

University of Pretoria Yearbook 2023

BScAgric (Plant Pathology) (02133424)

Department Plant Science

Minimum duration of study 4 years

Total credits 570

NQF level 08

Admission requirements

Important information for all prospective students for 2023

The admission requirements below apply to all who apply for admission to the University of Pretoria with a **National Senior Certificate (NSC) and Independent Examination Board (IEB) qualifications**. [Click here](#) for this Faculty Brochure.

Minimum requirements

Achievement level

English Home Language or English First Additional Language	Mathematics	Physical Sciences	APS
NSC/IEB	NSC/IEB	NSC/IEB	
5	5	5	32

Life Orientation is excluded when calculating the APS.

You will be considered for final admission to degree studies if space allows, and if you have a National Senior Certificate (NSC) or equivalent qualification with admission to bachelor's degree studies, and comply with the minimum subject requirements as well as the APS requirements of your chosen programme.

Applicants with qualifications other than the abovementioned should refer to the Brochure:

Undergraduate Programme Information 2023: Qualifications other than the NSC and IEB, available at [click here](#).

International students: [Click here](#).

Transferring students

A transferring student is a student who, at the time of applying at the University of Pretoria (UP) is/was a registered student at another tertiary institution. A transferring student will be considered for admission based on NSC or equivalent qualification and previous academic performance. Students who have been dismissed from other institutions due to poor academic performance will not be considered for admission to UP.

Closing dates: Same as above.

Returning students

A returning student is a student who, at the time of application for a degree programme is/was a registered student at UP, and wants to transfer to another degree at UP. A returning student will be considered for admission based on NSC or equivalent qualification and previous academic performance.

Note:

- Students who have been excluded/dismissed from a faculty due to poor academic performance may be

considered for admission to another programme at UP, as per faculty-specific requirements.

- Only ONE transfer between UP faculties and TWO transfers within a faculty will be allowed.
- Admission of returning students will always depend on the faculty concerned and the availability of space in the programmes for which they apply.

Closing date for applications from returning students

Unless capacity allows for an extension of the closing date, applications from returning students must be submitted before the end of August via your UP Student Centre.

Candidates who do not comply with the minimum admission requirements for BScAgric (Plant Pathology), may be considered for admission to the BSc – Extended programme – Biological and Agricultural Sciences, which requires an additional year of study. Students who are placed in the BSc – Extended programme – Biological and Agricultural Sciences will take a minimum of five years to complete the BScAgric (Plant Pathology) programme.

BSc – Extended Programme – Biological and Agricultural Sciences

Minimum requirements

Achievement level

English Home Language or English First Additional Language	Mathematics	Physical Sciences	APS
NSC/IEB	NSC/IEB	NSC/IEB	
4	4	4	26

Note:

*The BSc – Extended programmes are not available for students who meet all the requirements for the corresponding mainstream programme.

*Please note that only students who apply in their final NSC or equivalent qualification year will be considered for admission into any of the BSc – Extended programmes. Students who are upgrading or taking a gap year will not be considered.

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.

1.1 Requirements for specific modules

A candidate who:

- does not qualify for STK 110, must enrol for STK 113 and STK 123;
- registers for Mathematical Statistics (WST) and Statistics (STK) modules must take note that WST and STK modules, except for STK 281, may not be taken simultaneously in a programme; a student must take one and only one of the following options:
 - WST 111, WST 121, WST 212, WST 211, WST 221, WST 311, WST 312, WST 322, WST 321, and STK 353
 - or
 - WST 111, WST 121, WST 212, WST 211, WST 221, WST 311, WST 312, WST 322, STK 320, STK 353.
 - or

- STK 110, STC 122, STK 210, STK 220, WST 212, STK 310, STK 320, STK 353.

c. registers for a module presented by another faculty must take note of the timetable clashes, prerequisites for that module, subminimum required in examination papers, supplementary examinations, etc.

1.2 Fundamental modules

- a. It is compulsory for all new first-year students to satisfactorily complete the Academic orientation (UPO 102) and to take Academic information management modules (AIM 111 and AIM 121) and Language and study skills (LST 110). Please see curricula for details.
- b. Students who intend to apply for admission to MBChB or BChD in the second semester, when places become available in those programmes, may be permitted to register for up to 80 module credits and 4 core modules in the first semester during the first year provided that they obtained a final mark of no less than 70% for Grade 12 Mathematics and achieved an APS of 34 or more in the NSC.

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.

Progression to the final year of study

Only students who have completed all modules prescribed for the first, second and third year of study will be admitted to the final year of study.

Special examination

1. A student requiring no more than the equivalent of 36 credits in total across the first, second and third year of their BScAgric degree programme, may be admitted to a special examination.
2. If, subject to faculty regulations, there is an indication at the end of an academic year that a student qualifies for a special examination in no more than the equivalent of 36 credits, and that such student can complete his or her third study year if he or she is successful, the faculty may require such student to write a special examination or examinations. If the student declines the offer, this may be taken into consideration with regard to further residence accommodation and financial support by the University.
3. A student only qualifies for a special examination if he or she sat for the prescribed examination in the preceding year of study.
4. In the case of a student who passes the module on the basis of the special examination, the result of the special examination does not replace the failed mark of such a module on a student's academic record and it is recorded as an additional mark.
5. In order to continue with the next (final) year of study, the results of the special examination must be submitted to the relevant faculty's head of student administration. It must be noted that a special examination is a once-off opportunity.

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: Year 1

Minimum credits: 142

Fundamental = 14

Core modules = 128

Fundamental modules

Academic information management 111 (AIM 111)

Module credits	4.00
NQF Level	05
Service modules	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
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology.

Academic information management 121 (AIM 121)

Module credits	4.00
NQF Level	05
Service modules	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
Prerequisites	No prerequisites.
Contact time	2 lectures per week

Language of tuition Module is presented in English

Department Informatics

Period of presentation Semester 2

Module content

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)

Module credits 6.00

NQF Level 05

Service modules Faculty of Natural and Agricultural Sciences
Faculty of Veterinary Science

Prerequisites No prerequisites.

Contact time 2 lectures per week

Language of tuition Module is presented in English

Department Unit for Academic Literacy

Period of presentation 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)

Module credits 0.00

NQF Level 00

Language of tuition Module is presented in English

Department Natural and Agricultural Sciences Deans Office

Period of presentation Year

Core modules

Biometry 120 (BME 120)

Module credits 16.00

NQF Level 05

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Natural and Agricultural Sciences
Faculty of Veterinary Science

Prerequisites At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123

Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	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.

Plants and society 161 (BOT 161)

Module credits	8.00
NQF Level	05
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

Botanical principles of structure and function; diversity of plants; introductory plant systematics and evolution; role of plants in agriculture and food security; principles and applications of plant biotechnology; economical and valuable medicinal products derived from plants; basic principles of plant ecology and their application in conservation and biodiversity management.

This content aligns with the United Nation's Sustainable Development Goals of No Poverty, Good Health and Well-being, Climate Action, Responsible Consumption and Production, and Life on Land.

General chemistry 117 (CMY 117)

Module credits	16.00
NQF Level	05
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.
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Contact time	1 practical per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemistry
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Period of presentation	Semester 1
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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
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NQF Level	05
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
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Prerequisites	Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none
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Contact time	1 practical per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemistry
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Period of presentation	Semester 2
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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
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NQF Level	05
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Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Education
Faculty of Veterinary Science

Prerequisites MLB 111 GS

Contact time 2 lectures per week, fortnightly tutorials

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

Period of presentation 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

NQF Level 05

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites No prerequisites.

Contact time 2 lectures per week, fortnightly tutorials

Language of tuition 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

NQF Level 05

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
NQF Level	05
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

Note: PHY 131 is aimed at students who will not continue with physics. PHY 131 cannot be used as a substitute for PHY 114.

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, radioactivity.

Mathematics 134 (WTW 134)

Module credits	16.00
NQF Level	05
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 1 tutorial per week, 4 lectures 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

NQF Level 05

Service modules Faculty of Education
Faculty of Veterinary Science

Prerequisites No prerequisites.

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 organisation 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 in various animal phyla. In-class discussion will address the sustainable development goals #3, 12, 13, 14 and 15 (Good Health and Well-being. Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land).

Curriculum: Year 2

Minimum credits: 147

Core modules

Introduction to proteins and enzymes 251 (BCM 251)

Module credits	12.00
NQF Level	06
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. Online activities include 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.

Plant physiology and biotechnology 261 (BOT 261)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Education
Prerequisites	BOT 161 and CMY 127 GS.
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

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 abiotic stress tolerant and disease resistant plants. Practicals: Basic laboratory skills in plant physiology; techniques used to investigate nitrogen metabolism, carbohydrate metabolism, pigment analysis, water transport in plant tissue and response of plants to hormone treatments.

Introductory soil science 250 (GKD 250)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	CMY 117 GS
Contact time	1 practical per week, 3 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

Soil is a finite resource and with the global challenges we are facing, it is more important than ever to understand and sustainably manage soil. Our daily lives are impacted by soil in several ways, including the food we eat, the water we drink, and the environment we live in. In this Introductory Soils module, we will look at how basic and more advanced abiotic and biotic soil properties impact us and the larger environment. We will also examine the fundamental principles behind sustainable soil use management.

Molecular genetics 251 (GTS 251)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 161 GS
Contact time	2 lectures per week, fortnightly tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	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
NQF Level	06
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 251 GS
Contact time	2 lectures per week, fortnightly tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	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	14.00
NQF Level	06
Service modules	Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	1 practical/tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Agricultural Economics Extension and Rural Develo
Period of presentation	Semester 1

Module content

Introduction to the world of agricultural economics: where to find practising agricultural economics services, overview of South African Agricultural Economy, scope of agricultural economics. Introduction to consumption and demand: utility theory, indifference curves, the budget constraint, consumer equilibrium, the law of demand, consumer surplus, tastes and preferences, and measurement and interpretation of elasticities. Introduction to production and supply: condition for perfect competition, classification of inputs, important production relationships, assessing short-run business costs, economics of short-run decisions. Isoquants, iso-cost line, least cost combination of inputs, long-run expansion of inputs, and economics of business expansion, production possibility frontier, iso-revenue line and profit maximising combination of products. Introduction to market equilibrium and product prices: market equilibrium in a perfectly competitive market, total economic surplus, changes in welfare, adjustments to market equilibrium, market structure characteristics, market equilibrium in a imperfectly competitive market, government regulatory measures. 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. Elements of business plan, marketing planning and price risk. Financial structuring and sources of finance for farm business. Time value of money.

Agricultural economics 220 (LEK 220)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Agricultural Economics Extension and Rural Develo
Period of presentation	Semester 2

Module content

The agribusiness system; the agricultural value chain, the unique characteristics of agricultural products; marketing functions and costs; historical evolution of agricultural marketing in South Africa. The marketing environment. Consumer behaviour and consumer trends. Introduction to supply and demand analysis. Developing a marketing plan and strategies for agricultural commodities; market analysis; product management; distribution channels for agricultural commodities, the agricultural supply chain. Introduction to the agricultural futures market. Marketing in the 21st century. Online marketing, social media. Market structure.

Bacteriology 251 (MBY 251)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MBY 161 GS
Contact time	2 lectures per week, fortnightly practicals

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

Period of presentation Semester 1

Module content

Growth, replication and survival of bacteria, Energy sources, harvesting from light versus oxidation, regulation of catabolic pathways, chemotaxis. Nitrogen metabolism, iron-scavenging. Alternative electron acceptors: denitrification, sulphate reduction, methanogenesis. Bacterial evolution, systematic and genomics. Biodiversity; bacteria occurring in the natural environment (soil, water and air), associated with humans, animals, plants, and those of importance in foods and in the water industry.

Mycology 261 (MBY 261)

Module credits 12.00

NQF Level 06

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites MBY 161 GS

Contact time 2 lectures per week, Fortnightly practicals/tutorials

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

Period of presentation Semester 2

Module content

Organisation and molecular architecture of fungal thalli, chemistry of the fungal cell. Chemical and physiological requirements for growth and nutrient acquisition. Mating and meiosis; spore development; spore dormancy, dispersal and germination. Fungi as saprobes in soil, air, plant, aquatic and marine ecosystems; role of fungi as decomposers and in the deterioration of materials; fungi as predators and parasites; mycoses, mycetisms and mycotoxicoeses; fungi as symbionts of plants, insects and animals. Applications of fungi in biotechnology.

Introduction to crop protection 251 (PLG 251)

Module credits 12.00

NQF Level 06

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, globally as well as in African context. Life cycles of typical disease causing organisms. Basic principles of integrated pest and disease management. The importance of crop protection in the context of sustainable development will be highlighted.

Principles of plant pathology 262 (PLG 262)

Module credits 12.00

NQF Level 06

Prerequisites MBY 161 GS

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

Fundamental principles of plant pathology. The concept of disease in plants. Causes of plant diseases. Stages in development of plant diseases. Disease cycles and selected examples relevant to Africa. Diagnosis of plant diseases and the sustainable development goals that articulate with plant pathology.

Sustainable crop production and agroclimatology 251 (PPK 251)

Module credits 15.00

NQF Level 06

Prerequisites BOT 161

Contact time 3 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

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: 136

Core modules

Field crops 361 (AGR 361)

Module credits	14.00
NQF Level	07
Prerequisites	PPK 251
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

Botanical characteristics, classification, growth requirements, production practices and utilization of crops rich in starch, oil, sugar and protein, fibre crops, narcotic and medicinal plants. The use of conservation agriculture (CA) in field crop production is becoming ever increasingly important, especially since it is directly related to Sustainable Development Goals (SDGs) 2 (food), 6 (water), 7 (energy) 13 (climate) and 15 (soil). During the semester applicable AC and SDG examples will be highlighted. Practical will consist out of a trial on the experimental farm and visits to research institutions and producers.

Plant ecophysiology 356 (BOT 356)

Module credits	18.00
NQF Level	07
Service modules	Faculty of Education
Prerequisites	BOT 161
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

Introduction to plant ecophysiology and plants response to environmental stress. Understanding how various biotic and abiotic factors affect plant metabolic processes, including photosynthesis and respiration. Emphasis is placed on the efficiency of the mechanisms whereby C3-, C4 and CAM-plants bind CO₂ and how they are impacted by the environment. To understand the functioning of plants in diverse environments, the relevant structural properties of plants, the impact of soil composition, water flow in the soil-plant air continuum and long distance transport of assimilates will be discussed. Students will research a topic relevant to plant ecophysiology and present this in the form of an oral presentation. Students will conduct a practical project to study the effects of environmental factors on C3 and C4 plant growth and physiology. Students will present the report in a written format according to the guidelines of a relevant scientific journal. Relevant readings will be used to highlight the alignment of the module with the Sustainable Development Goals, with emphasis placed on climate action.

Plant genetics and crop biotechnology 361 (BTC 361)

Module credits	18.00
NQF Level	07
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GTS 251 and {GTS 261 GS or BOT 261}
Contact time	1 practical/tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

Plant genetics and genomics: gene control in plants, epigenetics, co-suppression, forward and reverse genetics, structural and functional genomics. Plant development: flowering, genetics imprinting. Plant-environment interactions. Crop genetic modification: food security, GMO regulation, plant transformation, whole-chromosome transformation, synthetic biology, homologous recombination. Crop molecular markers: marker types, genotyping, QTL mapping, marker-assisted breeding. Future of crop biotechnology: applications of genomics, biopharming, genetical genomics, systems biology

Principles and practices 351 (HSC 351)

Module credits	14.00
NQF Level	07
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 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.

Virology 351 (MBY 351)

Module credits 18.00

NQF Level 07

Prerequisites MBY 251 GS

Contact time 1 practical/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

Introduction to the viruses as a unique kingdom inclusive of their different hosts, especially bacteria, animals and plants; RNA and DNA viruses; viroids, tumour viruses and oncogenes, mechanisms of replication, transcription and protein synthesis; effect on hosts; viral immunology; evolution of viruses.

Genetic manipulation of microbes 364 (MBY 364)

Module credits 18.00

NQF Level 07

Prerequisites MBY 251 and GTS 251

Contact time 1 practical per week, 2 lectures per week

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

Period of presentation Semester 2

Module content

Isolation of clonable DNA (genomic libraries, cDNA synthesis) cloning vectors (plasmids, bacteriophages, cosmids) plasmid incompatibility and control of copy number. Ligation of DNA fragments, modification of DNA end and different ligation strategies. Direct and indirect methods for the identification of recombinant organisms. Characterization (polymerase chain reaction, nucleic acid sequencing) and mutagenesis of cloned DNA fragments. Gene expression in Gram negative (E.coli) Gram positive (B.subtilis) and yeast cells (S.cerevisiae). Use of Agrobacterium and baculoviruses for gene expression in plant and insect cells respectively. Applications in protein engineering, diagnostics and synthesis of useful products.

General plant pathology 351 (PLG 351)

Module credits	18.00
NQF Level	07
Prerequisites	MBY 161 and PLG 262
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

Principles and examples of plant diseases and their socio-economic importance particularly in the context of Africa and South Africa. Pathogens causing disease of seeds, seedlings, foliage, roots, stems, grains and fruit. Diagnosis, symptom expression and selected disease cycle examples caused by fungi, bacteria, viruses and nematodes.

Plant disease control 363 (PLG 363)

Module credits	18.00
NQF Level	07
Prerequisites	PLG 251 or PLG 262.
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 and how it resonates with the sustainable development goals. Non-chemical control including biological control, disease resistance, regulatory measures, cultivation practices, physical methods. Modern chemo-therapy: characteristics, mode of action and application of bioproducts, fungicides, bactericides and nematicides. Principles of integrated disease management. The module will also cover applicable South African legislation, the local crop protection industries and the procedure of registering new chemicals.

Curriculum: Final year

Minimum credits: 145

Additional Information

Only students who have completed all modules prescribed for the first, second and third year of study will be admitted to the final year of study.

Core modules

Statistics for biological sciences 410 (BME 410)

Module credits	15.00
NQF Level	08
Prerequisites	Final year students only.
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.

Weed science 413 (OKW 413)

Module credits	15.00
NQF Level	08
Prerequisites	PLG 251. Final year students only.
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

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
NQF Level	08
Prerequisites	Final year students only.
Contact time	1 lecture per week, 3 seminars per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	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.

Research project 462 (PLG 462)

Module credits	28.00
NQF Level	08
Prerequisites	Final year students only.
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	Year

Module content

A practical research project of limited extent under the supervision of one of the lecturers within the department. Any topic in plant pathology can be selected that reflect a current plant disease in South Africa.

Plant disease epidemiology 463 (PLG 463)

Module credits	18.00
NQF Level	08
Prerequisites	PLG 251 or PLG 262 and PLG 363. Final year students only.
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 how of 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 and modelling for quantifying and comparing epidemics. Classical case studies from South African disease epidemiological models will be discussed i.e. citrus black spot. Impact of climate change on plant disease development and how this relates to achieving the sustainable development goal #13 Take urgent action to combat climate change and its impact. In-depth discussions on plant-pathogen interactions and plant defence mechanisms.

Advanced plant disease control 483 (PLG 483)

Module credits	18.00
NQF Level	08
Prerequisites	PLG 251 or PLG 262 and PLG 363. Final year students only.
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. The importance of plant disease control in the context of sustainable development will be emphasised.

Current concepts in plant pathology 490 (PLG 490)

Module credits	18.00
NQF Level	08
Prerequisites	PLG 351. Final year students only.
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 with a focus on diseases that is unique in the African context and the unpacking of the sustainable development goals in plant pathology.

Applied entomology 365 (ZEN 365)

Module credits	18.00
NQF Level	07
Service modules	Faculty of Education

Prerequisites	No prerequisites.
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Quarter 4

Module content

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. Lectures will be complemented by practical experiences that provide students with skills in the design, analysis, interpretation and reporting of applied entomological research. Examples used in this module are directly relevant to the sustainable development goals of Life on Land, No Poverty, Zero Hunger and Good Health and Well-being.

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.

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.