



# University of Pretoria Yearbook 2020

## BScHons Medicinal Plant Science (02240706)

**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 minimum of 60% in Phytomedicine 365 (BOT 365)
- A final grade point average of at least 60% at final-year level

The recommended modules at BSc third-year level are as follows:

1. BOT 366 Plant diversity
2. BOT 356 Plant ecophysiology
3. BCM 368 Molecular basis for disease
4. BCM 357 Biocatalysis and integration of metabolism
5. FAR 382 Pharmacology
6. CMY 282 Physical chemistry
7. CMY 284 Organic chemistry

### 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: 105

Elective credits: 30

### Additional information:

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

Apart from the compulsory and elective modules, a project, leading to a research report (60 credits), forms an essential part of the 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.

## Core modules

### Phytopharmacology 748 (BOT 748)

**Module credits** 10.00

**Prerequisites** No prerequisites.

**Contact time** 1 discussion class 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

Pharmacological action of low molecular plant constituents and high molecular weight compounds. Plant constituents as anticancer, antibacterial, antiviral, hypoglycaemic, freeradical scavengers, hypotensive and as anti-inflammatory agents. Cell culturing, cell growth and apoptosis, cell mediated immune responses. Drug development in TB as models for research. Enzymes, receptors and plant constituents. The unique challenges of plant-based medicines.

### Pharmacognosy/Phytotherapy 749 (BOT 749)

**Module credits** 10.00

**Prerequisites** No prerequisites.

**Contact time** 1 discussion class 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

Basic concepts of toxicology. Systemic, developmental, genetic and organ-specific toxic effects. Hallucinogenic, allergenic, teratogenic and other toxic plants. Plant constituents, contradictions and interactions. Phytotoxicity unrelated to plant constituents. Safety and efficacy issues of commonly used Phyto-drugs with emphasis on pharmaceutical applications. Practical aspects related to the manufacture of good quality plant-based medicines. Phyto-drug formulation, standardisation and aspects concerning different dosage forms.

## 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.

## 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)

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

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

### Introduction to plant biotechnology 718 (BOT 718)

<b>Module credits</b>	10.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 lecture per week, 1 practical per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	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.

## 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 dispersalism 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.

**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 prioritising conservation, especially in a South African context.

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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.