

## CAREERS

Graduates of this course work in a major growth industry of strategic importance to economic development both in Ireland and abroad. Prospective students should be aware that the chemical and pharmaceutical ('pharmachem') industries offer well-paid secure employment in a wide range of career options, and have a high demand for chemistry graduates. Cork is the centre of the Irish pharmachem sector, and multinational industries such as Pfizer, Glaxo-SmithKline, Novartis, Eli Lilly and many others have been employing analytical chemistry graduates from CIT for many years.

## FREQUENTLY ASKED QUESTIONS

### What are the minimum entry requirements?

Leaving Certificate with at least two subjects at minimum Grade C3 (Higher Level) together with a further four subjects (which must include Mathematics and either Irish or English) at Grade D3 (Ordinary or Higher Level).

### What are the most helpful Leaving Cert Subjects?

Chemistry, Physics, Mathematics, and Biology.

### If I'm not doing Chemistry, can I still apply?

YES – the fundamentals of chemistry, physics, and biology are delivered in year one.

### What standard of Mathematics is required for the course?

D3 or better at Ordinary or Higher Level. Numeracy, accuracy and precision are important, but advanced mathematical ability is not essential.

### How is time allocated in first year?

Theory 60%, practical laboratory 40%.

### How are marks allocated in first year?

Final examination 25-30%, continuous assessment 70-75%.

### Is there placement during the course?

Mandatory placement in industry at home or abroad during year 3. Most placements are in the Cork area, but options may be available in Italy, Spain, Finland, France, and Scotland.

## ANALYTICAL CHEMISTRY WITH QUALITY ASSURANCE CR 340 (LEVEL 8 AWARD)

Chemistry is the fundamental science that deals with the "three Cs" – the composition of matter, the changes that transform matter, and the conditions under which those changes occur. The study of fundamental chemistry allows us to increase our total knowledge and understanding of our universe, our environment, and indeed life itself. Other branches of chemistry use our understanding of fundamental chemistry to improve the way in which we live, work, and develop.

The equipment of everyday life is made from raw materials. Chemists analyse and understand these raw materials to determine efficient and safe ways of transforming them into useful products, develop new products and materials, and monitor production processes to ensure the quality of finished products.

Analytical Chemistry is the speciality dealing with devising, selecting, and using methods for determining the identity and quantity of chemical components of materials. Many important materials, such as biological samples or drugs and medicines, have key components that are present at very low levels or concentrations, and many sophisticated techniques have been developed for their detection and analysis.



### ENQUIRIES TO

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## BACHELOR OF SCIENCE (HONOURS) IN ANALYTICAL CHEMISTRY WITH QUALITY ASSURANCE

Course Code  
CR 340



## COURSE STRUCTURE

The BSc (Honours) in Analytical Chemistry with Quality Assurance prepares students for laboratory careers in the pharmaceutical industries. Graduates identify and solve analytical problems by the selection and use of a wide range of methods and techniques – from the mainstream areas of spectroscopy, chromatography, and electrochemistry, to more specialised areas such as particle size analysis or immunoassay techniques.

The BSc ACQUA additionally focuses on quality assurance, which is of vital importance to the pharmaceutical, chemical and allied industries. Graduates are qualified in areas such as Quality Standards, Good Manufacturing Practice, Total Quality Management, and Regulatory Compliance. They may take up leadership roles in areas such as method design and implementation, process validation, and management of quality systems.

Course delivery is usually by means of formal lectures and practical sessions, with about half of the working week spent in the laboratory. The course is examined using a combination of continuous assessment (of both theory and practical work), and terminal examinations.

A substantial period of work experience in industry at the end of the third year gives students a broader perspective of the industry and its role. This usually commences at the start of April, and frequently continues until the end of the summer period.

Holders of the BSc ACQUA with a minimum of a H2.1 award are eligible for progression to postgraduate research programmes in Chemistry, at MSc and PhD level. The BSc ACQUA is recognised for professional membership of the Institute of Chemistry of Ireland, and graduates are also eligible to apply for associate membership of the Royal Society of Chemistry. It is also recognised by the Department of Education & Skills as a second-level teaching qualification.

## COURSE PROGRAMME

The course is delivered over 4 full academic years, with 2 semesters per year. Modules marked 'M' are mandatory for completion of the stage or award; those marked 'E' are elective modules.

## GRADUATE PROFILE

### BRENDAN HEALY TECHNICAL SERVICES CHEMIST



"I graduated with the honours BSc in Analytical Chemistry with Quality Assurance (ACQUA), then worked as a research assistant in the chemistry research group at CIT, where I received a research grant to start my PhD in analysis of freshwater and marine natural toxins.

After completing my PhD, I began work as an Analytical Chemist at Pfizer Ltd in Little Island, Cork. This role was varied and involved validation and transfer of analytical methods, analytical support for production and quality control, method development, regulatory support for new product submissions, technical writing, etc - I had encountered many of these topics during both my BSc and PhD studies.

I subsequently transferred to the Process Development and the Technical Services Departments at Pfizer."



## BSc in Analytical and Pharmaceutical Chemistry CR 340 Level 8

## COURSE PROGRAMME

### YEAR ONE

#### Semester 1 (Sept – Dec)

Chemical Principles M  
Introduction to Physics M  
Technological Mathematics 1 M  
Biomolecules and Cells M  
Laboratory Technology, Health and Safety M  
Creativity, Innovation & Teamwork M

#### Semester 2 (Feb – May)

Fundamental Physical Chemistry M  
Organic Chemistry Fundamentals M  
Calculus and Statistics for Biological Science M  
Computing Skills M  
Introduction to Biotechnology M  
Physics E  
Microbes, Enzymes and Energy E

### YEAR TWO

#### Semester 3 (Sept – Dec)

Organic Chemistry M  
Inorganic Chemistry M  
Analytical Chemistry 1 M  
Industrial Chemistry M  
Fundamentals of Microbiology M  
Quality, Validation, and Regulatory Affairs E  
Structural Biochemistry E  
Cellular Biotechnology E  
Free Choice module E

#### Semester 4 (Feb – May)

Pharmaceutical Chemistry M  
Physical Chemistry M  
Analytical Chemistry 2 M  
Calculus and Statistical Analysis M  
Instrumentation & Computing M  
Quality, Validation, and Regulatory Affairs E  
Structural Biochemistry E  
Cellular Biotechnology E  
Free Choice module E

### YEAR THREE

#### Semester 5 (Sept – Dec)

Spectroscopic and Chromatographic Methods M  
Topics in Organic Chemistry M  
Inorganic & Physical Chemistry 1 M  
Quality Assurance for the Chemical Industry M  
Experimental Chemistry M  
Chemical Applications for the Pharmaceutical Industry E  
Analytical Microbiology E  
Industrial Biotechnology E

#### Semester 6 (Feb – May)

Environmental Analysis M  
Pharmaceutical Applications M  
Inorganic & Physical Chemistry 2 M  
Industrial Placement M

### YEAR FOUR

#### Semester 7 (Sept – Dec)

Methodology & Experimental Analytical Chemistry M  
Advanced Chromatography M  
Electrochemical, Thermal & Particle Methods M  
Quality Management Systems for Chemists M  
Statistical Quality Control M  
Specialist Topics (Immunoassays, Philosophy of Science) E  
Molecular Biotechnology E  
Pharmaceutical Microbiology E  
Free Choice module E

#### Semester 8 (Feb – May)

Advanced Spectroscopic Methods M  
Analytical Applications M  
Chemical Informatics M  
Pharmaceutical Quality Management M  
Experimental Project M

Please visit: <http://modules.cit.ie/CR340> for detailed module information.