

# THE INTERDEPARTMENTAL HONOURS PROGRAMME IN **BIOTECHNOLOGY**

## **Programme Information**

Biotechnology Honours is an inter-departmental programme aimed at enabling students to pursue their interest in biotechnology through any of the relevant research areas within the molecular biosciences, including genetics, biochemistry, microbiology, and plant science. The Biotechnology study programme at the University of Pretoria has a strong emphasis on gene technologies and interested students are expected to have a solid background in molecular genetics and biochemistry in particular.

While the Department of Biochemistry, Genetics & Microbiology (BGM) is responsible for coordinating the study programme, the students within this programme will register and will conduct their studies within the field of their choice – either biochemistry (BGM), genetics (BGM), microbiology (BGM) or plant science (Dept of Plant & Soil Sciences). A student's choice of undergraduate modules at final year level will guide which of these options are available to them.

### **OBJECTIVES OF THE PROGRAMME**

The Biotechnology Honours programme is designed to provide students with career-orientated training in molecular biotechnology. The most important study objective is to teach students to read, think and communicate in their chosen field of study. The following specific objectives can be identified:

- ✓ To obtain an overview of biotechnology, its various applications and possibilities.
- ✓ To learn how to collect information from the literature and how to process and integrate that information.
- ✓ To learn how to communicate scientifically about their research.
- ✓ To master the technical aspects necessary for working in the field of molecular biotechnology.
- ✓ To learn how research is planned, conducted, evaluated and reported.
- ✓ To obtain insight into the entrepreneurial side of biotechnology.

### **GENERAL INFORMATION**

#### **MINIMUM REQUIREMENTS FOR ADMISSION:**

All applicants must have a Bachelor of Science degree in Biotechnology or an equivalent degree (NQF level 7) with clear evidence of a strong background in molecular biology and biochemistry. We require at least a 60% average (lower second GPA) across all final year modules for the preceding degree. In-house students who wish to continue with an Honours degree in Biotechnology must have completed the modules BCM 356, GTS 351 and MBY 364 as part of their undergraduate programme. In addition, applicants must have successfully completed at least three/four final year modules in the field they choose to do their honours research project in accordance with the admission requirements specified by the relevant division/department.

All applications for admission are screened on an individual basis by the participating divisions/departments in accordance with their stated admission criteria and quotas. Only a limited number of students are annually admitted to the Hons programme, and preference is given based on

academic merit as evidenced in your academic study record. The study programme is presented in English and we require all students to be fully proficient in this language. Additional criteria and admission requirements may be imposed by the respective Departments and such information will be available from the relevant contact persons listed below.

#### **THE SELECTION PROCESS:**

##### **■ In-house students:**

Please apply for postgraduate study online through your **Student Portal** (MyTuks login) or at NAS Student Administration in the foyer of the Agricultural Sciences building. Please ensure that your correct contact details (email and cell phone number) are available on your Student Portal. Please take note of the attached closing dates for applications.

Applications will be placed for consideration according to the applicant's final year module combinations, e.g. applications that adhere to the stated minimum admission requirements for genetics, will be considered along with all other Hons applications in the Division of Genetics. The same applies for Biochemistry, Microbiology, and Plant and Soil Sciences. Applicants may, however, indicate a preference in which of the participating divisions/departments they would prefer to be considered by sending an email to Lucille Hermann. Contact details for each of the participating divisions/departments are provided below. Please clearly state "Hons 2021" in the subject line.

Successful candidates will be notified via email and will receive official letters of acceptance in early December.

##### **■ Students from institutions other than UP:**

Interested persons may apply by completing the online UP application at <http://www.up.ac.za/en/online-application/article/2445192/apply-at-the-university-of-pretoria>.

Please ensure that you provide the correct contact details – email and cell phone number. It is essential that a CV and up-to-date academic record is attached as supporting documentation (see "step 10" of the online UP application process). If you do not have your final marks as yet, please include your official mid-year progress marks and ensure that we receive your final marks as soon as possible! Note that applications will not be processed based on 1<sup>st</sup> and 2<sup>nd</sup> year marks only. Please take note of the attached closing dates for applications. International applications must be submitted by the end of August and will be processed as soon as possible thereafter.

Applicants are encouraged to indicate on the accompanying documents in which of the participating divisions/departments they wish to do their Hons programme. However, if no preference is indicated, applications will be placed according to the research field most closely aligned with the final year modules.

Successful candidates will be notified via email and will receive official letters of acceptance in early December.

#### **BURSARIES:**

There are NRF bursaries available for students who have excelled in their academic career. Please consult the University's bursaries office for more information or apply online at <http://www.nrf.ac.za/bursaries/calls>. University Fees Waiver bursaries are also available and all registered students will automatically be considered. However, it is dependent on the availability of funds; bursaries are not guaranteed and equity considerations apply.

#### **GENERAL:**

This is a full-time programme that usually lasts for one full year. Students are generally expected to be in the Department on a full-time basis during the academic year and to participate fully in all departmental activities. Students are provided with space in their Department in which to work.

## COMPOSITION OF THE PROGRAMME

The Honours programme serves as the first level of postgraduate training and therefore aims to provide the student with broad-based training, be it in biochemistry, genetics, microbiology, or plant science. While each of the Departments involved in the Biotechnology programme curricula the programme to suit *their* specific needs, the programme does have a general structure (135 credits) and two compulsory modules, namely BTW 701, which is unique to this degree, and MLB 721.

Specific details regarding any of the programmes can be obtained from the respective Departments (see contact info below). Compulsory aspects to all Biotechnology Honours programmes include:

### TECHNIQUES COURSE COMPONENT:

All candidates must successfully complete a comprehensive molecular/recombinant DNA techniques course that will provide exposure to a wide range of gene technologies applicable in molecular biotechnology.

### RESEARCH PROJECT:

Students are required to complete a limited research project within one of the research fields in the biosciences (biochemistry, genetics, microbiology or plant science). All projects will have a strong focus on molecular biotechnology and the above technical training serves as a foundation for the research project. The project aims to teach students the basic concepts of research planning and how to develop strategies and use technology to answer specific questions. Wherever possible, the project is conducted under the direct leadership of a lecturer or postdoctoral fellow, with one or more postgraduate student mentor.

### SCIENCE COMMUNICATION COURSE:

The objective of these courses is to teach students how to effectively search literature databases, use referencing software and condense collated information into the format of either a short oral presentation or a more detailed oral and written report. A main outcome for this module is that students understand the process through which information is accumulated, evaluated, processed and communicated.

### **MLB 721: Molecular and Cellular Biology (15 credits)**

The module addresses the principles and applications of molecular biotechnology. Very strong emphasis is placed on the principles of research planning and the use of molecular technology to address questions in the biological sciences. The module is assessed by means of a research project proposal submitted by each of the students. This proposal should focus on the use of recombinant DNA technology in addressing questions in the biological sciences. Students must choose their own research proposal topic and are encouraged to choose something that is related to their own field of interest, postgraduate specialization or future career commitments. There is also an oral defense based on the proposal submitted.

### **BTW 701: Biotechnology in the Workplace 701 (20 credits)**

Given the continuing advances in the field of biotechnology and bioentrepreneurship, the content of this module has been updated and expanded to better align with the curricula of similar modules at peer Universities, as well as to reflect global developments. Following consultation with the Faculty of Economic and Management Sciences (EMS), business-related topics were defined and allocated credits based on the existing criteria for the Postgraduate Diploma in Entrepreneurship offered by EMS. This interfaculty alignment will allow BSc(Hons)Biotechnology graduates the opportunity to apply for the MPhil degrees offered by the Faculty of EMS.

This module provides an introduction to the principles and realities of working in the field of biotechnology. Students will be guided through discussions on various essential components of the biotechnology industry including bio-entrepreneurship, marketing, business plan writing, business

communication skills, procuring capital for start-ups, incubators, basic accounting and finance, as well as issues surrounding biosafety, ethics and legal aspects. Students are then tasked to develop a comprehensive business plan for a hypothetical biotechnological venture.

### **Registering for a BScHons (Biotechnology):**

- 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.

### **ARTICULATION WITH FURTHER HIGHER DEGREES**

- More information on the MPhil options in can be found here: <https://www.up.ac.za/business-management/article/2521300/masters-degrees>
- Other MSc options in Biochemistry, Genetics, Microbiology, as well as in Plant Sciences are available. Please see:  
<https://www.up.ac.za/biochemistry-genetics-and-microbiology/article/2808568/study-programs>  
and <https://www.up.ac.za/plant-and-soil-sciences/article/45005/postgraduate-degrees-in-plant-and-soil-sciences>.

Please feel free to contact any of the persons below for more information on the Biotechnology Honours programme in the contributing departments/divisions:

#### **Div of Genetics**

- **Ms Lucille Hermann** +27 (0)12 420 3254 **LUCILLE.HERMANN @ up.ac.za**
- Dr Vida van Staden +27 (0)12 420 3257 **VIDA.VANSTADEN @ up.ac.za**

#### **Dept of Plant and Soil Sciences**

- Prof Dave Berger +27 (0)12 420 4634 **DAVE.BERGER @ up.ac.za**
- Dr Eugene Makgopa +27 (0)12 420 4676 **EUGENE.MAKGOPA @ up.ac.za**

#### **Div of Biochemistry**

- Dr Precious Motshwene +27 (0)12 420 6985 **PRECIOUS.MOTSHWENE @ up.ac.za**
- Prof Anabella Gaspar +27 (0)12 420 2486 **ANABELLA.GASPAR @ up.ac.za**

#### **Div of Microbiology**

- Ms Tarren Seale +27 (0)12 420 3263 **TARREN.SEALE @ up.ac.za**
- Prof Jacques Theron +27 (0)12 420 3266 **JACQUES.THERON @ up.ac.za**

**Please note**, if you would like to add BScHons Biotechnology to your list of applications, simply add it on your Student Portal or contact Ms Rebekah Chauke ([REBECCA.CHAUKE@up.ac.za](mailto:REBECCA.CHAUKE@up.ac.za)) for assistance. Alternately, you could talk to your programme coordinator about the possibility, once you have been accepted in whichever programme.