Biotechnology is defined as the controlled and deliberate manipulation of biological systems for the efficient manufacture or processing of useful products.

The Objective of this four-year, full-time degree is to produce graduates for the Bioprocessing Industries, with skills developed at laboratory and pilot plant scale in microbiology, biochemistry, molecular biology, genetics and process engineering.

Programme Outline

The first year of the B.Sc. Biotechnology concentrates on the disciplines of biology, chemistry, physics and mathematics with an introduction to bioprocessing. The second year develops the biological and engineering aspects of Biotechnology and in third year, specialist areas of biology are introduced such as cell biology, recombinant DNA cloning and bioinformatics. In engineering, students are introduced to bioreactors, primary separations and downstream processing. In fourth year, all students study industrial bioprocessing, proteins and proteomics, genetics and cell biology, immunology and animal cell culture. They also undertake a detailed literature survey. Students then have the opportunity to specialise in one of two Streams, either (1) Biotechnology and Life Science, which includes a laboratory research project, or (2) Biopharma, which features bioprocessing and advanced bioanalysis laboratories, plus three biopharma-themed lecture modules.

Relevant Work Experience through DCU's work experience programme INTRA (INtegrated TRAining) is an integral part of our Biotechnology degree and has been a central feature of education at DCU since its foundation. Students from the B.Sc. Biotechnology are required to complete an INTRA placement of up to eight months' duration at the end of third year, during the period February to September.

Skills

Students from the B.Sc. Biotechnology will have the ability to work in roles listed below:

- Process/Bioprocess Engineering
- Process validation
- Protein separation and purification
- Fermentation
- Project Engineering
- Quality control/assurance
- Immunodiagnostics
- Animal/plant cell culture
- Molecular biology/genetics
- Food Processing
- Biochemical Analysis
- Microbiological Analysis
- Environmental Monitoring & Analysis
- Waste Treatment

Work Areas

To date, Biotechnology graduates have worked successfully in the following industries worldwide:

- Pharmaceutical
- Biomedical
- Diagnostics
- Fine Chemicals
- Medical
- Brewing
- Food
- Dairy Production
- Agricultural
- Bulk Chemicals
- Plant Science
- Veterinary

Student Availability

Students are available for interview from October onwards and for appointment from the following February to September. Please post vacancies on the INTRA online website at www.intra.dcu.ie, or send details to:

INTRA Unit, Student Support & Development,
Dublin City University,
Glasnevin, Dublin 9, Ireland.
Phone: 00 353 1 700 554
Fax: 00 353 1 700 5505
Website: www.intra.dcu.ie
B.Sc. Biotechnology

Year 1

- **BIOLOGY**
- **CHEMISTRY**
- **PHYSICS**
- **MATHEMATICS**
- **INTRODUCTION TO BIOPROCESSING**

Year 2

- **PROCESS ENGINEERING**
  Bioprocess Engineering Principles
  Transport Processes
  Bioprocessing and Instrumentation Laboratory

- **BIOLOGY**
  Biomolecules and Metabolism
  Microbiology and Genetics
  Cell Structure and Function
  Practical Biochemistry Laboratory
  Practical Microbiology and Genetics Laboratory

- **SCIENTIFIC TOPICS**
  Statistics
  Organic Chemistry
  Scientific Literature

Year 3

- **CELL AND MOLECULAR BIOLOGY**
  Gene Cloning and Gene Expression
  Cell Biology, Recombinant DNA Cloning and Bioinformatics
  Advanced Cell Biology

- **BIOPROCESS ENGINEERING**
  Bioreactors and Primary Separations
  Downstream Processing
  Bioprocessing Laboratory

Year 4

- **STREAM 1**
  **BIOTECHNOLOGY AND LIFE SCIENCE**
  Research Project
  Commercial Biotechnology and Biopharma
  Human Inheritance and Population Genetics

- **ALL STUDENTS**
  Industrial Bioprocessing
  Proteins, Proteomics and Biopharma
  Current Topics in Genetics and Cell Biology
  Immunology and Immunoanalysis
  Animal Cell Biotechnology
  Literature Survey and Experimental Design

- **STREAM 2**
  **BIOPHARMA**
  Bioprocessing Laboratory
  Advanced Bioanalysis Laboratory
  Biopharmaceutical Industry
  Regulation and Management
  Biopharmaceutical Facility Design and Operation
  Formulation and Delivery of Biopharmaceuticals

**INTRA** up to 8 months