressed. Genetics is a field at the forefront of modern biological research, looking at everything from the inheritance of traits, to the genetic basis of disease, to unravelling the evolutionary history of modern organisms. A BSc in Genetics opens a huge number of doors across not just the Science sector but also a variety of business areas. I am now completing a PhD at the European Molecular Biological Laboratory in Germany using Structural Genetics to study the effect of ageing on human blood stem cells.

Karen Grimes, Graduate
## Microbiology

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

### Sample pathway for a degree in Microbiology *

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th><strong>BIOLOGY</strong></th>
<th><strong>CHEMISTRY</strong></th>
<th><strong>MATHEMATICS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics include:</td>
<td>Biology in Action</td>
<td>The Basis of Organic and Biological Chemistry</td>
<td>Mathematics for the Biological &amp; Chemical Sciences</td>
</tr>
<tr>
<td>Topics include:</td>
<td>Life on Earth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topics include:</td>
<td>Cell Biology &amp; Genetics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topics include:</td>
<td>Biomedical Sciences</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Engage with the Principles

- One Elective module
- One Small-Group Project

<table>
<thead>
<tr>
<th>YEAR 2</th>
<th><strong>MICROBIOLOGY</strong></th>
<th><strong>CELL &amp; MOLECULAR BIOLOGY</strong></th>
<th><strong>GENETICS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics include:</td>
<td>Chemistry for Biologists</td>
<td>Biological Systems</td>
<td>Principles of Genetics</td>
</tr>
<tr>
<td>Topics include:</td>
<td>Molecular Genetics and Biotechnology</td>
<td>Principles of Cell and Molecular Biology</td>
<td></td>
</tr>
<tr>
<td>Topics include:</td>
<td>Biomolecular Laboratory Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topics include:</td>
<td>Metabolic and Immune Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topics include:</td>
<td>Principles of Microbiology: Medicine, Environment and Biotechnology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Choose Your Subjects

- Two Elective modules

<table>
<thead>
<tr>
<th>YEAR 3</th>
<th><strong>FOCUS ON YOUR CHOSEN SUBJECT</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbiology – Topics include:</td>
<td>Microbial Physiology</td>
</tr>
<tr>
<td>Microbiology – Topics include:</td>
<td>Medical Microbiology</td>
</tr>
<tr>
<td>Microbiology – Topics include:</td>
<td>Skills in Microbiology</td>
</tr>
<tr>
<td>Microbiology – Topics include:</td>
<td>Ecology &amp; Environmental Microbiology</td>
</tr>
</tbody>
</table>

### Focus on Your Chosen Subject

- Two Elective modules

<table>
<thead>
<tr>
<th>YEAR 4</th>
<th><strong>REFINE YOUR KNOWLEDGE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbiology – Topics include:</td>
<td>Enzyme Technology &amp; Protein Engineering</td>
</tr>
<tr>
<td>Microbiology – Topics include:</td>
<td>Natural Product Synthesis</td>
</tr>
<tr>
<td>Microbiology – Topics include:</td>
<td>Host Defense Mech. In Health</td>
</tr>
</tbody>
</table>

### BSc (Honours) Microbiology

- Microbiology Research Project/Internship
- Ecological & Environmental Microbiology
- Systems Microbiology
- Applied Microbiology
- Bioprocessing

<table>
<thead>
<tr>
<th>MSc (Taught)</th>
<th>PhD</th>
<th>Industry</th>
<th>Conversion Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSc Biotechnology</td>
<td>Students can pursue a PhD in universities in Ireland or abroad in areas as diverse as Biotechnology, Environmental Biology, Medical and Veterinary Sciences</td>
<td>Pharmaceutical Companies</td>
<td>Professional Master of Education (PME)</td>
</tr>
<tr>
<td>MSc Biotechnology &amp; Business</td>
<td></td>
<td>Food and food-related companies</td>
<td>Graduate Veterinary Medicine</td>
</tr>
<tr>
<td>MSc Environmental Management</td>
<td></td>
<td>(Veterinary) Hospitals and related laboratories</td>
<td>Graduate Medicine</td>
</tr>
<tr>
<td>MSc Regulatory Affairs &amp; Toxicology</td>
<td></td>
<td>Government agencies including the EPA and county councils</td>
<td>Medical Scientist</td>
</tr>
<tr>
<td>MSc Plant Biology &amp; Biotechnology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSc Biopharmaceutics</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Emma Cullen in a Microbiology practical in the UCD O’Brien Centre for Science.

---

I found DN200 Science fantastic because I could try out all the subjects I liked before choosing my major. I found that I adored Microbiology. I am fascinated by how microorganisms can be manipulated to make such a wide assortment of valuable products – from antibiotics and crucial hormones like insulin to bioplastics and biofuels. I love seeing how what I’ve learned all these years is applied in real life in industry. I am now working as a Quality Control Microbiologist in Takeda Biologics Dunboyne. Without the leadership, teamwork and communication skills I learned while studying at UCD, I would not be here today.

Caoimhe Cullen, Graduate

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www.ucd.ie/myucd/microbiology

---

Dr Tadhg Ó Cróinín
UCD School of Biomolecular and Biomedical Science

microbiology@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience
# Sample pathway for a degree in Neuroscience *

**YEAR 1**

**BIOLOGY**
- Topics include:
  - Biology in Action
  - Life on Earth
  - Cell Biology & Genetics
  - Biomedical Sciences

**CHEMISTRY**
- Topics include:
  - The Basis of Organic and Biological Chemistry

**MATHEMATICS**
- Topics include:
  - Mathematics for the Biological & Chemical Sciences
  - One Elective Module
  - One Small-Group Project

---

**YEAR 2**

**NEUROSCIENCE**
- Topics include:
  - Principles of Neuroscience
  - Cell Signalling
  - Drugs used in CNS diseases
  - Nervous System Development
  - Membrane Biology

**BIOCHEMISTRY & MOLECULAR BIOLOGY**
- Topics include:
  - Principles of Biochemistry
  - Biomedical Science of Drugs

**PHARMACOLOGY**
- Topics include:
  - Principles of Genetics
  - Biostatistics
  - Sensory Neuroscience
  - Genetic Basis of Disease
  - Higher Cortical Function

**GENETICS**
- Topics include:
  - Two Elective modules

---

**YEAR 3**

**NEUROSCIENCE**
- Topics include:
  - Neuroscience Research Project
  - Synaptic Plasticity
  - Advanced Topics in Neural Development

**FOCUS YOUR CHOSEN SUBJECT**
- Topics include:
  - Biostatistics
  - Sensory Neuroscience
  - Genetic Basis of Disease
  - Higher Cortical Function
  - Two Elective modules

---

**YEAR 4**

**NEUROSCIENCE**
- Topics include:
  - Genetics of Disease & Behaviour
  - Synaptic Signalling
  - Emerging Therapies

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

**BSc (Honours) Neuroscience**
- MSc (Taught)
  - MSc Biotechnology & Business
  - MSc Biotechnology & Business
  - MSc Biotherapeutics & Business
  - MSc Biotherapeutics & Business

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

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

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

---

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---

I have always known that Science is my passion, but it wasn’t until I had the opportunity to explore the subject in a hands-on environment that I realised how much I love Neuroscience. I was intrigued straight away by the brain, and by how much is still to be discovered. I am a member of the UCD Lacrosse Club, I volunteered in Tanzania with UCD Volunteers Overseas and I work as a Residential Assistant on campus. The great thing about UCD is being able to study electives, so I was able to study French, Spanish, Astronomy and Psychology as well as all my Science modules. When I graduate, I hope to work in research, particularly on developing treatments for brain disorders.

Shauna Corry, Student

---

**www.ucd.ie/myucd/neuroscience**
Pharmacology

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

Sample pathway for a degree in Pharmacology *

YEAR 1

ENGAGE WITH THE PRINCIPLES

BIOLOGY
Topics include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences

CHEMISTRY
Topics include:
- The Basis of Organic and Biological Chemistry

MATHEMATICS
Topics include:
- Mathematics for the Biological & Chemical Sciences

YEAR 2

CHOOSE YOUR SUBJECTS

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

PHYSIOLOGY
Topics include:
- Introduction to Physiology
- Organs and Systems Physiology

MICROBIOLOGY
Topics include:
- Principles of Microbiology: Medicine, Environment and Biotechnology

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

PHARMACOLOGY – Topics include:
- Drugs used in CNS diseases
- Advanced CNS Pharmacology
- Toxicology
- Molecular Pharmacology

YEAR 4

REFINE YOUR KNOWLEDGE

PHARMACOLOGY – Topics include:
- Gene Regulation
- Drug Discovery & Development

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

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

Áine Madden, Student

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

The degree programme offers a wide range of modules covering the scientific background of current therapies, to identifying novel targets in diseases, and the drug development process itself. I spent a semester abroad in the University of Queensland, Australia, which was an exciting opportunity to learn from other pharmacology experts from around the world. A degree in Pharmacology offers an ideal pathway into the pharmaceutical and healthcare industry where there are a huge variety of roles from research and development all the way through to the sales and marketing of medicines.

Áine Madden, Student

www.ucd.ie/myucd/pharmacology

Professor Orina Belton
UCD School of Biomolecular and Biomedical Science
orina.belton@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience
Physiology

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

Sample pathway for a degree in Physiology *

YEAR 1

ENGAGE WITH THE PRINCIPLES

BIOLOGY
Topics include:
- Biology in Action
- Diversity of Life
- Cell Biology & Genetics
- Biomedical Sciences

CHEMISTRY
Topics include:
- The Basis of Organic and Biological Chemistry

MATHEMATICS
Topics include:
- Mathematics for the Biological & Chemical Sciences

YEAR 2

CHOOSE YOUR SUBJECTS

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

NEUROSCIENCE
Topics include:
- Principles of Neuroscience

MICROBIOLOGY
Topics include:
- Principles of Microbiology: Medicine, Environment and Biotechnology

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

PHYSIOLOGY – Topics include:
- Cardiovascular System
- Biostatistics
- Experimental Physiology
- Endocrine/Reproductive Physiology
- Digestion, Absorption and Excretion
- Membrane Biology
- Higher Cortical Function
- Respiratory Physiology

YEAR 4

REFINE YOUR KNOWLEDGE

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

BSc (Honours) Physiology

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

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

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

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

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

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

Stephen Murphy, Student

www.ucd.ie/myucd/physiology
Plant Biology
CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for a degree in Plant Biology *

YEAR 1

ENGAGE WITH THE PRINCIPLES

BIOLOGY
Topics include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences

CHEMISTRY
Topics include:
- The Basis of Organic and Biological Chemistry

MATHEMATICS
Topics include:
- Mathematics for the Biological & Chemical Sciences

YEAR 2

CHOOSE YOUR SUBJECTS

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

ENVIRONMENTAL BIOLOGY
Topics include:
- Principles of Environmental Biology and Ecology

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

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

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

YEAR 4

REFINE YOUR KNOWLEDGE

PLANT BIOLOGY – Topics include:
- Developmental Plant Genetics
- Cell Signalling in Plants
- Plants and Stress
- Plant Phenotyping

BSc (Honours) Plant Biology

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

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

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

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

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

Understand how plants are a vital component of the biosphere and are responsible for the environmental conditions essential for all life on Earth

Develop skills to study how plants and plant cells grow and develop

Emma Doyle, Graduate

I chose Plant Biology as Plant Biotechnology and Plant Pathology particularly interested me. Our classes were specific to Plant Biology, were smaller and we had lots of contact with lecturers and tutors. The opportunity to carry out a research internship in South America with the Plant Palaeoecology and Palaeobiology research group in my third year was one of the highlights of my time in UCD. After graduating, I completed a research Master’s in Plant Pathology and I am currently completing a PhD in molecular plant genetics, focused on the regulation of gene expression in stomatal guard cells.

Emma Doyle, Graduate

www.ucd.ie/myucd/ plantbiology

Associated Professor Carl Ng
UCD School of Biology and Environmental Science
carl.ng@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience
Zoology
CAO code: DN200 Option: Biological, Biomedical and Biomolecular Science (BBB)

Sample pathway for a degree in Zoology *

YEAR 1

ENAGNE WITH THE PRINCIPLES

BIOLOGY
Topics include:
- Biology in Action
- Life on Earth
- Cell Biology & Genetics
- Biomedical Sciences

CHEMISTRY
Topics include:
- The Basis of Organic and Biological Chemistry

MATHEMATICS
Topics include:
- Mathematics for the Biological & Chemical Sciences

- One Elective module
- One Small-Group Project

YEAR 2

CHOOSE YOUR SUBJECTS

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

ENVIRONMENTAL BIOLOGY
Topics include:
- Principles of Environmental Biology and Ecology

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

- Two Elective modules

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

ZOLOGY – Topics include:
- Functional Morphology
- Arthropoda
- Diversity of Invertebrates
- Field courses in Ireland and Spain

- Two Elective modules

YEAR 4

REFINE YOUR KNOWLEDGE

ZOLOGY – Topics include:
- Zoology Research Project
- Biological Invasions

- Marine Community Ecology
- Bioassessent of Freshwaters
- Biodiversity

- Molecular Phylogenetics and Evolution
- Physiology of epithelial transport

- Two Elective modules

BSc (Honours) Zoology

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

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

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

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

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

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Adam Smith, Student

"The Costa Rican rainforest was a sensual overload, a true wildlife paradise and a dream come true for any zoologist. Staff and students alike were constantly uncovering the countless creatures of the forest and putting our knowledge to work to quantify and sample in such a different world, a truly unforgettable experience."

Professor Emma Teeling
UCD School of Biology and Environmental Science

emmag.teeling@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience

www.ucd.ie/myucd/ zoology

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

Emily Lewanowski-Breen, Student
Preparing an experiment in Chemistry.

PhD Students can pursue a PhD in Ireland or abroad in areas as diverse as:
- Pharmaceutical design
- Atmospheric kinetics
- Biological aspects of nanoscience
- Energy generation
- Pollution control
- Novel material synthesis
- Polymer chemistry
- Materials analysis bio-inorganic chemistry
- Computational studies

Industry
Most graduates work in the pharmaceutical or chemical industries. Positions range from manufacturing chemists to quality control/analysis/assurance, research and development and raw materials/product analysis in manufacturing.
- 2nd level or 3rd level Teaching
- State Labs such as the Forensic laboratory
- ESB and Bord Gáis
- Environmental Protection Agency
- Medical device industry
- Patent law
- Healthcare industry

As soon as I had my first Chemistry lecture, I knew it was for me. The lecturers were excellent, funny and passionate. By my second year I was hooked. I had great opportunities to be a part of several clubs and societies. During my degree, I was captain of the UCD Mountaineering Club. We organised several trips around Ireland and the UK as well as hosting the Irish Climbing Intervarsities. I’ve also had the fantastic opportunity to be a Peer Mentor and a Science Student Leader.

Andrew Keating, Graduate

Associate Professor Mike Casey
UCD School of Chemistry
mike.casey@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience

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

www.ucd.ie/myucd/chemistry

Preventing an experiment in Chemistry.

Dr. Alan Horgan
School of Chemistry
UCD

BSc (Honours) Chemistry
Chemistry with Biophysical Chemistry

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

Sample pathway for a degree in Chemistry with Biophysical Chemistry*

YEAR 1

ENGAGE WITH THE PRINCIPLES

CHEMISTRY
Topics include:
- The Basis of Organic and Biological Chemistry
- The Basis of Physical Chemistry
- The Molecular World

MATHEMATICS
Topics include:
- Mathematics for the Biological & Chemical Sciences

BIOLOGY
Topics include:
- Cell Biology & Genetics

YEAR 2

CHOOSE YOUR SUBJECTS

CHEMISTRY WITH BIOPHYSICAL CHEMISTRY
Topics include:
- Biophysical Chemistry
- Physical Chemistry
- Inorganic Chemistry
- Organic Chemistry

YEAR 3

FOCUS ON YOUR CHOSEN SUBJECT

CHEMISTRY WITH BIOPHYSICAL CHEMISTRY – Topics include:
- Instrumental Analysis
- Carbonyl Chemistry & Synthesis
- Quantum Mechanics
- Mechanism & Stereochemistry
- Nano-Assemblies and Interfaces

YEAR 4

REFINE YOUR KNOWLEDGE

CHEMISTRY WITH BIOPHYSICAL CHEMISTRY – Topics include:
- Biophysical Chemistry
- Physical Chemistry
- Inorganic Chemistry

BSc (Honours) Chemistry with Biophysical Chemistry

PhD
- Biophysical Chemistry Research Project
- Metals in Biology
- Electrochemistry
- Biophysical Chemistry
- Advanced Kinetics and Thermodynamics
- Nanochemistry

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

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

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

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

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

Rian Lynch, Student

Associate Professor Vitaly Buckin
UCD School of Chemistry
vitaly.buckin@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience

www.ucd.ie/myucd/biophysicalchemistry

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

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

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

**Year 1**

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

**Mathematics**
- Mathematics for the Biological & Chemical Sciences

**Engage with the Principles**
- One Small-Group Project
- One Elective module

**Year 2**

**Choose Your Subjects**

**Chemistry with Environmental & Sustainable Chemistry**
- Environmental and Sustainable Chemistry
- Inorganic Chemistry
- Physical Chemistry
- Environmental Geology

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

**Year 3**

**Focus on Your Chosen Subject**

**Chemistry with Environmental & Sustainable Chemistry**
- Quantum Mechanics
- Carbonyl Chemistry & Synthesis
- Self-Assembly of Biomolecules
- Mechanism & Stereochemistry
- Environmental & Sustainable Chemistry Research Project
- Green and Sustainable Chemistry
- Methods in Organic Synthesis

**Chemistry**
- Advanced Inorganic Chemistry
- Methods in Organic Synthesis 2

**Year 4**

**Refine Your Knowledge**

**Chemistry with Environmental & Sustainable Chemistry**
- Chemical Thermodynamics
- Nanochemistry
- Electrochemistry
- Reactivity & Change
- Modern Methods and Catalysis

**Chemistry**
- Advanced Inorganic Chemistry
- Methods in Organic Synthesis 2

**BSc (Honours) Chemistry with Environmental & Sustainable Chemistry**

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

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

**Industry**
- Most graduates work in the pharmaceutical or chemical industries. Positions range from manufacturing chemists to quality control/analysis/assurance, research and development and raw materials/product analysis in manufacturing.
- 2nd level or 3rd level Teaching
- State Labs such as the Forensic laboratory
- ESB and Bord Gáis
- Medical device industry
- Patent law
- Healthcare industry

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

Associate Professor James Sullivan
UCD School of Chemistry
james.sullivan@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience

Undergraduate Chemistry laboratory in the UCD O’Brien Centre for Science.

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

“DN200 allowed me to sample subjects from across Biology, Chemistry, Physics and Geology and I decided Chemistry was the subject for me. I believe a knowledge in Chemistry with Environmental & Sustainable Chemistry is very applicable in industry as legislation is being introduced which holds industries accountable for the waste they produce. This degree investigates how Chemistry can be used to tackle issues such as global warming, acid rain, water pollution and ozone layer depletion. Following graduation, I plan to continue my study of Environmental Chemistry and eventually, I would like to work within an industrial laboratory to implement the principles of green chemistry.”

Eimear Madden, Student

www.ucd.ie/myucd/environmentaland sustainablechemistry
I chose Medicinal Chemistry & Chemical Biology due to my interest in human health, diseases and drug design. I also enjoyed spending time in the practical labs learning skills and techniques and understanding how they are used on a larger scale in drug production. After I graduate, I hope to work in the pharmaceutical industry in the area of validation or quality control. I completed a placement with Kerry Group in my second year. This was a highly beneficial opportunity, where I worked alongside their analysts to carry out qualitative and quantitative food analysis. The internship provided me the chance to explore other career paths available to me through a degree in chemistry.

Shekemi Denuga, Student

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

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>CHEMISTRY</th>
<th>MATHEMATICS</th>
<th>BIOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics include:</td>
<td>Topics include:</td>
<td>Topics include:</td>
<td></td>
</tr>
<tr>
<td>The Basis of Organic and Biological Chemistry</td>
<td>Mathematics for the Biological &amp; Chemical Sciences</td>
<td>Cell Biology &amp; Genetics</td>
<td></td>
</tr>
<tr>
<td>The Basis of Physical Chemistry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Basis of Inorganic Chemistry</td>
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<td></td>
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<tr>
<td>The Molecular World</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>YEAR 2</th>
<th>MEDICINAL CHEMISTRY &amp; CHEMICAL BIOLOGY</th>
<th>CHEMISTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics include:</td>
<td>Topics include:</td>
<td></td>
</tr>
<tr>
<td>Molecular Genetics and Biotechnology</td>
<td>Students who choose Medicinal Chemistry &amp; Chemical Biology as their main subject for second year also cover the requirements for Chemistry.</td>
<td></td>
</tr>
<tr>
<td>Principles of Biochemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicinal Chemistry &amp; Chemical Biology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacology: Biomedical Science of Drugs</td>
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</table>

<table>
<thead>
<tr>
<th>YEAR 3</th>
<th>MEDICINAL CHEMISTRY &amp; CHEMICAL BIOLOGY</th>
<th>CHEMISTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics include:</td>
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</tr>
<tr>
<td>Chemical Biology of Natural Products</td>
<td>Structure Determination &amp; Heterocyclic Chemistry</td>
<td></td>
</tr>
<tr>
<td>Chemical Biology of Macromolecules</td>
<td>Microbial Cell Factory/Chemists</td>
<td></td>
</tr>
<tr>
<td>Carbonyl Chemistry &amp; Synthesis</td>
<td>Mechanism &amp; Stereochemistry</td>
<td></td>
</tr>
<tr>
<td>Medicinal Chemistry</td>
<td>Biochemist’s Toolkit</td>
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<table>
<thead>
<tr>
<th>YEAR 4</th>
<th>MEDICINAL CHEMISTRY &amp; CHEMICAL BIOLOGY</th>
<th>CHEMISTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics include:</td>
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</tr>
<tr>
<td>Research Project</td>
<td>Two Elective modules</td>
<td></td>
</tr>
<tr>
<td>Metals in Biology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**BSc (Honours) Medicinal Chemistry & Chemical Biology**

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

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

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

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

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**Contact**

**Professor Stefan Oscarson**
UCD School of Chemistry

**shekemi.denuga@ucd.ie**

[Visit the UCD School of Chemistry website](http://www.ucd.ie/medicinalchemistryandchemicalbiology)
Chemistry, Mathematics & Education

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

Sample pathway to become a Chemistry and Mathematics teacher *

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>ENGAGE WITH THE PRINCIPLES</th>
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</thead>
<tbody>
<tr>
<td>EDUCATION Topics include:</td>
<td>CHEMISTRY Topics include:</td>
</tr>
<tr>
<td>Mathematics &amp; Science Education &amp; Communication</td>
<td>Introductory Chemistry</td>
</tr>
<tr>
<td>Science &amp; Mathematics Pedagogy</td>
<td>Organic Chemistry and Chemical Biology</td>
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<tr>
<td></td>
<td>Educational Research</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YEAR 2</th>
<th>CHOOSE YOUR SUBJECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUCATION Topics include:</td>
<td>CHEMISTRY Topics include:</td>
</tr>
<tr>
<td>Education for Democracy</td>
<td>Physical Chemistry</td>
</tr>
<tr>
<td>Science and Mathematics Pedagogy</td>
<td>Organic Chemistry</td>
</tr>
<tr>
<td>Collaborative Pedagogy in Mathematics Education</td>
<td>Inorganic Chemistry</td>
</tr>
<tr>
<td>Schools and Society</td>
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<table>
<thead>
<tr>
<th>YEAR 3</th>
<th>REFINED YOUR KNOWLEDGE</th>
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</thead>
<tbody>
<tr>
<td>EDUCATION Topics include:</td>
<td>SCHOOL PLACEMENT</td>
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<tr>
<td>Collaborative Pedagogy in Mathematics Education</td>
<td>Post-Primary Placement</td>
</tr>
<tr>
<td>Science &amp; Mathematics Pedagogy</td>
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<table>
<thead>
<tr>
<th>YEAR 4</th>
<th>PREPARE FOR PROFESSIONAL PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUCATION Topics include:</td>
<td>SCHOOL PLACEMENT</td>
</tr>
<tr>
<td>Pedagogical Approaches to Mathematics and Science</td>
<td>Year-Long Placement in Post-Primary School</td>
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<tr>
<td>Psychology for Teaching and Learning</td>
<td>Classroom Teaching</td>
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<td></td>
<td>Broad Experience of Wider School Context</td>
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</table>

<table>
<thead>
<tr>
<th>YEAR 5</th>
<th>BSc Chemistry, Mathematics &amp; Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUCATION Topics include:</td>
<td>PREPARE FOR PROFESSIONAL PRACTICE</td>
</tr>
<tr>
<td>Research Methods</td>
<td>SCHOOL PLACEMENT</td>
</tr>
<tr>
<td>Professional Dissertation</td>
<td>Year-Long Placement in Post-Primary School</td>
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<tr>
<td></td>
<td>Continuous Professional Development Activities</td>
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<td></td>
<td>Further Development of Professional Practice Portfolio</td>
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<table>
<thead>
<tr>
<th>MSc Mathematics and Science Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Primary School Teacher</td>
</tr>
</tbody>
</table>

QUALIFIED TO TEACH

- Chemistry: Leaving Certificate
- Mathematics: Leaving Certificate
- Science: Junior Certificate

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

Group work in an active learning environment classroom.

Science and Mathematics were always my favourite subjects in school and I knew I would study something Science related at third level. Having always wanted to be a teacher, I realised that the Science, Maths and Education pathway was for me as I get to study my two favourite subjects, Chemistry and Mathematics, in depth. I am currently undertaking a placement in Third Year. It is an eight week observation/teaching placement that runs alongside my lectures and labs. It is extremely beneficial as I can see the theories and educational practices I have been learning over the last two years put into practice and it is an opportunity to prepare myself for the year-long placement in my final year.

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

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

Shane Walsh, Student

www.ucd.ie/myucd/appliedandcomputationalmathematics

Associate Professor Ted Cox
UCD School of Mathematics and Statistics
ted.cox@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience

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

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

Sample pathway for a degree in Financial Mathematics *

**YEAR 1**

ENGAGE WITH THE PRINCIPLES

MATHEMATICS
Topics include:
- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences
- Numbers and Functions
- Mathematical Analysis

STATISTICS
Topics include:
- Statistical Modelling

APPLIED & COMPUTATIONAL MATHEMATICS
Topics include:
- Applications of Differential Equations

One Elective module
One Small-Group Project

**YEAR 2**

CHOOSE YOUR SUBJECTS

FINANCIAL MATHEMATICS
Topics include:
- Calculus of Several Variables
- Linear Algebra 2
- Theory of Games
- Business Economics
- Principles of Finance

STATISTICS
Topics include:
- Inferential Statistics
- Probability Theory
- Predictive Analytics

APPLIED AND COMPUTATIONAL MATHEMATICS
Topics include:
- Computational Science
- Vector Calculus

Two Elective modules

**YEAR 3**

FOCUS ON YOUR CHOSEN SUBJECT

FINANCIAL MATHEMATICS – Topics include:
- Foundations for Financial Mathematics
- Partial Differential Equations
- Metric Spaces
- Optimization in Finance
- Corporate Finance
- Statistical Machine Learning
- Computational Finance
- Stochastic Models

Two Elective modules

**YEAR 4**

REFINE YOUR KNOWLEDGE

FINANCIAL MATHEMATICS – Topics include:
- Measure Theory and Integration
- Stochastic Analysis
- Financial and Actuarial Mathematics
- Investment and Trading
- Advanced Risk Management
- Time Series Analysis
- Monte Carlo Inference
- Topics in Computational Science and Machine Learning

Two Elective modules

BSc (Honours) Financial Mathematics

MSc (Taught)
- MSc Mathematical Science
- MSc Statistics
- MSc Actuarial Science
- MSc Business Analytics
- MSc Data Analytics
- MSc Quantitative Finance

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

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

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

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

When I learned about Financial Mathematics, it sounded like the perfect way to continue to study mathematics while also combining it with my interest in financial markets. I was lucky enough to get to go abroad for my third year to UC Berkeley in California which was an amazing experience. I completed an internship in the summer between third and fourth year at Credit Suisse and was able to earn credits as part of the professional placement module. After I graduate, I’ll be going back to work at that same firm full time.

Joseph Mulligan, Student

www.ucd.ie/myucd/financialmathematics

Dr Adamaria Perrotta
UCD School of Mathematics and Statistics
adamaria.perrotta@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience
Discover the power and beauty of the universal language of Mathematics

Explore its applications and its deep influence on the physical and social sciences, technology, data analysis, philosophy and more

Sample pathway for a degree in Mathematics

YEAR 1
ENGAGE WITH THE PRINCIPLES

MATHEMATICS
Topics include:
- Calculus in the Mathematical and Physical Sciences
- Numbers & Functions
- Linear Algebra in the Mathematical and Physical Sciences
- Mathematical Analysis
- Applications of Differential Equations
- Statistical Modelling

YEAR 2
CHOOSE YOUR SUBJECTS

MATHEMATICS
Topics include:
- Linear Algebra 2
- Calculus of Several Variables
- Groups, Rings & Fields

APPLIED & COMPUTATIONAL MATHEMATICS (OPTIONAL)
Topics include:
- Computational Science
- Vector Calculus
- Oscillations in Mechanical Systems
- Classical Mechanics and Special Relativity

YEAR 3
FOCUS ON YOUR CHOSEN SUBJECT

MATHEMATICS – Topics include:
- Advanced Linear Algebra
- Metric Spaces
- Fourier Analysis
- Measure Theory & Integration

YEAR 4
REFINE YOUR KNOWLEDGE

MATHEMATICS – Topics include:
- Functions of One Complex Variable
- Topology
- Number Theory
- Coding Theory

BSc (Honours) Mathematics

MSc (Taught)
- MSc Mathematical Science
- MSc Statistics
- MSc Actuarial Science
- MSc Business Analytics
- MSc Data Analytics
- MSc Quantitative Finance

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)

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

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

Caitríona Byrne, Student

Dr Michael Mackey
UCD School of Mathematics and Statistics
michael.mackey@maths.ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience
Statistics

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

Sample pathway for a degree in Statistics *

<table>
<thead>
<tr>
<th>YEAR 1</th>
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<td>Statistical Modelling</td>
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<td>Research Methods for Science</td>
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<td>MATHEMATICS</td>
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<td>Survey Sampling</td>
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<td>Linear Algebra 2</td>
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<td>Survival Models</td>
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<td>Design of Experiments</td>
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<td>Stochastic Models</td>
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<td>Monte Carlo Inference</td>
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<td>Applied Statistical Modelling</td>
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<td>Nonparametric Statistics</td>
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<td>Categorical Data Analysis</td>
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<td>Data Programming</td>
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<td>Two Elective modules</td>
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</table>

BSc (Honours) Statistics

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

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

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

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

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

Assistant Professor Isabella Gollini
UCD School of Mathematics and Statistics
Isabella.gollini@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience

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

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

Melanie Dwayne, Student

www.ucd.ie/myucd/
I was not certain of my favourite area of Science, so DN200 allowed me to sample a variety of subjects before I decided which area I wanted to focus on. By choosing the Applied Mathematics, Mathematics & Education pathway I was able to continue studying Mathematics while also learning how to best share my enthusiasm for Maths with others through teaching. School placements in both primary and secondary schools are incorporated into the course from first year, and it took a while to get used to sitting on the other side of the teacher’s desk!

I also work as a tutor in the UCD Maths Support Centre, and I enjoy meeting students studying Mathematics from all faculties and answering their questions.

Lucy Nyland, Student

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

**YEAR 1**

**PHYSICS**

Topics include:
- Foundations of Physics
- Frontiers of Physics
- Thermal Physics and Materials
- Quantum, Particles and Relativity

**MATHEMATICS**

Topics include:
- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences

**APPLIED & COMPUTATIONAL MATHEMATICS**

Topics include:
- Applied Mathematics: Mechanics and Methods
- One Elective module
- One Small-Group Project

**YEAR 2**

**PHYSICS**

Topics include:
- Electronics and Devices
- Introductory Quantum Mechanics
- Fields, Waves and Light
- Methods for Physicists

Physics students also study the following topics in Mathematics:
- Calculus of Several Variables
- Vector Integral & Differential Calculus
- Computational Science

**PHYSICS WITH ASTRONOMY & SPACE SCIENCE**

Topics include:
- Students who chose Physics as their main subject for second year may also cover the requirements for Physics with Astronomy and Space Science
- Exploring the Solar System
- Exploring the Solar System
- Two Elective modules

**YEAR 3**

**FOCUS ON YOUR CHOSEN SUBJECT**

**PHYSICS**

Topics include:
- Classical Mechanics & Relativity
- Optics & Lasers
- Electromagnetism
- Advanced Laboratory

**PHYSICS WITH ASTRONOMY & SPACE SCIENCE**

Topics include:
- Thermodynamics & Statistical Physics
- Nuclear Physics
- Quantum Mechanics
- Stellar Astrophysics & Astronomical Techniques

**YEAR 4**

**REFINE YOUR KNOWLEDGE**

**PHYSICS**

Topics include:
- Advanced Laboratory
- Applied Quantum Mechanics
- Applied Optics
- General Relativity & Cosmology
- High Energy Particle Physics

**PHYSICS WITH ASTRONOMY & SPACE SCIENCE**

Topics include:
- Computational Biophysics
- Theoretical Astrophysics
- Condensed Matter Physics
- Medical Physics
- Galaxies & Observational Cosmology
- Quantum Field Theory
- Advanced Statistical Physics

**BSc (Honours) Physics**

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

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

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

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

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

---

Eimear Conroy preparing an experiment in the Physics undergraduate laboratories.

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

“...I have the opportunity to learn about topics such as quantum mechanics and nuclear physics. I particularly enjoy being able to combine this theoretical foundation with computer programming and hands-on work in the lab, where we have the chance to recreate experiments from scientific papers. In the summer of my second year, I completed my first research internship with the School of Physics along with a group of other undergraduates. As part of this project, I worked closely with lecturers in the School to write programmes to solve equations describing white dwarf and neutron stars. I found this placement hugely beneficial as it gave me my first taste of real scientific research.

Eimear Conroy, Student

www.ucd.ie/myucd/physics
Develop practical skills by making astronomical observations using a variety of telescopes.

During my degree, I had the amazing opportunity of being on the team that built ILOFAR, a research grade radio telescope. For my final year project, I went to Teide Observatory in Tenerife where I observed star clusters with two optical telescopes which was an amazing experience. I am currently completing my Research MSc on EIRSAT-1, Ireland’s first satellite, which is being built in UCD. I will be starting my PhD in UCD this September, I am continuing to work on EIRSAT-1 and will also start working on gamma-ray burst science which involves studying one of the most violent explosions in the universe.

Rachel Dunwoody, Graduate

www.ucd.ie/myucd/physicswithastronomyandspacescience

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

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>PHYSICS</th>
<th>Topics include:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Foundations of Physics</td>
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<tr>
<td></td>
<td>Frontiers of Physics</td>
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<tr>
<td></td>
<td>Astronomy &amp; Space Science</td>
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<tr>
<td></td>
<td>Thermal Physics and Materials</td>
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<tr>
<td></td>
<td>Quanta, Particles and Relativity</td>
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<table>
<thead>
<tr>
<th>MATHEMATICS</th>
<th>Topics include:</th>
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<tr>
<td>Calculus in the Mathematical and Physical Sciences</td>
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<tr>
<td>Linear Algebra in the Mathematical and Physical Sciences</td>
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<thead>
<tr>
<th>APPLIED &amp; COMPUTATIONAL MATHEMATICS</th>
<th>Topics include:</th>
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<tbody>
<tr>
<td>Applied Mathematics: Mechanics and Methods</td>
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</table>

| One Elective module |
| One Small-Group Project |

<table>
<thead>
<tr>
<th>CHOICE YOUR SUBJECTS</th>
<th>YEAR 2</th>
</tr>
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<tr>
<td>PHYSICS</td>
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<td></td>
<td>Electronics and Devices</td>
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<td></td>
<td>Introductory Quantum Mechanics</td>
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<tr>
<td></td>
<td>Fields, Waves and Light</td>
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<tr>
<td></td>
<td>Exploring the Solar System</td>
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<tr>
<td></td>
<td>Methods for Physicists</td>
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</tbody>
</table>

| Students also study the following topics in Mathematics |
| Calculus of Several Variables |
| Vector Integral & Differential Calculus |
| Computational Science |

| PHYSICS | Topics include: |
|         | Students who choose Physics with Astronomy & Space Science as their main subject for second year also cover the requirements for Physics |

| Two Elective modules |

<table>
<thead>
<tr>
<th>FOCUS ON YOUR CHOSEN SUBJECT</th>
<th>YEAR 3</th>
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</thead>
<tbody>
<tr>
<td>PHYSICS WITH ASTRONOMY &amp; SPACE SCIENCE</td>
<td>Topics include:</td>
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<td>Classical Mechanics &amp; Relativity</td>
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<tr>
<td>Stellar Astrophysics &amp; Astronomical Techniques</td>
<td></td>
</tr>
<tr>
<td>Optics and Lasers</td>
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</tbody>
</table>

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

| Two Elective modules |

<table>
<thead>
<tr>
<th>REFINING YOUR KNOWLEDGE</th>
<th>YEAR 4</th>
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<tbody>
<tr>
<td>PHYSICS WITH ASTRONOMY &amp; SPACE SCIENCE</td>
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<tr>
<td>Galaxies &amp; Obs. Cosmology</td>
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<tr>
<td>Astronomy Field Trip to Tenerife</td>
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</tr>
<tr>
<td>Theoretical Astrophysics</td>
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</tbody>
</table>

| General Relativity & Cosmology |
| Applied Quantum Mechanics |
| Condensed Matter Physics |
| Nuclear Physics |
| Computational Biophysics |

| Hi Energy Particle Physics |
| Medical Physics |
| Quantum Field Theory |
| Advanced Statistical Physics |

| Two Elective modules |

<table>
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<tr>
<th>BSc (Honours) Physics with Astronomy &amp; Space Science</th>
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<tbody>
<tr>
<td>MSc</td>
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<tr>
<td>MSc NanoBio Science</td>
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<tr>
<td>MSc Meteorology</td>
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<tr>
<td>MSc Space Science &amp; Technology</td>
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<tr>
<td>MSc Research</td>
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<td>MSc Physics (NL)</td>
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<tr>
<td>MSc Nanotechnology</td>
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<tr>
<td>MSc Applied Mathematics &amp; Computational Physics</td>
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<tr>
<td>MSc Computational Physics</td>
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</tbody>
</table>

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

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

Sample pathway for a degree in Theoretical Physics *

**YEAR 1**

**ENAGE WITH THE PRINCIPLES**

**PHYSICS**

Topics include:
- Foundations of Physics
- Frontiers of Physics
- Thermal Physics and Materials
- Quanta, Particles and Relativity

**MATHMATICS**

Topics include:
- Calculus in the Mathematical and Physical Sciences
- Linear Algebra in the Mathematical and Physical Sciences

**APPLIED & COMPUTATIONAL MATHEMATICS**

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

**YEAR 2**

**CHOOSE YOUR SUBJECTS**

**THEORETICAL PHYSICS**

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

**PHYSICS**

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

**YEAR 3**

**FOCUS ON YOUR CHOSEN SUBJECT**

**THEORETICAL PHYSICS** – Topics include:
- Analytical Mechanics
- Partial Differential Equations
- Electromagnetism
- Foundations of Fluid Mechanics

**PHYSICS**

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

**YEAR 4**

**REFINE YOUR KNOWLEDGE**

**THEORETICAL PHYSICS** – Topics include:
- Theoretical Physics Project
- Applied Quantum Mechanics
- Advanced Mathematical Methods
- High Energy Particle Physics

**BSc (Honours) Theoretical Physics**

**Conversion Courses**
- Professional Master of Education (PME)
- MA Economics
- Graduate Medicine
- Master of Management

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

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

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

**Eoin Ó Laighléis, Graduate**

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

Theoretical Physics allowed me to keep and combine aspects from both Applied Mathematics and Physics, with a wide choice of modules including thermodynamics, computational science, biophysics, and astrophysics. With a degree in Theoretical Physics, there are plenty of job opportunities ranging from working with computers, in meteorology, in the finance sector, even in further research in labs around the world. Theoretical Physics has a high emphasis on group work, which I had direct experience with working in a computational biophysical chemistry lab while studying abroad in California during my third year.

*See pages 4 and 5 for information on the terminology used above. Potential combinations shown here are examples only and are not guaranteed by UCD. Topics are subject to change each year.*
Physics, Mathematics & Education
CAO code: DN200 Option: Mathematical, Physical & Geological Sciences (MPG)

Sample pathway to become a Physics and Mathematics teacher *

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<td>Topics include:</td>
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<td>Topics include:</td>
<td>Topics include:</td>
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<tr>
<td></td>
<td>Psychology for Teaching and Learning</td>
<td></td>
<td>Classical Mechanics and Relativity</td>
<td>Particle Physics</td>
</tr>
<tr>
<td></td>
<td>Pedagogical Approaches to Mathematics and Science</td>
<td></td>
<td>Quantum Mechanics</td>
<td>Group Theory</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Electromagnetism</td>
<td>Geometry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nuclear Physics</td>
<td>Complex Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Laboratory Skills</td>
<td>History of Mathematics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YEAR 5</th>
<th>EDUCATION</th>
<th>SCHOOL PLACEMENT</th>
<th>PHYSICS</th>
<th>MATHEMATICS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Topics include:</td>
<td></td>
<td>Topics include:</td>
<td>Topics include:</td>
</tr>
<tr>
<td></td>
<td>Research Methods</td>
<td></td>
<td>Year-Long Placement in Post-Primary School</td>
<td>Particle Physics</td>
</tr>
<tr>
<td></td>
<td>Professional Dissertation</td>
<td></td>
<td>Classroom Teaching</td>
<td>Group Theory</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Broad Experience of Wider School Context</td>
<td>Geometry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Complex Analysis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BSc Physics, Mathematics &amp; Education</th>
<th>PREPARE FOR PROFESSIONAL PRACTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SCHOOL PLACEMENT</td>
</tr>
<tr>
<td></td>
<td>Year-Long Placement in Post-Primary School</td>
</tr>
<tr>
<td></td>
<td>Classroom Teaching</td>
</tr>
<tr>
<td></td>
<td>Broad Experience of Wider School Context</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MSc Mathematics and Science Education</th>
<th>QUALIFIED TO TEACH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Primary School Teacher</td>
<td>Physics Leaving Certificate</td>
</tr>
<tr>
<td></td>
<td>Mathematics Leaving Certificate</td>
</tr>
<tr>
<td></td>
<td>Science Junior Certificate</td>
</tr>
</tbody>
</table>

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

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

Jim Rossiter, Student

www.ucd.ie/myucd/physmathed

Associate Professor Maria Meehan
UCD School of Mathematics and Statistics
maria.meehan@ucd.ie
facebook.com/UCDScience
twitter.com/ucdscience
## Sample pathway to become a Computer Science and Mathematics teacher *

### Year 1
#### Engage with the Principles
- **Education**
  - Topics include:
    - Mathematics & Science Education & Communication

#### Computer Science
- Topics include:
  - Computer Programming I
  - Computer Programming II

#### Mathematics
- Topics include:
  - Linear Algebra
  - Calculus
  - Applications of Differential Equations
  - Statistical Modelling

- One Small-Group Project
- One Elective module

### Year 2
#### Choose Your Subjects
- **Education**
  - Topics include:
    - Education for Democracy
    - Science and Mathematics Pedagogy

#### Computer Science
- Topics include:
  - Introduction to Java
  - Introduction to Computer Architecture

#### Mathematics
- Topics include:
  - Calculus of Several Variables
  - Groups, Rings and Fields
  - Linear Algebra
  - Computational Science
  - Vector Calculus

- Two Elective modules

### Year 3
#### Refine Your Knowledge
- **Education**
  - Topics include:
    - Collaborative Pedagogy in Mathematics Education
    - Schools and Society

#### School Placement
- Topics include:
  - Post-Primary Placement
  - Peer-Assisted Tutoring
  - Small Group Tutoring

#### Computer Science
- Topics include:
  - Data Structures and Algorithms
  - Databases and Information Systems
  - Web Design
  - Introduction to Operating Systems

#### Mathematics
- Probability Theory

### Year 4
#### Prepare for Professional Practice
- **Education**
  - Topics include:
    - Pedagogical Approaches to Mathematics
    - Computer Science Pedagogy
    - Psychology for Teaching and Learning

#### School Placement
- Topics include:
  - Year-Long Placement in Post-Primary School
  - Classroom Teaching
  - Broad Experience of Wider School Context

#### Computer Science and Mathematics
- Topics include:
  - Information Ethics
  - Networks and Internet Systems
  - Geometry
  - Complex Analysis
  - History of Mathematics

### Year 5
#### BSc Computer Science, Mathematics & Education
- **Prepared for Professional Practice**
  - Research Methods
  - Professional Dissertation

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

### MSc Mathematics and Science Education
#### Qualified to Teach
- Computer Science Leaving Certificate
- Mathematics Leaving Certificate

---

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---

**Associate Professor Maria Meehan**
UCD School of Mathematics and Statistics

**twitter.com/ucdscience**

---

Dr Brett Becker, Faculty
**Geology**

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

---

**Sample pathway for a degree in Geology**

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>ENGAGE WITH THE PRINCIPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOLGY – Topics include:</td>
<td></td>
</tr>
<tr>
<td>› Introduction to Earth Sciences</td>
<td>› Geology and Earth Science involve applying ‘traditional’ science subjects to the study of the past, present and future of the Earth System</td>
</tr>
<tr>
<td>› Earth Science and Materials</td>
<td>› Explore across the range of scientific disciplines available to study in UCD</td>
</tr>
<tr>
<td>› Earth And Humanity</td>
<td>› One Elective module</td>
</tr>
<tr>
<td>› Mathematics for the Biological and Chemical Sciences</td>
<td>› One Small-Group Project</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YEAR 2</th>
<th>CHOOSE YOUR SUBJECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOLGY – Topics include:</td>
<td></td>
</tr>
<tr>
<td>› Earth’s Structure</td>
<td>› Two Elective modules</td>
</tr>
<tr>
<td>› Investigating Minerals</td>
<td></td>
</tr>
<tr>
<td>› Field Geology</td>
<td></td>
</tr>
<tr>
<td>› Global Environmental Change</td>
<td></td>
</tr>
<tr>
<td>› Sedimentology and Palaeobiology</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YEAR 3</th>
<th>FOCUS ON YOUR CHosen SUBJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOLGY – Topics include:</td>
<td></td>
</tr>
<tr>
<td>› Geological Structures</td>
<td>› Applied Palaeontology</td>
</tr>
<tr>
<td>› Sedimentary Environments</td>
<td>› Precambrian Geology &amp; Geotectonics</td>
</tr>
<tr>
<td>› Igneous &amp; Metamorphic Petrology</td>
<td>› Low Temperature Geochemistry</td>
</tr>
<tr>
<td>› Geological Fieldwork</td>
<td>› Geomatrics and Geoeenergy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YEAR 4</th>
<th>REFINe YOUR KNOWLEDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOLGY – Topics include:</td>
<td></td>
</tr>
<tr>
<td>› Field Mapping Research Project</td>
<td>› Emphasis on independent learning and research, including a field-based project</td>
</tr>
<tr>
<td>› Geobiology</td>
<td>› Many modules contain laboratory-based projects and field-based research</td>
</tr>
<tr>
<td>› Basin Analysis</td>
<td>› Breadth of course ensures graduates have a wide range of future career options within and outside the discipline</td>
</tr>
<tr>
<td>› Petrology &amp; Ore Geology</td>
<td></td>
</tr>
<tr>
<td>› Geological Fieldwork</td>
<td></td>
</tr>
<tr>
<td>› Geophysics &amp; GIS</td>
<td></td>
</tr>
<tr>
<td>› Research Seminars</td>
<td></td>
</tr>
</tbody>
</table>

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**BSc (Honours) Geology**

<table>
<thead>
<tr>
<th>Other Options</th>
<th>PhD</th>
<th>Industry</th>
<th>Conversion Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our Geology graduates are routinely sought for careers outside Earth Science including:</td>
<td>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</td>
<td>Resources (oil and mineral exploration and development)</td>
<td>› Master of Management</td>
</tr>
<tr>
<td>› Management consultancy</td>
<td></td>
<td>Environmental consultancy companies</td>
<td></td>
</tr>
<tr>
<td>› Education</td>
<td></td>
<td>Hydrogeology and water resources</td>
<td></td>
</tr>
<tr>
<td>› Financial services</td>
<td></td>
<td>Geological Surveys, Environmental Protection Agencies</td>
<td></td>
</tr>
</tbody>
</table>

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**www.ucd.ie/myucd/geology**

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**Associate Professor Julian Menuge**

UCD School of Earth Sciences

j.f.menuge@ucd.ie

facebook.com/UCDScience
twitter.com/ucdscience
Create an account at www.myucd.ie for further information and booking

**EVENTS FOR ALL ENTRY 2020 APPLICANTS**

22 October 2019 5pm-8pm  
**UCD SCIENCE, BAFS AND COMPUTER SCIENCE OPEN EVENING**

This event will focus on an introduction to degrees available through Science DN200, Computer Science DN201 and Actuarial & Financial Studies DN230 in the following areas:

- Actuarial & Financial Studies
- Biology & Environmental Science
- Biomolecular & Biomedical Science
- Chemistry
- Computer Science
- Geology
- Mathematics & Statistics
- Physics

Contact: Dr Orla Donoghue  
+353 1 7162311  
orla.donoghue@ucd.ie

14 January 2020  
**QQI-FET SCIENCE DN200 & COMPUTER SCIENCE DN201 EVENT FOR 2020 APPLICANTS**

Join us for information sessions on QQI-FET entry routes into DN200 Science and DN201 Computer Science including information on Admissions, completing the CAO form and an opportunity to meet staff.

Contact: Mr Gary Dunne  
+353 1 716 2637  
gary.dunne@ucd.ie

26 November 2019  
**COMPUTER SCIENCE OPEN EVENING FOR 2020 and 2021 APPLICANTS**

Evening will include an opportunity to talk with lecturers about the degrees in Computer Science and Computer Science with Data Science as well as attend talks from current students and alumni.

Contact: Mr Gary Dunne  
+353 1 716 2637  
gary.dunne@ucd.ie

15 February 2020 10am-2pm  
**UCD SCIENCE, BAFS & COMPUTER SCIENCE 6TH YEAR OPEN DAY**

This event will focus on the first year experience for degrees available through Science DN200, Computer Science DN201 and Actuarial & Financial Studies DN230 in the following areas:

- Actuarial & Financial Studies
- Biology & Environmental Science
- Biomolecular & Biomedical Science
- Chemistry
- Computer Science
- Geology
- Mathematics & Statistics
- Physics

Contact: Dr Orla Donoghue  
+353 1 7162311  
orla.donoghue@ucd.ie

3 June 2020  
**SCIENCE 5TH YEAR STUDENTS SUMMER SCHOOL**

A day of two workshops and taster lectures in areas relating to Science DN200 and Actuarial & Financial Studies DN230.

Contact: Mr Gary Dunne  
+353 1 716 2637  
gary.dunne@ucd.ie

4 June 2020  
**COMPUTER SCIENCE 5TH YEAR STUDENTS SUMMER SCHOOL**

A day of computer programming, taster lectures and research demos, aimed at introducing you to the degrees in Computer Science DN201 and DN201 Computer Science with Data Science.

Contact: Mr Gary Dunne  
+353 1 716 2637  
gary.dunne@ucd.ie

**EVENTS FOR ENTRY 2021 APPLICANTS (5th Year Secondary School Students)**

2-6 December 2019  
**PHYSICS TRANSITION YEAR WEEK**

A week-long programme of lectures and practical experience of Physics.

Contact: Ms Sonja MacCurtain  
+353 1 716 2230  
sonja.maccurtain@ucd.ie

18 March 2020  
**SCIENCE TRANSITION YEAR STUDENTS OPEN DAY**

A day where transition year students have an opportunity to see demonstrations and attend taster lectures.

Contact: Mr Gary Dunne  
+353 1 716 2637  
gary.dunne@ucd.ie

**EVENTS FOR ENTRY 2022 APPLICANTS (Transition Year Students)**

17 March 2020  
**SCIENCE TRANSITION YEAR STUDENTS SUMMER SCHOOL**

A day of taster lectures in areas relating to Science DN200 and Actuarial & Financial Studies DN230.

Contact: Mr Gary Dunne  
+353 1 716 2637  
gary.dunne@ucd.ie