University of Pretoria Yearbook 2020

BScHons Plant Science (02240707)

Minimum duration of study	1 year
Total credits	135
NQF level	08

Programme information

Renewal of registration

i. Subject to exceptions approved by the Dean, on the recommendation of the relevant head of department, a student may not sit for an examination for the honours degree more than twice in the same module.
ii. A student for an honours degree must complete his or her study, in the case of full-time students, within two years and, in the case of after-hours students, within three years of first registering for the degree. Under special circumstances, the Dean, on the recommendation of the relevant head of department, may give approval for a limited extension of this period.

In calculating marks, General Regulation G.12.2 applies.

Apart from the prescribed coursework, a research project is an integral part of the study.

Admission requirements

- BSc (Plant Science) or on recommendation from the head of department if the candidate did not major in Plant Science.
- A final grade point average of at least 60% at final-year level
- Selection will be considered on the highest final grade point average of the preceding degree.
- Applicants may be subjected to an entrance evaluation examination.

Other programme-specific information

BOT 705 and BTW 701 are for BScHons (Biotechnology) students. PB students who wish to take one of these modules as an elective need to apply to the programme leader.

The curriculum for the balance of the credits will be determined by the heads of department of the interdepartmental BScHons (Biotechnology) degree programme.

Pass with distinction

The BScHons degree is awarded with distinction to a candidate who obtains a weighted average of at least 75% in all the prescribed modules and a minimum of 65% in any one module.

Curriculum: Final year

Minimum credits: 135

Core credits: 75
Elective credits: 60

The programme consists of compulsory modules and elective modules. Students may register for modules to the maximum of 20 credits presented by another department, which forms part of the elective modules.

The following streams are presented in the BScHons in Plant Science programme:

- Plant Diversity (D)
- Plant Biotechnology/Physiology (PB)
- Plant Ecology (E)
- Plant Pathology (P)

Apart from the compulsory and elective modules, a project, leading to a research report (60 credits), forms an essential part of the training programme. One seminar (15 credits) must also be written and presented. Field excursions are undertaken.
In addition to the compulsory modules, electives are selected in consultation with the supervisor.
Suitably qualified candidates may also apply for the interdepartmental BScHons in Biotechnology degree (Code 02240393) with a supervisor in the Department of Plant and Soil Science.
Please consult Prof P Bloomer, Tel: +27 12 420 3259, for further details.

Core modules

Research report 782 (BOT 782)

Module credits	60.00
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

Teaching and planning, execution and documentation of a research project.

Seminar 783 (BOT 783)

Module credits	15.00
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.

Elective modules

Crop physiology 761 (APS 761)

Module credits	15.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week, Fortnightly practicals
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

An overview of photosynthesis and respiration, with the aim of examining the physiological basis of yield in cropping systems. this includes an assessment of parameters for determining plant growth, factors governing yield, partitioning of photoassimilates within plants and opportunities for increasing yield. Crop growth and yield will be put into context of a changing global climate. Evaluation of the manner in which plants respond to various abiotic stresses and how plants sense changing environments. The various roles of plant growth regulators in plants and the importance of these compounds in agriculture.

Statistics for biological sciences 780 (BME 780)

Module credits	15.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	2 Block weeks
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

The principles of experimental design as required for the selection of an appropriate research design. Identification of the design limitations and the impact thereof on the research hypotheses and the statistical methods. Identification and application of the appropriate statistical methods needed. Interpreting of statistical results and translating these results to the biological context.

Natural woodland and forests: Ecology and management 700 (BOT 700)

Module credits	15.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content
Definitions of woodlands and forests and vegetation and forest resources in southern Africa; Classification of forest and woodland in southern Africa; Woodland dynamics including disturbance, recruitment, growth and mortality, recovery after disturbance; Ecosystem services (microclimate and nutrient cycling, carbon sequestration etc); Sustainable forest resource management (resource assessment, socio-economic assessment e.g. wood and non-forest products, participatory resource management processes); Forest health; Monitoring of resource-use impacts and adaptive management; Development of a framework for sustainable conservation and use of non-timber forest products; Climate change and resilience. Forest disease and pathology.

Molecular techniques 705 (BOT 705)

Module credits	15.00
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.

Introduction to plant biotechnology 718 (BOT 718)

Module credits	10.00
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 1

Module content
Plant genome: structure and composition of the plant genome (nuclear, mitochondrial and chloroplast); applications in plant biotechnology: plant tissue culture (microproagation, somatic embryogenesis and cell suspension cultures). Genetic manipulation and gene transfer technology (Agrobacterium-based and other) and DNA-marker technology.

Plant ecology 730 (BOT 730)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	8 hours per day for 5 days
Language of tuition	Module is presented in English

Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Practical applications of plant ecology principles. Designing and executing field studies. Exposure to skills of field ecology and plant identification. This module includes a compulsory 5-day field component.

Applied plant anatomy 741 (BOT 741)

Module credits	15.00
Prerequisites	BOT 161 or permission from the Head of Department.
Contact time	Block of 4 weeks for lectures with practical compo
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1 or Semester 2

Module content

Theory of plant anatomy, understanding of basic tissue types and arrangement within organs. Evolutionary modifications to the basic anatomy. Introduction to seed anatomy/palynology. Understanding of developmental anatomy – ontogeny of tissues/organs. Advantages/disadvantages of different stains/techniques. Microscopy, including electron microscopy. Ethics and protocols of image manipulation. Practical understanding of tissue preservation, staining and sectioning techniques will be learnt and a portfolio of evidence submitted for assessment.

Plant classification and phytogeography 742 (BOT 742)

Module credits	20.00
Prerequisites	BOT 366
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

An overview of phylogenetics sets the scene, and sources of taxonomic information (morphology, anatomy, chemotaxonomy, cytogenetics, reproductive biology, palynology, ethnobotany and paleobotany) and how these data are used are discussed. This is followed by a section on the use of phylogenies as tools to understand ecological and geographical patterns and processes. Modern plant distribution patterns are assessed from the framework of the competing explanations of dispersalisn and vicariance.

Applications in plant biotechnology 746 (BOT 746)

Module credits	10.00
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

Creation of genetically modified plants and their impact on modern agriculture.

Advanced phytomedicine 761 (BOT 761)

Module credits	10.00
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

Metabolism and functions of secondary compounds such as tannins, alkaloids, terpenoids, flavonoids and free amino acids. Importance of secondary compounds in the defence mechanisms of plants. Isolation and identification of medicinal bioactive compounds from plants. Their current scope and potential applications in ethnobotany. Strategies to discover new pharmaceuticals from ethnomedicine.

Trends in plant science 784 (BOT 784)

Module credits	10.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Literature study of recent publications in a subject related to one of the elective disciplines.

Plant identification and herbarium curation 786 (BOT 786)

Module credits	15.00
Prerequisites	BOT 161 or permission from the Head of Department.
Contact time	2 Block weeks, 2 practicals per week, 3 Block weeks
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Principles of identification, classification and nomenclature; identification of plants; family recognition; collection of plant specimens for identification; herbarium as a source of information. Variation in seed plants and breeding systems. Legal and ethical aspects of plant collection and permit requirements. Specimen preparation, including pressing, sterilisation, mounting, labelling and data capture. Introduction to herbarium databases. Herbarium curation and upkeep, including nomenclatural and taxonomic updates and classification systems, and aspects of pest control and health and safety. Practical work involves an excursion.

Spatial analysis in ecology 788 (BOT 788)

Module credits	10.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Mapping and analysing spatial data. Theory and basic techniques of analysing and manipulating spatial data using geographical information systems. Mapping of vegetation types, species distributions and diversity, species traits. Understanding the spatial drivers of biodiversity patterns. The influence of scale on biodiversity analyses. Relevance for conservation planning for mapping biodiversity risk and prioritsing conservation, especially in a South African context.

Land reclamation and restoration ecology 791 (BOT 791)

Module credits	15.00
Service modules	Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	Block: 6 weeks per semester,3 discussions per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

This module will provide students with the skills to use biophysical information and data obtained by undertaking a natural resource inventory. This will be supported by taught methods of critically evaluating data and information obtained through assessment methodologies and an understanding of sampling design (choosing reference sites, spatial replication) and monitoring methods (e.g. recording biomass vs vegetation cover vs species richness; aspects of seed biology etc.). Through the additional understanding of ecological and agricultural concepts (e.g. productivity, decomposition rate, carbon uptake, pollinator abundance, erosion protection, dust reduction) students will acquire the skills to provide reclamation and restoration solutions to land degradation challenges in South Africa.
A site visit or field trip during which students will get exposed to the realities of reclamation and restoration and apply their knowledge and skills will be a compulsory component of this module.

Biotechnology in the workplace 701 (BTW 701)

Module credits	15.00
Prerequisites	No prerequisites.
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 aspects, including entrepreneurship; intellectual property; patent rights; financial management; grant applications and product marketing. The module will be assessed by way of a simulated grant application for the development of a hypothetical biotechnological venture.

Advanced plant disease control 783 (PLG 783)

Module credits	15.00
Prerequisites	PLG 363 or permission from the HOD.
Contact time	1 practical per week, 2 discussion classes per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Advanced aspects of chemical and biological control of plant diseases as well as disease resistance.

Plant disease epidemiology 785 (PLG 785)

Module credits	15.00
Prerequisites	PLG 262, PLG 351 and PLG 363 or permission from the HOD.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English

Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Understanding of how plant disease epidemics occur in nature and how they can be monitored and analysed. In-depth knowledge of how plant diseases cause crop losses, how these losses are quantified, and how losses are predicted. Examples of how epidemiology is used to set the strategy of plant disease control. Use of some statistical procedures for quantifying and comparing epidemics. Impact of climate change on plant disease development. In-depth discussions on plant-pathogen interactions and plant defence mechanisms.

Current concepts in plant pathology 786 (PLG 786)

Module credits	15.00
Prerequisites	PLG 351 or permission from the HOD.
Contact time	1 seminar per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

This module will address the most recent concepts in plant pathology.

The information published here is subject to change and may be amended after the publication of this information. The General Regulations (G Regulations) apply to all faculties of the University of Pretoria. It is expected of students to familiarise themselves well with these regulations as well as with the information contained in the General Rules section. Ignorance concerning these regulations and rules will not be accepted as an excuse for any transgression.