

University of Pretoria Yearbook 2023

BScHons Biotechnology (02240393)

Department Genetics

Minimum duration of study 1 year

Total credits 135

NQF level 08

Programme information

BScHons (Biotechnology) is a unique interdepartmental programme aimed at enabling students to pursue their interest in molecular biotechnology through relevant research areas offered within fields of biochemistry, plant science, microbiology and plant pathology, plant production, as well as genetics. Students within this programme will be registered and will conduct their studies within the department of their choice. A student's choice of research programme will determine which of the respective departments will mentor their honours degree programme.

Admission requirements

1. Relevant BSc degree with specialisation in Biochemistry, Genetics, Microbiology or Plant Sciences
2. A weighted average of at least 60% at final-year level
3. An admission examination may be required

General information

University of Pretoria Programme Qualification Mix (PQM) verification project

The higher education sector has undergone an extensive alignment to the Higher Education Qualification Sub-Framework (HEQF) across all institutions in South Africa. In order to comply with the HEQSF, all institutions are legally required to participate in a national initiative led by regulatory bodies such as the Department of Higher Education and Training (DHET), the Council on Higher Education (CHE), and the South African Qualifications Authority (SAQA). The University of Pretoria is presently engaged in an ongoing effort to align its qualifications and programmes with the HEQSF criteria. Current and prospective students should take note that changes to UP qualification and programme names, may occur as a result of the HEQSF initiative. Students are advised to contact their faculties if they have any questions.

Curriculum: Final year

Minimum credits: 135

Core credits: 35

Elective credits: 100

Additional information:

- Students registered in the Division of Biochemistry must take BCM 771, BCM 773 and BCM 774 as electives.
- Students registered in the Division of Genetics must take GTK 702, GTK 703 and GTK 705 as electives.
- Students registered in the Division of Microbiology must take MCP 751, MCP 752 and MCP 754 as electives.
- Students registered in the Department of Plant and Soil Sciences must take BOT 705, BOT 746, BOT 782 and BOT 783 as electives.

Core modules

Biotechnology in the workplace 701 (BTW 701)

| | |
|-------------------------------|---|
| Module credits | 20.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 2 discussion classes per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

Introduction to the principles and realities of working in the field of biotechnology. Discussions on various essential components of the biotechnology industry including bio-entrepreneurship, marketing, business plan writing, business communication skills, capital for start-ups, incubators, basic accounting and finance as well as issues surrounding biosafety, ethics and legal aspects. The module is concluded by students writing a business plan for the development of a hypothetical biotechnological venture. This module is jointly presented in the Departments of Biochemistry, Genetics and Microbiology and Plant and Soil Sciences.

Molecular and cellular biology 721 (MLB 721)

| | |
|-------------------------------|---|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 2 discussion classes per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |



Module content

Principles and applications of recombinant DNA, and other novel molecular and genomics technologies, to address questions in the biological sciences and/or biotechnology. Strong emphasis is placed on the principles of research planning, including identifying suitable research objectives, formulating a research strategy and understanding the relevance and feasibility of research. The module is assessed by means of a research project proposal, conceived and formulated by each student. The proposal must focus on the use of molecular technologies in addressing realistic questions in biology and/or biotechnology. There is also an oral defense of the project proposal.

This module is jointly presented in the Departments of Biochemistry, Genetics and Microbiology and Plant and Soil Sciences.

Elective modules

Scientific communication 771 (BCM 771)

| | |
|-------------------------------|---|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 1 discussion class per week, 1 seminar per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

Students are guided to collect relevant and up-to-date literature on broad topics from databases using referencing software, and to select and condense relevant papers into the outline for a literature review. Critical reading of research papers, article discussions and presentations. Scientific writing and presentation skills.

Research project and report 773 (BCM 773)

| | |
|-------------------------------|---|
| Module credits | 60.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 1 other contact session per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Research methods 774 (BCM 774)

| | |
|-----------------------|-------------------|
| Module credits | 25.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |

| | |
|-------------------------------|--|
| Contact time | 2 Practicals/Discussion classes per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

Students are guided through the methodology of research planning and data handling. They are given hands-on and in-depth practical experience in a range of biochemical and molecular biological techniques.

Molecular techniques 705 (BOT 705)

| | |
|-------------------------------|---|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | Admission into BSc Hons in Plant Science (Plant Biotechnology/Physiology) |
| Contact time | 1 discussion class per week, 1 lecture per week, 5 practical per week |
| Language of tuition | Module is presented in English |
| Department | Department of Plant and Soil Sciences |
| Period of presentation | Semester 1 |

Module content

Students are guided through the methodology of research planning and data handling. They are offered hands-on experience in a range of advanced techniques employed in molecular research and analysis.

Applications in plant biotechnology 746 (BOT 746)

| | |
|-------------------------------|--|
| Module credits | 10.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 1 lecture per week, 1 practical per week |
| Language of tuition | Module is presented in English |
| Department | Department of Plant and Soil Sciences |
| Period of presentation | Semester 2 |

Module content

Plant tissue culture. Plant gene transfer technologies (Agrobacterium-based, biolistics and other). Design of plant gene transfer constructs, including synthetic biology. New plant breeding technologies, including plant gene editing. Applications of genetically modified (GM) and gene edited crops and their impact on modern agriculture. Biosafety evaluation and regulation of GM and new plant breeding technologies.

Research report 782 (BOT 782)

| | |
|-----------------------|-------|
| Module credits | 60.00 |
| NQF Level | 08 |



| | |
|-------------------------------|---------------------------------------|
| Prerequisites | No prerequisites. |
| Language of tuition | Module is presented in English |
| Department | Department of Plant and Soil Sciences |
| Period of presentation | Year |

Module content

A mini research project with defined limits is undertaken under the guidance of a supervisor. The students identify potential projects by contacting supervisors from the different research programmes in the department. A list of projects on offer can be obtained from the Honours coordinator, and in exceptional circumstances a student can propose a project not listed. The module also has a strong theoretical component since emphasis is placed on writing and presenting a detailed project proposal. Additional relevant technical and analytical training is provided by the respective supervisors. The project is concluded with a final mini dissertation, presented in the format of a short manuscript, as well as an oral presentation.

Seminar 783 (BOT 783)

| | |
|-------------------------------|---------------------------------------|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Language of tuition | Module is presented in English |
| Department | Department of Plant and Soil Sciences |
| Period of presentation | Semester 1 |

Module content

Literature study, discussion and oral presentation of a subject related to the main discipline.

Scientific communication 702 (GTK 702)

| | |
|-------------------------------|---|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 1 discussion class per week, 1 seminar per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

Students are guided to collect relevant and up-to-date literature on large topics from databases using referencing software, and to select and condense relevant papers into the outline for a literature review. Critical reading of research papers, article discussions and presentations. Scientific writing skills.

Research project 703 (GTK 703)



| | |
|-------------------------------|---|
| Module credits | 60.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

A mini-dissertation with well-defined limits is undertaken under the guidance of a supervisor. The students are allowed to choose from a number of projects from the different research programmes in the department. The module also has a strong theoretical component since emphasis is placed on writing and presenting a comprehensive literature review and project proposal. Additional technical and analytical training is provided. The project is concluded with a final report, presented in the format of a short manuscript, as well as a poster and an oral presentation.

Research methods 705 (GTK 705)

| | |
|-------------------------------|--|
| Module credits | 25.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 2 Practicals/Discussion classes per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

Students are guided through the methodology of research planning and data handling. They are offered hands-on experience in a range of advanced techniques employed in molecular research and analysis.

Research methods 751 (MCP 751)

| | |
|-------------------------------|--|
| Module credits | 25.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 2 Practicals/Discussion classes per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

The module provides students with planning, data handling, writing, and presentation skills required for microbiological research. In addition, students are provided with hands-on experience in the advanced techniques utilised in research and analysis.

Scientific communication 752 (MCP 752)

| | |
|-------------------------------|---|
| Module credits | 15.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Contact time | 1 discussion class per week, 1 seminar per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

Students are guided to collect relevant literature from disparate papers in the broader field of Microbiology and to condense and collate this into a written seminar, which is also presented verbally.

Research project and literature study 754 (MCP 754)

| | |
|-------------------------------|---|
| Module credits | 60.00 |
| NQF Level | 08 |
| Prerequisites | No prerequisites. |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Year |

Module content

The module includes both practical and theoretical components. In addition to an individual research project with well-defined limits that is undertaken under the guidance of a lecturer, the module also acquaint the student with the theoretical aspects relevant to a specific research topic. The research project is thus preceded by the presentation of an in-depth review of the relevant literature, and the project is concluded with a progress report, presented in the format of a short publication and an oral presentation.

Regulations and rules

The regulations and rules for the degrees published here are subject to change and may be amended after the publication of this information.

The [General Academic Regulations \(G Regulations\)](#) and [General Student Rules](#) apply to all faculties and registered students of the University, as well as all prospective students who have accepted an offer of

a place at the University of Pretoria. On registering for a programme, the student bears the responsibility of ensuring that they familiarise themselves with the General Academic Regulations applicable to their registration, as well as the relevant faculty-specific and programme-specific regulations and information as stipulated in the relevant yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations.

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