

# University of Pretoria Yearbook 2019

## BScAgric Applied Plant and Soil Sciences (02133431)

**Minimum duration of study** 4 years

**Total credits** 573

### Admission requirements

- The following persons will be considered for admission: a candidate who is in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement, a candidate who is a graduate from another tertiary institution or has been granted the status of a graduate of such an institution, and a candidate who is a graduate of another faculty at the University of Pretoria.
- Life Orientation is excluded in the calculation of the Admission Point Score (APS).
- Grade 11 results are used for the conditional admission of prospective students. Final admission is based on the Grade 12 results.

#### Minimum requirements

##### Achievement level

##### English Home

##### Language or

##### English First

##### Additional

##### Language

##### Mathematics

##### Physical Science

##### APS

NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	<b>30</b>

\* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Candidates who do not comply with the minimum admission requirements for BScAgric (Applied Plant and Soil Sciences), may be considered for admission to the BSc – Extended programme for the Biological and Agricultural Sciences. The BSc – Extended programme takes one year longer to complete.

#### BSc Extended Programme for the Biological and Agricultural Sciences

##### Minimum requirements

##### Achievement level



**English Home  
Language or  
English First  
Additional  
Language**

**Mathematics**

**Physical Science**

**APS**

NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level
4	D	4	D	4	D

**24**

## Other programme-specific information

### Compilation of curriculum

Students must register for elective modules in consultation with the head of department who must ensure that the modules do not clash on the set timetable.

The Dean may, in exceptional cases and on recommendation of the relevant head of department, approve deviations from the prescribed curriculum.

## Promotion to next study year

A student will be promoted to the following year of study if he or she passed 100 credits of the prescribed credits for a year of study, unless the Dean on the recommendation of the relevant head of department decides otherwise. A student who does not comply with the requirements for promotion to the following year of study, retains the credit for the modules already passed and may be admitted by the Dean, on recommendation of the relevant head of department, to modules of the following year of study to a maximum of 48 credits, provided that it will fit in with both the lecture and examination timetable.

## Pass with distinction

The BScAgric degree is conferred with distinction if a student obtains a weighted average of at least 75% in the modules of the major subjects in the third and the fourth year of study, with a weighted average of at least 65% in the other modules of the third and the fourth year of study.

## Curriculum: Year 1

**Minimum credits: 140**

**Minimum credits: 140**

Fundamental = 12

Core = 128

### Additional information:

Students who do not qualify for AIM 102 must register for AIM 111 and AIM 121.

Students intending to apply for the **BVSc** selection have to enrol for MTL 180(12)

## Fundamental modules

### Academic information management 102 (AIM 102)

**Module credits** 6.00

#### Service modules

Faculty of Education  
Faculty of Economic and Management Sciences  
Faculty of Humanities  
Faculty of Law  
Faculty of Health Sciences  
Faculty of Natural and Agricultural Sciences  
Faculty of Theology and Religion  
Faculty of Veterinary Science

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Information Science

**Period of presentation** Semester 2

#### Module content

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology. Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

### Academic information management 111 (AIM 111)

**Module credits** 4.00



<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Information Science
<b>Period of presentation</b>	Semester 1
<b>Module content</b>	Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology.

**Academic information management 121 (AIM 121)**

<b>Module credits</b>	4.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion Faculty of Veterinary Science
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Informatics
<b>Period of presentation</b>	Semester 2
<b>Module content</b>	Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

**Language and study skills 110 (LST 110)**

<b>Module credits</b>	6.00
<b>Service modules</b>	Faculty of Natural and Agricultural Sciences Faculty of Veterinary Science



<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Unit for Academic Literacy
<b>Period of presentation</b>	Semester 1

#### Module content

The module aims to equip students with the ability to cope with the reading and writing demands of scientific disciplines.

### Academic orientation 102 (UPO 102)

<b>Module credits</b>	0.00
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Natural and Agricultural Sciences Deans Office
<b>Period of presentation</b>	Year

### Core modules

#### Biometry 120 (BME 120)

<b>Module credits</b>	16.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences Faculty of Veterinary Science
<b>Prerequisites</b>	At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123
<b>Contact time</b>	1 practical per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 2

#### Module content

Simple statistical analysis: Data collection and analysis: Samples, tabulation, graphical representation, describing location, spread and skewness. Introductory probability and distribution theory. Sampling distributions and the central limit theorem. Statistical inference: Basic principles, estimation and testing in the one- and two-sample cases (parametric and non-parametric). Introduction to experimental design. One- and twoway designs, randomised blocks. Multiple statistical analysis: Bivariate data sets: Curve fitting (linear and non-linear), growth curves. Statistical inference in the simple regression case. Categorical analysis: Testing goodness of fit and contingency tables. Multiple regression and correlation: Fitting and testing of models. Residual analysis. Computer literacy: Use of computer packages in data analysis and report writing.



## Plant biology 161 (BOT 161)

**Module credits** 8.00

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education

**Prerequisites** MLB 111 GS

**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

Basic plant structure and function; introductory plant taxonomy and plant systematics; principles of plant molecular biology and biotechnology; adaptation of plants to stress; medicinal compounds from plants; basic principles of plant ecology and their application in natural resource management.

## General chemistry 117 (CMY 117)

**Module credits** 16.00

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Health Sciences  
Faculty of Veterinary Science

**Prerequisites** A candidate must have Mathematics for at least 60% and 60% for Physical Sciences.

**Contact time** 1 practical per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Chemistry

**Period of presentation** Semester 1

### Module content

General introduction to inorganic, analytical and physical chemistry. Atomic structure and periodicity. Molecular structure and chemical bonding using the VSEOR model. Nomenclature of inorganic ions and compounds. Classification of reactions: precipitation, acid-base, redox reactions and gas-forming reactions. Mole concept and stoichiometric calculations concerning chemical formulas and chemical reactions. Principles of reactivity: energy and chemical reactions. Physical behaviour gases, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to chemical kinetics.

## General chemistry 127 (CMY 127)

**Module credits** 16.00

<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
<b>Prerequisites</b>	Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none
<b>Contact time</b>	4 lectures per week, 1 practical per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 2

#### Module content

Theory: General physical-analytical chemistry: Chemical equilibrium, acids and bases, buffers, solubility equilibrium, entropy and free energy, electrochemistry. Organic chemistry: Structure (bonding), nomenclature, isomerism, introductory stereochemistry, introduction to chemical reactions and chemical properties of organic compounds and biological compounds, i.e. carbohydrates and aminoacids. Practical: Molecular structure (model building), synthesis and properties of simple organic compounds.

### Introductory genetics 161 (GTS 161)

**Module credits** 8.00

<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science
<b>Prerequisites</b>	MLB 111 GS
<b>Contact time</b>	2 lectures per week, fortnightly tutorials
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Biochemistry, Genetics and Microbiology
<b>Period of presentation</b>	Semester 2

#### Module content

Chromosomes and cell division. Principles of Mendelian inheritance: locus and alleles, dominance interactions, extensions and modifications of basic principles.. Probability studies. Sex determination and sex linked traits. Pedigree analysis. Genetic linkage and chromosome mapping. Chromosome variation.

### Introduction to microbiology 161 (MBY 161)

**Module credits** 8.00

<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	MLB 111 GS
<b>Contact time</b>	2 lectures per week, fortnightly tutorials
<b>Language of tuition</b>	Module is presented in English



**Department** Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 2

**Module content**

The module will introduce the student to the field of Microbiology. Basic Microbiological aspects that will be covered include introduction into the diversity of the microbial world (bacteria, archaea, eukaryotic microorganisms and viruses), basic principles of cell structure and function, microbial nutrition and microbial growth and growth control. Applications in Microbiology will be illustrated by specific examples i.e. bioremediation, animal-microbial symbiosis, plant-microbial symbiosis and the use of microorganisms in industrial microbiology. Wastewater treatment, microbial diseases and food will be introduced using specific examples.

**Molecular and cell biology 111 (MLB 111)**

**Module credits** 16.00

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Health Sciences  
Faculty of Veterinary Science

**Prerequisites** A candidate who has passed Mathematics with at least 60% in the Grade 12 examination

**Contact time** 1 practical/tutorial per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 1

**Module content**

Introduction to the molecular structure and function of the cell. Basic chemistry of the cell. Structure and composition of prokaryotic and eukaryotic cells. Ultrastructure and function of cellular organelles, membranes and the cytoskeleton. General principles of energy, enzymes and cell metabolism. Selected processes, e.g. glycolysis, respiration and/or photosynthesis. Introduction to molecular genetics: DNA structure and replication, transcription, translation. Cell growth and cell division.

**Physics for biology students 131 (PHY 131)**

**Module credits** 16.00

**Service modules** Faculty of Education  
Faculty of Health Sciences  
Faculty of Veterinary Science

**Prerequisites** A candidate must have passed Mathematics with at least 60% in the Grade 12 examination

**Contact time** 1 discussion class per week, 1 practical per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Physics



**Period of presentation** Semester 1

**Module content**

Units, vectors, one dimensional kinematics, dynamics, work, equilibrium, sound, liquids, heat, thermodynamic processes, electric potential and capacitance, direct current and alternating current, optics, modern physics, radio activity.

**Mathematics 134 (WTW 134)**

**Module credits** 16.00

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Veterinary Science

**Prerequisites** 50% for Mathematics in Grade 12

**Contact time** 4 lectures per week, 1 tutorial per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 1

**Module content**

*\*Students will not be credited for more than one of the following modules for their degree: WTW 134, WTW 165, WTW 114, WTW 158. WTW 134 does not lead to admission to Mathematics at 200 level and is intended for students who require Mathematics at 100 level only. WTW 134 is offered as WTW 165 in the second semester only to students who have applied in the first semester of the current year for the approximately 65 MBChB, or the 5-6 BChD places becoming available in the second semester and who were therefore enrolled for MGW 112 in the first semester of the current year.*

Functions, derivatives, interpretation of the derivative, rules of differentiation, applications of differentiation, integration, interpretation of the definite integral, applications of integration. Matrices, solutions of systems of equations. All topics are studied in the context of applications.

**Animal diversity 161 (ZEN 161)**

**Module credits** 8.00

**Service modules** Faculty of Education  
Faculty of Veterinary Science

**Prerequisites** MLB 111 GS or permission from the HOD.

**Contact time** 2 lectures per week, fortnightly practicals

**Language of tuition** Module is presented in English

**Department** Zoology and Entomology

**Period of presentation** Semester 2

## Module content

Animal classification, phylogeny, organization and terminology. Evolution of the various animal phyla, morphological characteristics and life cycles of parasitic and non-parasitic animals. Structure and function of reproductive, respiratory, excretory, circulatory and digestive systems.



## Curriculum: Year 2

**Minimum credits: 135**

**Minimum credits: 135**

Core = 135

### Core modules

#### Introduction to proteins and enzymes 251 (BCM 251)

**Module credits** 12.00

**Service modules** Faculty of Health Sciences

**Prerequisites** CMY 117 GS and CMY 127 GS and MLB 111 GS

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Biochemistry, Genetics and Microbiology

**Period of presentation** Semester 1

##### Module content

Structural and ionic properties of amino acids. Peptides, the peptide bond, primary, secondary, tertiary and quaternary structure of proteins. Interactions that stabilise protein structure, denaturation and renaturation of proteins. Introduction to methods for the purification of proteins, amino acid composition, and sequence determinations. Enzyme kinetics and enzyme inhibition. Allosteric enzymes, regulation of enzyme activity, active centres and mechanisms of enzyme catalysis. Examples of industrial applications of enzymes and in clinical pathology as biomarkers of diseases. Introduction to practical laboratory techniques and Good Laboratory Practice. Techniques for the quantitative and qualitative analysis of biological molecules, enzyme activity measurements. Processing and presentation of scientific data.

#### South African flora and vegetation 251 (BOT 251)

**Module credits** 12.00

**Service modules** Faculty of Education

**Prerequisites** BOT 161 or permission from head of department

**Contact time** 1 practical per week, 2 lectures per week

**Language of tuition** Separate classes for Afrikaans and English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1



## Module content

Origin and affinity of South African flora and vegetation types; principles of plant geography; plant diversity in southern Africa; characteristics, environments and vegetation of South African biomes and associated key ecological processes; centre of plant endemism; rare and threatened plant species; biodiversity conservation and ecosystem management; invasion biology; conservation status of South African vegetation types.

## Plant physiology and biotechnology 261 (BOT 261)

<b>Module credits</b>	12.00
<b>Service modules</b>	Faculty of Education
<b>Prerequisites</b>	BOT 161, CMY 117, CMY 127 or permission from head of department
<b>Contact time</b>	2 lectures per week, 1 practical per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

## Module content

Nitrogen metabolism in plants; nitrogen fixation in Agriculture; plant secondary metabolism and natural products; photosynthesis and carbohydrate metabolism in plants; applications in solar energy; plant growth regulation and the Green Revolution; plant responses to the environment; developing drought tolerant and disease resistant plants.

## Introductory soil science 250 (GKD 250)

<b>Module credits</b>	12.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	CMY 117 GS or permission from the HOD
<b>Contact time</b>	3 lectures per week, 1 practical per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

## Module content

Origin and development of soil, weathering and soil formation processes. Profile differentiation and morphology. Physical characteristics: texture, structure, soil water, atmosphere and temperature. Chemical characteristics: clay minerals, ion exchange, pH, buffer action, soil acidification and salinisation of soil. Soil fertility and fertilisation. Soil classification. Practical work: Laboratory evaluation of simple soil characteristics. Field practicals on soil formation in the Pretoria area.

## Molecular genetics 251 (GTS 251)

<b>Module credits</b>	12.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	GTS 161 GS
<b>Contact time</b>	fortnightly tutorials, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Biochemistry, Genetics and Microbiology
<b>Period of presentation</b>	Semester 1

#### Module content

The chemical nature of DNA. The processes of DNA replication, transcription, RNA processing, translation. Control of gene expression in prokaryotes and eukaryotes. Recombinant DNA technology and its applications in gene analysis and manipulation.

### Genetic diversity and evolution 261 (GTS 261)

**Module credits** 12.00

<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	GTS 251 GS
<b>Contact time</b>	2 lectures per week, fortnightly tutorials
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Biochemistry, Genetics and Microbiology
<b>Period of presentation</b>	Semester 2

#### Module content

Chromosome structure and transposable elements. Mutation and DNA repair. Genomics and proteomics. Organelle genomes. Introduction to genetic analysis of populations: allele and genotypic frequencies, Hardy Weinberg Law, its extensions and implications for different mating systems. Introduction to quantitative and evolutionary genetics.

### Introduction to agricultural economics 210 (LEK 210)

**Module credits** 12.00

<b>Service modules</b>	Faculty of Economic and Management Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Afrikaans and English are used in one class
<b>Department</b>	Agricultural Economics Extension and Rural Develo
<b>Period of presentation</b>	Semester 1

## Module content

Introduction to financial management in agriculture: Farm management and agricultural finance, farm management information; analysis and interpretation of farm financial statements; risk and farm planning. Budgets: partial, break-even, enterprise, total, cash flow and capital budgets. Time value of money. Introduction to production and resource use: the agricultural production function, total physical product curve, marginal physical product curve, average physical product curve, stages of production. Assessing short-term business costs; Economics of short-term decisions. Economics of input substitution: Least-cost use of inputs for a given output, short-term least-cost input use, effects of input price changes. Least-cost input use for a given budget. Economics of product substitution. Product combinations for maximum profit. Economics of crop and animal production.

## Agricultural economics 220 (LEK 220)

**Module credits** 12.00

**Service modules** Faculty of Economic and Management Sciences

**Prerequisites** [LEK 210 ] or [EKN 113 and/or EKN 120]

**Contact time** 3 lectures per week

**Language of tuition** Afrikaans and English are used in one class

**Department** Agricultural Economics Extension and Rural Develo

**Period of presentation** Semester 2

## Module content

The agribusiness system; the unique characteristics of agricultural products; marketing functions and costs; market structure; historical evolution of agricultural marketing in South Africa. Marketing environment and price analysis in agriculture: Introduction to supply and demand analysis.

Marketing plan and strategies for agricultural commodities; market analysis; product management; distribution channels for agricultural commodities, the agricultural supply chain, the agricultural futures market.

## Introduction to crop protection 251 (PLG 251)

**Module credits** 12.00

**Prerequisites** No prerequisites.

**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 1

## Module content

Development and importance of crop protection. Basic principles in crop protection i.e. epidemic development of disease and insect pest populations, ecology of plant diseases and abiotic factors that affect plant health i.e. environmental pollution and pesticides, nutrient deficiencies and extreme environmental conditions. Ecological aspects of plant diseases, pest outbreaks and weed invasion. Important agricultural pests and weeds. Life cycles of typical disease causing organisms. Basic principles of integrated pest and disease management.



## Principles of plant pathology 262 (PLG 262)

<b>Module credits</b>	12.00
<b>Prerequisites</b>	MBY 161
<b>Contact time</b>	2 lectures per week, 1 practical per week
<b>Language of tuition</b>	Afrikaans and English are used in one class
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

### Module content

Fundamental principles of plant pathology. The concept of disease in plants. Causes of plant diseases. Stages in development of plant diseases. Disease cycles. Diagnosis of plant diseases.

## Sustainable crop production and agroclimatology 251 (PPK 251)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	BOT 161
<b>Contact time</b>	fortnightly practicals, 3 lectures per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

### Module content

Influence of climate on cropping systems in South Africa. The surface energy balance. Hydrological cycles and the soil water balance. Sustainable crop production. Simple radiation and water limited models. Potential yield, target yield and maximum economic yield. Crop nutrition and fertiliser management. Principles of soil cultivation and conservation. Climate change and crop production – mitigation and adaptation.

## Curriculum: Year 3

**Minimum credits: 148**

**Minimum credits: 148**

Core = 148

### Core modules

#### Field crops 361 (AGR 361)

<b>Module credits</b>	14.00
<b>Prerequisites</b>	PPK 251
<b>Contact time</b>	2 lectures per week, fortnightly practicals
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

##### Module content

Botanical characteristics, classification, growth requirements, production practices and utilization of crops rich in starch, oil and protein, fibre crops, tobacco, sugarcane and medicinal plants. Visits to research institutions and producers.

#### Plant ecophysiology 356 (BOT 356)

<b>Module credits</b>	18.00
<b>Service modules</b>	Faculty of Education
<b>Prerequisites</b>	BOT 161 or permission from head of department
<b>Contact time</b>	2 lectures per week, 1 practical per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

##### Module content

The emphasis is on the efficiency of the mechanisms whereby C3-, C4 and CAM-plants bind CO<sub>2</sub> and how it impacted upon by environmental factors. The mechanisms and factors which determine the respiratory conversion of carbon skeletons and how production is affected thereby will be discussed. Insight into the ecological distribution and manipulation of plants for increased production is gained by discussing the internal mechanisms whereby carbon allocation, hormone production, growth, flowering and fruitset are influenced by external factors. To understand the functioning of plants in diverse environments, the relevant structural properties of plants, and the impact of soil composition, water flow in the soil-plant air continuum and long distance transport of assimilates will be discussed. Various important techniques will be used in the practicals to investigate aspects such as water-use efficiency, photosynthesis and respiration of plants.



### Soil chemistry 320 (GKD 320)

<b>Module credits</b>	14.00
<b>Prerequisites</b>	GKD 250
<b>Contact time</b>	2 lectures per week, 1 practical per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

#### Module content

The more exact chemistry of soils systematically explained by understanding the particular chemical principles. Charge origin. Chemical equilibriums. Manifestations of sorption. Ion exchange. Acidic soils, saline soils and the organic fraction of soil. The chemistry of the important plant nutrient elements P, K and N is explained.

### Soil classification and surveying 350 (GKD 350)

<b>Module credits</b>	14.00
<b>Prerequisites</b>	GKD 250 GS
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

#### Module content

A taxonomic system for South Africa. USDA's Soil Taxonomy. Land suitability evaluation. Optimal resource utilization. The conservation component. Ecological aspects. Ecotype, land types. Soil maps. Practical work: Field practicals and compulsory excursion. Identification of soil horizons, forms and families. Land suitability evaluation. Elementary mapping exercise.

### Principles and practices 351 (HSC 351)

<b>Module credits</b>	14.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week, fortnightly practicals
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1



## Module content

The organised nursery industry in South Africa. Principles: seed production; seed germination; rooting of cuttings; budding and grafting; propagation using specialised organs; micro propagation (tissue culturing). Practices: Greenhouse construction, lighting in the nursery; cooling and heating; soil-based and soil-less growing media; container types; irrigation and fertilisation; growth manipulation; pest and disease management. Management, economic and marketing aspects of a typical nursery operation. Students will get hands-on experience and will visit nurseries.

## Soil-water relationship and irrigation 350 (PGW 350)

**Module credits** 14.00

**Prerequisites** GKD 250

**Contact time** fortnightly practicals, 2 lectures per week

**Language of tuition** Separate classes for Afrikaans and English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

## Module content

Quantitative description and measurement of soil water content and potential as well as saturated and unsaturated hydraulic conductivity. Modelling water flow in soil (Darcy's law, Richards's equation). Infiltration, redistribution, evaporation, runoff and percolation. Irrigation in South Africa. Modelling and managing the soil water balance. Plant water consumption and the soil-plant-atmosphere continuum. Irrigation scheduling (soil, plant and atmosphere approaches). Managing poor quality water. Irrigation systems. The module includes a field trip to an irrigation scheme.

## Plant disease control 363 (PLG 363)

**Module credits** 18.00

**Prerequisites** PLG 251 or PLG 262 or permission from the HOD. MBY 261 is recommended.

**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

Principles of plant disease control. Non-chemical control including biological control, disease resistance, regulatory measures, cultivation practices, physical methods. Modern chemo-therapy: characteristics, mode of action and application of fungicides, bactericides and nematicides. Principles of integrated disease management.

## Principles of veld management 310 (WDE 310)

**Module credits** 12.00

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week, fortnightly practicals



**Language of tuition** Afrikaans and English are used in one class

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

### Module content

The influence of biotic and abiotic factors on the productivity of different strata and components of natural pastures. This will enable the student to advise users, with the necessary motivation, on the appropriate use of these strata and components and will form a basis for further research on this system. The principles of veld management and the influence of management practices on sustainable animal production from natural pastures. This will enable the student to advise users on veld management and veld management principles. It will also form a basis for further research on veld management.

## Planted pastures and fodder crops 320 (WDE 320)

**Module credits** 12.00

**Prerequisites** WDE 310

**Contact time** 2 lectures per week, fortnightly practicals

**Language of tuition** Afrikaans and English are used in one class

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 2

### Module content

The establishment and use of planted pastures species and fodder crops and the conservation of fodder. This will enable students to advise users on establishment and utilization of planted pastures species as well as farmers on the production, conservation and optimum use of fodder. This will also form a basis for further research on planted pastures.

## Applied entomology 365 (ZEN 365)

**Module credits** 18.00

**Service modules** Faculty of Education

**Prerequisites** No prerequisites.

**Contact time** 4 lectures per week, 2 practicals per week

**Language of tuition** Module is presented in English

**Department** Zoology and Entomology

**Period of presentation** Quarter 4

## Module content

\*It is strongly recommended that students first complete ZEN 355: Insect diversity 355

Impact of insects on economies, human health and well-being. Protection of crops from insect herbivores through monitoring, forecasting and application of the principles of integrated pest management; epidemiology and modern developments in the control of insect vectors of human and animal diseases; insects as a tool in forensic investigations; ecological and economic significance of insect pollinators and current threats to their survival and health. Lecturers will be complemented by practical experiences that provide students with skills in the design, conduct, analysis, interpretation and reporting of applied entomological research.

## Curriculum: Final year

**Minimum credits: 150**

**Minimum credits: 150**

Core = 150

### Core modules

#### Vegetable crops 410 (AGR 410)

**Module credits** 15.00

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week, fortnightly practicals

**Language of tuition** Separate classes for Afrikaans and English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

##### Module content

Integration of agronomic, pedological, botanical, economic and management considerations in crop production systems with a view to sustainable maximum economic yield. Case studies of specific crops.

#### Crop physiology 461 (APS 461)

**Module credits** 15.00

**Prerequisites** GKD 250 and BOT 356

**Contact time** fortnightly practicals, 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 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.

#### Soil fertility, soil microbiology and plant nutrition 420 (GKD 420)

**Module credits** 15.00

**Prerequisites** GKD 250 GS



<b>Contact time</b>	3 lectures per week, 1 practical per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

#### Module content

Soil ultimately controls nutrient supply to plants and organisms. The health and resilience of biota are therefore closely linked to the interaction between the pedosphere and the biosphere. This course deals with the availability and uptake of macro and micro nutrients in the plant - microbial- soil system, nutrient deficiencies and toxicities, as well as soil properties and soil environmental conditions that influence soil fertility and its suitability to act as a growth medium. Practical work includes the laboratory evaluation of soil fertility and greenhouse pot trials to investigate nutrient uptake as well as deficiencies and toxicities symptoms in plants.

### Fruit tree crops 420 (HSC 420)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	GKD 250 and PGW 350
<b>Contact time</b>	4 lectures 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 2

#### Module content

Crop modelling, climate zones, climate requirements, cultivation regions, economic importance, anatomy and morphology, phenological modelling. Commercially important scions, rootstocks and their interactions. Crop management including fertilization, irrigation, pest and disease complex, tree and fruit manipulation, physiological disorders of economically important tropical, subtropical and temperate fruit crops produced in Southern Africa.

### Ornamental horticulture 490 (HSC 490)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	fortnightly practicals, 2 lectures per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1



### Module content

Economic importance of cut flowers, ornamentals and turfgrass. Taxonomy and plant description. Climatic requirements and production practices including establishing, growth manipulation, nutritional requirements, irrigation, pest and disease control, harvest and post-harvest handling. Identification of ornamental plants for commercial and landscape use. Climatic, reproduction and maintenance requirements for trees, palms, cycads, shrubs, flowering plants, ground covers, turfgrass, climbers and indoor plants. Functional and aesthetic value of plants in a landscape or indoors. Excursions to nurseries and practical experience on the experimental farm is compulsory for all participants in this module.

### Environmental biophysics 450 (LKM 450)

**Module credits** 15.00

**Prerequisites** WTW 134

**Contact time** 2 lectures per week, fortnightly practicals

**Language of tuition** Separate classes for Afrikaans and English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 1

### Module content

Environmental variables. Quantitative description and measurement of atmospheric environmental variables and water in organisms. Mass and energy fluxes. Quantitative description of energy fluxes in organisms' environments. Energy balances of animals and plant communities will be derived.

### Weed science 413 (OKW 413)

**Module credits** 15.00

**Prerequisites** PLG 251

**Contact time** fortnightly practicals, 2 lectures per week

**Language of tuition** Separate classes for Afrikaans and English

**Department** Department of Plant and Soil Sciences

**Period of presentation** Semester 2

### Module content

Identification of important weeds of crops, gardens and recreational areas. Identification of alien invasive and indigenous encroaching species. Impacts of weeds on desirable vegetation. Interference between crop and weed species through allelopathy and competition phenomena. Role of weeds in plant-biodiversity and crop production potential. Weeds in annual and perennial crop situations. Weed biology and ecology. Mechanical, cultural, biological and chemical weed management practices. Integrated weed management. Herbicide formulations and application techniques. Modes of action of herbicides, and their behaviour and fate in the environment.

### Seminar 400 (PGW 400)

**Module credits** 15.00



<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 lecture per week, 3 seminars per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Year

#### Module content

Basic principles of the scientific process. Literature accessing and article assessment. Manuscript preparation and presentation of seminars. Basic instruction on the use of visual aids, etc. for effective oral presentations.

### Experimental design and analysis 421 (PGW 421)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	BME 120
<b>Contact time</b>	2 lectures per week, fortnightly practicals
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

#### Module content

Basic experimental designs. Measurement and control over experimental error. Factorial experiments and interactions. Analysis of variance (ANOVA) and data interpretation.

### Advanced pasture science 450 (WDE 450)

<b>Module credits</b>	15.00
<b>Prerequisites</b>	WDE 320
<b>Contact time</b>	2 lectures per week, 3 practicals per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Department</b>	Department of Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

## Module content

The production potential and quality of pastures as influenced by botanical composition, vegetation cover, livestock grazing and browsing potential, soil chemical, physical and biological conditions in addition to other important environmental processes are addressed. Pasture selection for different purposes and the importance of pasture management requirements within a planned livestock fodder flow system are taught. Monitoring pastures (both natural and cultivated) in different biomes of Southern Africa, through different assessment techniques to understand the health, production potential and quality thereof is explained. The different utilisation methods of pastures, as influenced by the livestock factor and their effects on the pastures regrowth potential, in addition to soil quality aspects are important principles that determine the value of pastures. The evaluation of grasses and other vegetation types in terms of adaptation, acceptability and adaptability to environmental and management conditions are important to an integrated and adaptive pasture and livestock production system.

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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.