

PHD (MICROBIAL BIOTECHNOLOGY)

Overview

NFQ Level 10, Major Award

The PhD in Microbial Biotechnology is a full-time, thematic PhD programme that runs for 48 months from initial registration. Students complete the equivalent of 90 credits in each 12 month period. The primary component of the PhD programme is original research leading to the completion of a research thesis. At the end of the programme, students are required to submit and defend a thesis on the candidate's research topic.

Students complete modules that provide training in the three main domains of:

1. technical skills and knowledge related to the discipline of microbial biotechnology;
2. complementary and transferrable skills; and
3. innovation skills.

The programme is inherently flexible to facilitate students who will take different routes to achieve the same final set of skills but each student must satisfy all the training requirements by the end of year 3 in order to progress to thesis submission.

This programme includes a period of research (minimum **6 months**) outside of Ireland in the laboratory of another academic institution. This research training may be carried out in a single or several blocks of time in any year of the PhD.

This programme also includes a period of placement (between **3 and 6 months**) in the non-academic sector, typically industry. This placement module (MB7003) should ordinarily be completed in a single block of time and would typically be in the third year of the PhD.

Registration and Supervision

All students on the PhD in Microbial Biotechnology programme will register in the College of Science, Engineering and Food Science (SEFS) and will be governed by policies of that College. These include formation of an individual thesis committee to supervise the student, in line with the policies of the SEFS Graduate School. The student's training and research progress will be evaluated annually by a Progress Review Panel established by the Microbial Biotechnology Programme Board, which reports to the SEFS Graduate School.

Personal Career Development Plan

Each PhD candidate will, in consultation with their thesis committee, formulate a Personal Career Development Plan (PCDP) during their first progress review meeting to be completed within 3 months of registration. The PCDP will be refined and updated each year following a progress review. The PCDP defines the core components of the individual PhD programme for each student, namely:

- the modules to be taken to fulfil their credit requirements for the training component of their PhD
- the identity of the partner academic institution where the student will undertake a research period abroad

- the identity of the non-academic (industry) organisation where the student will undertake a placement.
- the research and training schedule for the next year and the remainder of the PhD
- the Research Plan

The PCDP is submitted for approval to the Microbial Biotechnology Programme Board. The candidate's academic and research progress will be reviewed at least annually by the Progress Review Panel, in accordance with the College of SEFS and UCC procedure for Progress Reviews. This review will include assessment of progress relative to the PCDP.

Module Selection

The PhD in Microbial Biotechnology requires students to complete modules and courses that provide training to the value of **80** credits in the three main domains of:

1. skills and knowledge related to the discipline;
2. complementary and transferrable skills; and
3. innovation skills.

This training should be delivered through modules run by UCC. In some cases modules or courses external to UCC may be proposed as part of the PCDP and, if approved by the Programme Director, in line with College of SEFS and UCC procedures, will fulfil credit requirements. The programme is designed to be flexible to facilitate individualised training within the parameters of the programme. Each candidate's PCDP will include a list of the modules/courses planned for each year. There is no requirement that specific modules be taken in a particular year of the PhD, and the flexibility required by variable start dates within the academic year is recognised. Nonetheless, the student's thesis committee and the Programme Director will advise the student on appropriate scheduling of training.

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 taught modules to the value of 80 credits as follows:		
Technical Skills and Knowledge		
Students take 30 credits as follows – all listed core modules (10 credits) and 20 credits of elective modules:		
<i>Core Modules</i>		
MB7001	Disseminating Research Results to a Scientific Audience	5
MB7002	Critical Appraisal of Biotechnology Research	5
<i>Elective Modules</i>		
Students take modules to the value of 20 credits from the following:		
BT6001	Genetic Engineering (5)	
CS6501	Programming for Bioscientists I (5)	
CS6502	Programming for Bioscientists II (5)	
MB6004	Advanced Molecular Microbial Biotechnology (5)	
MB6300	Computational Systems Biology (5)	
MB6301	Genomic Data Analysis (5)	
ML6005	Molecular Techniques in the Life Sciences (5)	

Complementary and Transferrable Skills

Students take **15** credits as follows – all listed core modules (**5** credits) and **10** credits of elective modules:

Core Modules

PG6015	An Introduction to Research Integrity, Ethics and Open Science	5
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Elective Modules

Students take modules to the value of **10** credits from the following: 10

PG6001	STEPS - Scientific Training for Enhanced Postgraduate Studies (5)	
PG6003	Teaching and Learning for Graduate Studies (5)	
PG6009	Graduate Information Literacy Skills (5)	
PG6014	Scientific Outreach and Communication (5)	
PG6025	Community-Based Participatory Research (5)	

Innovation Skills

Students take **35** credits as follows – all listed core modules (**30** credits) and **5** credits of elective modules:

Core Modules

LW6104	Principles of Intellectual Property Law	5
MB7003	Biotechnology Industry Placement	25

Elective Modules

Students take modules to the value of **5** credits from the following: 5

AC6301	Innovation Finance ()	
IS6306	Technology Business Planning (5)	

Total Credits **80**

Indicative Breakdown of Training over the 4 Years of the Programme

This table represents the typical breakdown of training and will vary according to the individual PCDP. **80** credits of training must be achieved by the end of year 3 of the PhD.

Year	Research	Modules covering different skills	Modules covering different skills	Modules covering different skills
		Technical	Complementary	Innovation
Year 1	60 credits	20 credits	5 credits	5 credits
Year 2	65 credits	10 credits	10 credits	5 credits
Year 3	65 credits			25 credits
Year 4	90 credits			

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 PhD in Microbial Biotechnology (NFQ Level 10, Major Award)

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

- Demonstrate their ability to advance knowledge in microbial biotechnology as evidenced by a body of original research described in a doctoral thesis;

- Critically evaluate scientific literature and important concepts in the field of biotechnology and to incorporate these concepts into research projects as required;
- Effectively communicate and present scientific and technological results and concepts, in written and oral form, to diverse audiences;
- Productively engage with colleagues in both academia and industry to develop and implement cross-sectoral research projects;
- Act autonomously in the planning and implementation of research projects;
- Work effectively as an individual, in teams and in multi-disciplinary settings, and take a proactive and self-reflective role in working and developing professional relationships with others;
- Identify the innovation potential of biotechnological research and the pathways towards research valorisation;
- Execute the steps needed to identify and protect intellectual property that may arise from original research;
- Demonstrate an awareness of the ethical context of biotechnological research and to be able to express the value of their research to society.