

University of Pretoria Yearbook 2022

BScAgric (Applied Plant and Soil Sciences) (02133431)

Department Plant Science

Minimum duration of study 4 years

Total credits 575

NQF level 08

Admission requirements

Important information for all prospective students for 2022

- The admission requirements apply to students who apply for admission to the University of Pretoria with a **National Senior Certificate (NSC) and Independent Examination Board (IEB) qualifications**.
- **Applicants with qualifications other than the abovementioned** should refer to:
 - **Brochure:** Undergraduate Programme Information 2022: Qualifications other than the NSC and IEB, available at [click here](#).
- **Citizens from countries other than South Africa (applicants who are not South African citizens)** should also refer to:
 - **Brochure:** Newcomer's Guide 2021, available at [click here](#).
 - **Website:** [click here](#).
- **School of Tomorrow (SOT), Accelerated Christian Education (ACE) and General Education Development Test (GED):** The University of Pretoria no longer accepts qualifications awarded by these institutions.
- **National Certificate (Vocational) (NCV) Level 4:** The University of Pretoria may consider NCV candidates, provided they meet the exemption for bachelor's status criteria and the programme requirements.

Transferring students

A transferring student is a student who, at the time of application for a degree programme at the University of Pretoria (UP) –

- is a registered student at another tertiary institution, **or** was previously registered at another tertiary institution and did not complete the programme enrolled for at that institution, and is not currently enrolled at a tertiary institution, **or** has completed studies at another tertiary institution, but is not currently enrolled at a tertiary institution, **or** has started with tertiary studies at UP, then moved to another tertiary institution and wants to be readmitted at UP.

A transferring student will be considered for admission based on

- an NSC or equivalent qualification with exemption to bachelor's or diploma studies (whichever is applicable); **and** meeting the minimum faculty-specific subject requirements at NSC or tertiary level; **or** having completed a higher certificate at a tertiary institution with faculty-specific subjects/modules passed (equal to or more than

50%), as well as complying with faculty rules on admission;

- previous academic performance (must have passed all modules registered for up to the closing date of application) or as per faculty regulation/promotion requirements;
- a certificate of good conduct.

Note: Students who have been dismissed at the previous institution due to poor academic performance, will not be considered for admission to UP.

Returning students

A returning student is a student who, at the time of application for a degree programme –

- is a registered student at UP, and wants to transfer to another degree at UP, **or** was previously registered at UP and did not complete the programme enrolled for, and did not enrol at another tertiary institution in the meantime (including students who applied for leave of absence), **or** has completed studies at UP, but is not currently enrolled or was not enrolled at another tertiary institution after graduation.

A returning student will be considered for admission based on

- an NSC or equivalent qualification with exemption to bachelor's or diploma studies (whichever is applicable); **and** meeting the minimum faculty-specific subject requirements at NSC or tertiary level; **or** previous academic performance (should have a cumulative weighted average of at least 50% for the programme enrolled for);
- having applied for and was granted leave of absence.

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. The Admissions Committee may consider such students if they were not dismissed more than twice. Only ONE transfer between UP faculties will be allowed, and a maximum of two (2) transfers within a faculty.

Important faculty-specific information on undergraduate programmes for 2022

- The closing date is an administrative admission guideline for non-selection programmes. Once a non-selection programme is full and has reached the institutional targets, then that programme will be closed for further admissions, irrespective of the closing date. However, if the institutional targets have not been met by the closing date, then that programme will remain open for admissions until the institutional targets are met.
- The following persons will be considered for admission: Candidates who have a certificate that is deemed by the University to be equivalent to the required National Senior Certificate (NSC) with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution, and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the Admission Point Score (APS).
- Grade 11 results are used for the conditional admission of prospective students. Final admission is based on the final NSC/IEB results.

University of Pretoria website: [click here](#)

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

NSC/IEB

5

Mathematics

NSC/IEB

5

Physical Sciences

NSC/IEB

5

APS

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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 – 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 (Applied Plant and Soil Sciences) programme.

BSc – Extended Programme – Biological and Agricultural Sciences

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

NSC/IEB

4

Mathematics

NSC/IEB

4

Physical Sciences

NSC/IEB

4

APS

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.

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, STK320, STK353.
or
 - STK 110, STK 122, STK 210, STK 220, WST 212, STK 310, STK 320, STK 353.
- 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.

Curriculum: Year 1

Minimum credits: 142

Fundamental = 14

Core = 128

Additional information:

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

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
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Prerequisites	At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123
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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	Statistics
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Period of presentation	Semester 2
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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
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NQF Level	05
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
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Prerequisites	MLB 111 GS
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Contact time	2 lectures per week, fortnightly practicals
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Language of tuition	Module is presented in English
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Department	Department of Plant and Soil Sciences
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Period of presentation	Semester 2
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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
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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.
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
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	Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	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
NQF Level	05
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

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
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: 135

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.

South African flora and vegetation 251 (BOT 251)

Module credits	12.00
NQF Level	06
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

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)

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

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)

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.

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: 148

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.

Soil chemistry 320 (GKD 320)

Module credits 14.00

NQF Level 07

Prerequisites GKD 250

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

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)

Module credits 14.00

NQF Level 07

Prerequisites GKD 250 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 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)

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.

Soil-water relationship and irrigation 350 (PGW 350)

Module credits	14.00
NQF Level	07
Prerequisites	GKD 250
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

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
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.

Principles of veld management 310 (WDE 310)

Module credits	12.00
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 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 s 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
NQF Level	07
Prerequisites	WDE 310 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

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

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.

Curriculum: Final year

Minimum credits: 150

Core modules

Vegetable crops 410 (AGR 410)

Module credits	15.00
NQF Level	08
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

Integration of agronomic, pedological, botanical, economic and management considerations in crop production systems with a view to sustainable maximum economic yield. The importance of vegetables in Sustainable Development Goals 1 (poverty), 2 (food), 3 (health), 4 (education), and 12 (reduced wastage) will be highlighted in case studies of specific vegetable crops. Practical will consist out of a trial on the experimental farm and a visit to the Tshwane fresh produce market.

Crop physiology 461 (APS 461)

Module credits	15.00
NQF Level	08
Prerequisites	GKD 250 and BOT 356
Contact time	2 lectures per week, fortnightly practicals
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

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

Statistics for biological sciences 410 (BME 410)

Module credits	15.00
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NQF Level	08
Prerequisites	No prerequisites.
Contact time	2 Block weeks
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

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

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

Module credits	15.00
NQF Level	08
Prerequisites	GKD 250 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 2

Module content

Soil ultimately controls nutrient supply to plants and organisms. The health and resilience of biota are therefore closely link 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)

Module credits	15.00
NQF Level	08
Prerequisites	GKD 250
Contact time	1 practical per week, 4 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

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. The important role fruit production can play in achieving the Sustainable Development Goals will be highlighted, with emphasis placed on the sustainable use of resources.

Ornamental horticulture 490 (HSC 490)

Module credits 15.00

NQF Level 08

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

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

NQF Level 08

Prerequisites WTW 134

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

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
NQF Level	08
Prerequisites	PLG 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

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	No prerequisites.
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.

Advanced pasture science 450 (WDE 450)

Module credits	15.00
NQF Level	08
Prerequisites	WDE 320
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

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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