

POSTGRADUATE DIPLOMA IN INDUSTRIAL BIOTECHNOLOGY AND BIOMANUFACTURING

Overview

NFQ Level 9, Major Award

The Postgraduate Diploma in **Industrial Biotechnology and Biomanufacturing** is a full-time intensive programme running for 9 months from the date of first registration.

Students take modules to the value of **60** credits, comprising of lectures and hands-on-training (tutorials, workshops, problem-based learning, laboratory practicals) at UCC.

This Postgraduate Diploma programme provide students with a formal qualification in areas of relevance to the bioprocessing industry, as well as the knowledge and skills that are required for development of new microbial bioprocesses that can be deployed in sustainable biotechnology applications and bioprocesses in a variety of industrial sectors.

The graduate attributes and skills encompass various areas, such as designing, constructing, and developing microbial strains for industrial applications. Students receive hands-on training in engineering principles and the operation of microbial bioprocesses. They also learn to develop and implement bioprocesses at different scales, while gaining an understanding of concepts like techno-economic feasibility and Life Cycle Assessment for bioprocess development. They acquire skills in data analytics and bioprocess monitoring, including aspects of digitalisation and digital twinning. Additionally, students gain proficiency in project planning, time management, working professionally and effectively in teams and project delivery.

Exit Award: Postgraduate Certificate in Industrial Biotechnology and Biomanufacturing (NFQ Level 9, Minor Award)

Students who successfully complete taught modules to the value of at least 30 credits may choose to exit the programme and be awarded a Postgraduate Certificate in Industrial Biotechnology and Biomanufacturing (<https://ucc-ie-public.courseleaf.com/programmes/pcibb/>).

Programme Requirements

For information about modules, module choice, options and credit weightings, please go to Programme Requirements (p. 1).

Programme Requirements

| Code | Title | Credits |
|---|---|---------|
| Students take 60 credits as follows: | | |
| Core Modules | | |
| MB6004 | Advanced Molecular Microbial Biotechnology | 5 |
| MB6015 | Microbial Strain Engineering | |
| MB6016 | Microbial Physiology in Bioreactors | |
| MB6017 | Biorefinery concepts for the bio-based economy | |
| PE6037 | Experimental Design and Data Analysis for Bioprocessing | 5 |

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| PE6038 | Industrial Bioprocessing Systems | 5 |
| PE6039 | Manufacturing Excellence in the Bioprocessing Industries | 5 |
| PE6042 | Sustainable Biochemical Engineering | 5 |
| PE6040 | Engineering principles and operation of microbial bioprocesses | 10 |
| PE6041 | Bioprocess Design Studio | 10 |
| Total Credits | | 45 |

Examinations

Full details and regulations governing Examinations for each programme will be contained in the *Marks and Standards Book* and for each module in the *Book of Modules*.

Programme Learning Outcomes

Programme Learning Outcomes for the Postgraduate Diploma in Industrial Biotechnology and Biomanufacturing (NFQ Level 9, Major Award)

On successful completion of this programme, students should be able to:

- Select, design, construct and develop microbial strains for application in biotechnology.
- Develop and implement bioprocesses at increasing scales.
- Integrate strain and bioprocess development in an holistic way by combining biological and engineering principles.
- Implement state of the art methodologies for both strain engineering and bioprocess development, monitoring and smart control.
- Critically evaluate the parameters required for bioprocess development including concepts like techno-economic feasibility and Life Cycle Assessment.
- Apply the latest concepts in data analytics and bioprocess monitoring including aspects of digitalisation and digital twinning.
- Work professionally and effectively in a team, to undertake research and development to build new bioprocess for novel applications .
- Appreciate the importance of the societal aspects of industrial biotechnology, including concepts like the regulatory environment, ethical research, and safe and sustainable by design
- Analyse quantitation measures of microbial strain growth and productivity and explain the relationships between microbial physiological and productivity parameters.
- Complete a body of independent research in an area related to biotechnology or biomanufacturing and present research findings in a dissertation.