



UCC

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

School of Biochemistry and Cell Biology

BSc Honours

CK402 Biological and Chemical Sciences

College of Science, Engineering and Food Science

BIOCHEMISTRY

Why study Biochemistry?

Biochemistry focuses on understanding living organisms and particularly the human body at the cellular and sub-cellular level. Biochemists want to know what kind of molecules we are made of, what do these molecules do, how do they work and interact with each other and how does our DNA, the genetic material of our cells, provide the blueprint for all the molecules and processes in our cells.

Biochemists also want to understand the biochemical reactions that occur in living organisms, how these are regulated and controlled and how these processes ensure that we function as healthy human beings in our environment.

Biochemists investigate how molecular processes go wrong in disease and use this information to develop new diagnosis and new drugs for treating human disease. Because Biochemistry is concerned with 'the molecules of life' it is central to all areas of human and animal biology and is a key subject in Biomedical Science, Biological Science and Biotechnology.

Programme Overview

The overall aim of this programme is: to educate the student in the broad area of Biochemistry, Molecular and Cell Biology, Biomedicine and Biotechnology; to provide the student with a solid foundation for carrying out research; to train the student in analytical approaches and methods; to develop in the student a solid foundation in the skills of critical thinking and critical analysis.

Entry Requirements

Entry to Biochemistry is via Biological and Chemical Sciences CAO code CK402. A student pursuing an honours degree in Biochemistry will complete Biological and Chemical Sciences in year 1, Biological Sciences in year 2 and Biochemistry in year 3 and year 4. Entry to Biochemistry is subject to quotas.

Leaving Certificate entry requirements to CK402

H5 in two subjects, and O6/H7 in four other subjects from Irish, English, Maths, one laboratory science subject (Biology, Chemistry, Physics, Physics with Chemistry or Agricultural Science) and two other subjects recognised for entry purposes.

Additional requirement

H4 in a laboratory science subject or Maths or Applied Maths.

Career Opportunities

Biochemistry graduates work in a very broad range of areas. Biochemists work in companies, state agencies and research institutes and research laboratories in the Biotechnology, Biopharmaceutical, Biomedical Science, Medical Diagnostics, Environmental Monitoring, and Food Science areas. Biochemists also work in the education sector as secondary school teachers, tutors and lecturers.

Job opportunities are plentiful, salaries for Biochemists are competitive and career development opportunities in the area are excellent. A large number of BSc Biochemistry graduates opt for further training through MSc and PhD degrees as this enhances their job opportunities and career development prospects. See <http://www.ucc.ie/academic/postgraduate/calendar/> for further details.

A number of graduates use their BSc (Honours) Biochemistry degree as a key stepping stone for graduate entry into Medical, Dental, Physiotherapy, Radiography and Pharmacy programmes in Ireland and the UK. Some graduates use their BSc simply as a graduate qualification and take graduate jobs in areas such as Management, Sales and State Agencies.

KEY FACTS

- Biochemistry graduates enjoy excellent employment opportunities in the biotechnology, pharmaceutical, biomedical, environmental monitoring and medical diagnostic areas.
- The School of Biochemistry and Cell Biology is very active in research and highly rated internationally.
- Students have the opportunity to engage in research through an independent research project in their final year.
- A degree in Biochemistry is an excellent foundation for all careers relating to human health and is a very appropriate foundation degree for graduate medicine.



BIOCHEMISTRY

What will you be studying?

Year 1 Modules

Core Modules (60 credits)

Introduction to Biochemistry and the Biological Basis of Disease (5 credits) • Cells, Biomolecules, Genetics and Evolution (5 credits) • Physiology and Structure of Plants and Animals (5 credits) • Microbiology in Society (5 credits) • Fundamentals of Modern Chemistry I & II (10 credits each) • Calculus for Science I & II (5 credits each) • PY1010 Physics for Biological and Chemical Sciences (10 credits).

Year 2 Modules

Core Modules (55 credits)

Principles of Human Structure • Introduction to Neuroscience, the Brain and Behaviour • Biomolecules • Principles of Metabolic Pathways • Introduction to Biotechnology • Fundamentals of Microbiology • Principles of Microbiology • Introductory Molecular Biology • Introductory Physiology I & II • Introduction to Biostatistics.

Elective Modules (5 credits)

Main Group and Transition Element Chemistry • Fundamentals of Organic Chemistry • Energetics and Kinetics • Spectroscopy • Introduction to Plant Biotechnology • Vertebrate Diversity • Fundamentals of Ecology.

Year 3 Modules

Core Modules (50 credits)

Structural Biochemistry • Introduction to Cell Biology and Biomembranes • Cell Signalling • Biochemical Immunology • Molecular Biology • Principles of Medical Genetics • Biochemistry of the Central Nervous System • Biophysical and Biochemical Methods • Bioinformatics • Literature Project.

Elective Modules (10 credits)

Medical Microbiology • Virology • Transmission and Epidemiology of Infectious Disease • BioPharmaceutical Engineering • Cell and Epithelial Physiology • Introduction to Pharmacology • Introduction to Toxicology • Chemotherapy and Pharmacology of Inflammation.

Year 4 Modules

Core Modules (60 credits)

Advanced Cell Biology • Protein Science • Immunobiology of Health and Disease • Cancer Biology • Biochemical Analysis and Research Methods • Molecular Basis of Brain Disorders • Advanced Metabolism in Health, Disease and Cancer • Principles and Applications of Biotechnology • Developmental Genetics • Research Project (15 credits).

Further details on Programme and Modules

<http://www.ucc.ie/calendar/science/sci003.html>

<http://www.ucc.ie/modules/descriptions/page007.html>

Work/Study Placement

There is no work placement in this course. However, the School of Biochemistry and Cell Biology facilitates students in finding summer laboratory work and pharmaceutical placements. In Year 4, each student carries out an independent research project which students find to be a highlight of the course.

Contact Information

Dr Sinéad Kerins, School of Biochemistry and Cell Biology, UCC.

T: +353 (0)21 420 5417/5416

E: s.kerins@ucc.ie

W: <https://www.ucc.ie/en/biochemistry/>

W: <https://www.ucc.ie/en/ck402/biochemistry/>

Graduate Profiles

Fiona

I found the BSc in Biochemistry to be a very fulfilling and rewarding programme. In addition to the academic component, we were supported and advised by the programme co-ordinator on how to secure summer placement. During my third year, I secured a place on the Amgen Scholars Programme and conducted a research project where I investigated the effects of mitomycin C on calcium signalling in bladder cancer cells, at the Karolinska Institutet in Stockholm, Sweden. In my final year, I was given the opportunity to undertake my own research project. I always found the staff of the School of Biochemistry and Cell Biology extremely helpful and supportive throughout my four years. My BSc in Biochemistry was an essential part of my acceptance into a MSc/PhD programme in cancer research at Oxford University.

Owen

I graduated from UCC with a BSc Honours degree in Biochemistry and an MSc in Biotechnology. I was initially employed by Genemedix as a Process Technologist, working in strict compliance with Good Manufacturing Practice, in the cell culture department. My responsibilities related to both production and process development projects. Subsequently, I was employed by Eli Lilly as a Biotechnology Operator. My responsibilities are in the cell culture department (Up Stream Processing). Over the next year, I will be working within production, bringing new products through from various phases of clinical trials to large scale production. The knowledge and experience I gained in completing a BSc in Biochemistry and an MSc in Biotechnology in UCC has provided me with the necessary skills to pursue a career in Biotechnology.

Elaine

I graduated from UCC with a BSc Honours in Biochemistry. I decided not to pursue further study and went directly into employment. I wasn't sure in which area of the healthcare industry I wanted to work, so I applied for a graduate programme with Abbott Ireland. This program involves 3 rotations around 3 different Abbott sites in Ireland over a 2-year period. All the sites are completely different as they have Vascular, Pharmaceutical, Diagnostic and Nutritional divisions. My first placement is in the Abbott Diagnostic plant in Longford. I am currently working on projects, to improve Abbott's products, from both a customer and business point of view. On completion of the programme, I will choose which Abbott site I would like to remain in, and also, in which position. I am quickly learning how a global healthcare company such as Abbott functions. It is completely different from an academic setting, but I am really enjoying it.

David

I was drawn to the Biological and Chemical Sciences course in University College Cork due to its broad scope of study, and also, the ability to sculpt your degree as the years progressed. The Biochemistry lecturers combined fundamental theory in lectures with the most current research or with practical and clinically significant anecdotes which helped to reinforce the importance of what we were learning. Studying modules such as "Cancer Biology", "Toxicology" and "Advanced Metabolism in Health, Disease and Cancer" fostered my passion to pursue a career in Medicine. After graduating with a BSc Biochemistry, I commenced graduate entry medicine at UCC. The benefits of my primary degree continue to be integral to the development of my career.

Graduate profiles online

Many more graduate profiles can be viewed on the School of Biochemistry and Cell Biology website @ <https://www.ucc.ie/en/biochemistry/graduates/testimonials/>