

BSc in Biotechnology (Level 8) TU889



Qualification awarded: BSc (Hons) Biotechnology (TU889)

Duration of programme: 4 years

Number of places: 34 approx.

Location: TU Dublin, Grangegorman

Lead School: School of Food Science and Environmental Health (SoFSEH)

Partner Schools: Biological, Health & Sports Sciences; Chemical & BioPharmaceutical Sciences

Introduction

Biotechnology utilizes biological systems to develop new products, methods or organisms intended to improve human health and society. This Biotechnology programme will produce graduates with a deep grounding in fundamental biotechnology such as cell biology, molecular biology, microbiology, biochemistry, bioprocessing and the bioeconomy.

Students will also explore different industrial applications, including agri-food, bioinformatics, biopharmaceuticals, environmental and marine to meet future industry needs.

The global biotechnology market size was estimated at USD 1,023.92 billion in 2021 and is expected to grow at a compound annual growth rate (CAGR) of 13.9% from 2022 to 2030.

The programme is designed with the objective of training future professionals that will work towards sustainable solutions to problems of waste, energy and food. The designed curriculum has sustainability embedded throughout and our graduates will help companies reduce their environmental footprint and incorporate sustainability in all parts of the supply chain.

Programme Aims

This Programme aims to provide graduates with an aligned and integrated programme of practice and theory related to basic and advanced concepts in biotechnology. The programme will develop graduates' knowledge of both the fundamental principles, as well as latest developments and applications, that will equip them for employment in a variety of areas within the biotechnological and associated sectors.

A focus on core competencies, and experience of a work environment during the programme, will aid students to develop their work readiness. Preparedness for an industrial/research environment post graduation will be further facilitated by the development of key personal and interpersonal graduate attributes. The provision of challenging self-directed learning exercises, culminating in a capstone research project, will produce graduates that will be self-reliant, problem-solving, innovative and self-motivating.

Programme Delivery

Each semester will last 12 weeks and will include continuous assessment and/or examinations. Students will also have a weekly tutorial class to help them settle in and navigate student life in TU Dublin. Lectures and practical classes will be supported by industry visits, and guest lecturers from industry experts.

Stages 1 & 2:

24 weeks of lecture and practical (12 weeks/semester).

Stage 3: 12 weeks of lectures and practical and industrial placement (512 hours) in Semester 2.



Year 1: Introduction to the Biotechnology Sector; Environmental Management for Biotechnology; Critical Thinking for Biotechnology; Introductory Biology (Cellular and Systems); Introductory Chemistry (Physical, Organic, Inorganic); Physics; Mathematics and Digital Skills for Scientists

Year 2: Structural and transformational Biochemistry; Natural Organic Chemistry; Statistics; Instrumentation; Microbial and Fermentation Technology; Process Technology; Regulatory Affairs, Quality Systems

Year 3: Computational & Molecular Biotechnology; Upstream and downstream Biotechnology; Safety Management; Lean Manufacturing and Six Sigma. Work Placement.

Year 4: Research Dissertation; Responsible research; Agri-food Biotech; Omics for Biotech; Bioprocessing Pilot Plant; Adv Anal Techniques; Process analytical technology; Biorefinery & Bio-based products. Optional Module.

The work placement module is a highly immersive experience, and an important component of this BSc.

A full semester is dedicated to an independent research project allowing

students to develop research skills and in-depth knowledge. One optional module is available.

Progression Opportunities

On graduation, graduates may proceed to postgraduate studies leading to the award of MSc, MPhil or PhD at research institutes and universities worldwide.

There is a range of taught postgraduate courses (in Ireland and abroad) on aspects of biotechnology, and there may also be research opportunities for graduates on specific biotechnological topics.

Career Opportunities

Biotechnology has a significant impact on a variety of industries, including agriculture, healthcare, biopharmaceuticals, food processing, brewing, the environment, chemicals and waste valorisation. Many employment opportunities exist for graduate. Examples include:

Bioprocess Scientist: design and develop processes to manufacture bio-based products, e.g., biofuels, bioplastics, and biochemicals in Industry.

Bioinformatics Specialist: use computational tools to analyse and interpret biological data (e.g., genomic, proteomic) to support research and development in industrial biotechnology.

Sales/Marketing/Technical Representative for biotechnology and biorefinery products (e.g., Instruments, final product) and services.

Research Scientist

Cell culture Technician

Biomanufacturing Technician

upstream/downstream

Quality Control Specialist

Microbiologist

Agricultural, Biopharma and Food Science Technicians, etc.

LEAVING CERT ENTRY REQUIREMENTS:

Minimum No of:

Subjects 6

Honours (H5) 2

Minimum Grade in:

Maths. O4/H7

English or Irish. O6/H7

Other Requirements

At least O4/H7 in one of: Physics, Chemistry, Physics & Chemistry or Biology.

Further Information

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