University of Pretoria Yearbook 2022

BScAgric (Animal Science) (02133411)

Department	Animal Science
Minimum duration of study	4 years
Total credits	562
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**	**Mathematics**	**Physical Sciences**	**APS**
NSC/IEB	NSC/IEB	NSC/IEB	
5	5	5	**32**

Candidates who do not comply with the minimum admission requirements for BScAgric (Animal Science), 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 (Animal Science) 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.

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:

a. does not qualify for STK 110, must enrol for STK 113 and STK 123;
b. egisters 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, 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.

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

Curriculum: Year 1

Minimum credits: 142

Fundamental = 14
Core modules = 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
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 Debelopment 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.
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: 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.

Carbohydrate metabolism 252 (BCM 252)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Education Faculty of Health Sciences
Prerequisites	BCM 251 GS and BCM 257 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 2

Module content

Carbohydrate structure and function. Blood glucose measurement in the diagnosis and treatment of diabetes. Bioenergetics and biochemical reaction types. Glycolysis, gluconeogenesis, glycogen metabolism, pentose phosphate pathway, citric acid cycle and electron transport. Total ATP yield from the complete oxidation of glucose. A comparison of cellular respiration and photosynthesis. Online activities include techniques for the study and analysis of metabolic pathways and enzymes; PO ratio of mitochondria, electrophoresis, extraction, solubility and gel permeation techniques; scientific method and design.

Introductory biochemistry 257 (BCM 257)

Module credits	12.00
NQF Level	06
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

Chemical foundations. Weak interactions in aqueous systems. Ionisation of water, weak acids and weak bases. Buffering against pH changes in biological systems. Water as a reactant and function of water. Carbohydrate structure and function. Biochemistry of lipids and membrane structure. Nucleotides and nucleic acids. Other functions of nucleotides: energy carriers, components of enzyme cofactors and chemical messengers. Introduction to metabolism. Bioenergetics and biochemical reaction types. Online activities include introduction to laboratory safety and Good Laboratory Practice; basic biochemical calculations; experimental method design and scientific controls, processing and presentation of scientific data.

Lipid and nitrogen metabolism 261 (BCM 261)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Health Sciences
Prerequisites	BCM 251 GS and BCM 257 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 2

Module content

Biochemistry of lipids, membrane structure, anabolism and catabolism of lipids. Total ATP yield from the complete catabolism of lipids. Electron transport chain and energy production through oxidative phosphorylation. Nitrogen metabolism, amino acid biosynthesis and catabolism. Biosynthesis of neurotransmitters, pigments, hormones and nucleotides from amino acids. Catabolism of purines and pyrimidines. Therapeutic agents directed against nucleotide metabolism. Examples of inborn errors of metabolism of nitrogen containing compounds. The urea cycle, nitrogen excretion. Online activities include training in scientific reading skills; evaluation of a scientific report; techniques for separation analysis and visualisation of biological molecules; hypothesis design and testing, method design and scientific controls.

Animal anatomy and physiology 200 (DAF 200)

Module credits	32.00
NQF Level	06
Prerequisites	CMY 127 GS
Contact time	1 practical every 2nd week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Year

Module content

The body cavities, the origin of trunk wall and the principle arrangement of other anatomical structures as explained by the basic embryological development of mammals. Introduction to anatomy and anatomical terminology. Introduction to basic histology of cells, epithelial tissue and connective tissue. Basic anatomy of tissues, organs, systems and joints. Anatomy of the musculo-skeletal system integrated, the histology of connective tissue and muscles. The anatomy and histology of the integument and skin structures, the cardiovascular, respiratory, immune, endocrine, urogenital and digestive systems all of which serves as basis for the physiology component of the module. General species differences of the anatomy and histology where applicable.

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.

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.

Animal science 250 (VKU 250)

Module credits	8.00
NQF Level	06
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 1

Module content

A brief perspective on the South African livestock industry with reference to the role of Sustainable development goals (SDGs) in a Southern African context. South African biomes in which animal production is practised. Animal ecological factors that influence regional classification. Introduction to adaptation physiology with reference to origin and domestication of farm and companion animals. Livestock species, breed development and breed characterisation. Basic principles of animal breeding and genetics, animal nutrition. Practical work includes identification and classification of different breeds of livestock.

Animal science 260 (VKU 260)

Module credits	8.00
NQF Level	06
Prerequisites	VKU 250 GS
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

Introduction to the concepts of animal production systems in South African production environments. Principles and requirements for extensive, semi-intensive and intensive livestock production with reference to large- and small stock, poultry and pigs. Principles of communal farming systems in Southern Africa. Game management systems with reference to conservation and game farming. The role of the human in livestock production systems and sustainable production.

Curriculum: Year 3

Minimum credits: 140

Core modules

Biometry 210 (BME 210)

Module credits	24.00
NQF Level	06
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	BME 120
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

Analysis of variance: Multi-way classification. Testing of model assumptions, graphics. Multiple comparisons. Fixed, stochastic and mixed effect models. Block experiments. Estimation of effects. Experimental design: Principles of experimental design. Factorial experiments: Confounding, single degree of freedom approach, hierarchical classification. Balanced and unbalanced designs. Split-plot designs. Analysis of covariance. Computer literacy: Writing and interpretation of computer programmes. Report writing.

Animal physiology 311 (DFS 311)

Module credits	10.00
NQF Level	07
Prerequisites	DAF 200 GS
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 1

Module content

Homeostasis and Homeorhesis in animals: Thermoregulation. Adaptation of glucose, lipid and protein metabolism in response to short and long-term changes in the supply and balance of nutrients and to changes in tissue demand for nutrients during different physiological states. Deviations from normal homeostasis, metabolic diseases and the prevention thereof. Pathogenesis of inflammation and infections; immunity.

Growth physiology 320 (DFS 320)

Module credits	12.00
NQF Level	07

Prerequisites	DFS 311 GS
Contact time	1 practical every 2nd week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

Functional anatomy, growth and development of tissues and organ systems. The underlying physiological processes in growth and development. Pre- and postnatal growth and factors which determine growth rate: growth curves, stimulants of growth, age, nutrition, breed, sex. Changes during maturation, reproduction, the post-partum period and lactation. Ageing and tissue changes with erosion diseases. The influence of hormones, production and reproduction on conformation and a critical evaluation of assessment of animals for functional efficiency.

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.

Reproduction science 310 (RPL 310)

Module credits	8.00
NQF Level	07
Prerequisites	DAF 200 GS
Contact time	1 lecture per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 1

Module content

Theriogenology, spermatogenesis, zoogenesis, the female sexual cycle. Species differences. Hormonal control of the sexual functions.

Reproduction science 320 (RPL 320)

Module credits	10.00
NQF Level	07
Prerequisites	RPL 310 GS
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

Artificial insemination. Semen collection techniques, the evaluation, dilution and conservation of semen. Collection, conservation and transfer of embryos. Collection of ova and in vitro fertilization. Handling of apparatus and practical insemination, oestrus observation and determination of gestation.

Animal breeding 320 (TLR 320)

Module credits	12.00
NQF Level	07
Prerequisites	GTS 261 GS
Contact time	2 lectures per week, fortnightly practicals
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

Single gene, major genes and polygenes. Sources of variation, population parameters and the estimation thereof. Introduction to matrix algebra for application in animal breeding. Selection indices theory. Statistical models in estimation of breeding values. Animal recording systems and international guidelines for evaluation. Variation in traits of economic importance and statistical description. Use of genetic variation. Application of breeding values and prerequisites for accuracy. Principles of breeding systems.

Nutrition science 310 (VGE 310)

Module credits	14.00
NQF Level	07
Prerequisites	BCM 251 GS and BCM 261 GS and DAF 200 GS and VKU 260 GS
Contact time	3 lectures per week, Fortnightly practicals
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 1

Module content

Basic principles of chemistry, biochemistry of feed constituents, digestion and metabolism in all livestock species. Digestibility in monogastric and ruminant animals. Evaluation of energy and nutrient content of feedstuffs and assessment of nutritional requirements, and feeding standards for maintenance, growth, reproduction and lactation.

Nutrition science 320 (VGE 320)

Module credits	14.00
NQF Level	07
Prerequisites	VGE 310 GS
Contact time	3 lectures per week, Fortnightly practicals
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

Voluntary feed intake, description of the characteristics of commonly used feedstuffs, such as forages, silage and hay protein and energy concentrates and byproducts and feed additives.

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.

Curriculum: Final year

Minimum credits: 133

Additional Information:
Only students who have **completed** all prescribed second- and third-year level modules will be admitted to the final year of study.

Core modules

Beef management and nutrition 420 (BMN 420)

Module credits	12.00
NQF Level	08
Prerequisites	DFS 320 GS, #VGE 411 and #KVK 420.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

Specialised nutrition and management of beef cattle in extensive beef production and intensive feedlot systems. Extensive beef production deals with production systems, veld supplementation, breeding seasons, reproduction and health management and record keeping. Feedlot topics cover nutrition during different feedlot phases, feed additives and exogenous hormonal growth implants, feedlot layout, feedlot industry, margins and economics of beef production. Meat science involves the meat industry and meat species. Composition of carcass and meat, slaughtering process, meat quality and the consumer.

Dairy management and nutrition 410 (DMN 410)

Module credits	16.00
NQF Level	08
Prerequisites	VGE 320, and VKU 260 and simultaneously register for TLR 411 and PVK 420.
Contact time	1 practical per week, 4 practicals per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 1

Module content

Specialised nutrition and management of dairy cattle during the different production phases and the integration thereof into practical on farm application in an environmentally friendly manner. Production phases include calves and heifers, dry and transition cows and the lactating herd under pasture or total mixed ration production systems. Topics covered include feed analyses and interpretation; protein, energy and mineral nutrition; diet formulation and nutritional models; milk composition and products; general management and cow comfort; milking and housing systems; disorders and diseases. Practical work: Farm visits, feed formulation, animal handling and troubleshooting.

Small stock nutrition and production 420 (KVK 420)

Module credits	16.00
NQF Level	08
Prerequisites	VGE 320 and VKU 260 and simultaneously register for VGE 411 and BMN 420
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

Specialised small stock and game nutrition. Principles of creep feeding, drought feeding, winter and supplementary feeding. Feeding pen nutrition and final nutritional preparation of lambs. Influence of nutrition on wool, pelts and mohair. Fodder-flow planning. Small stock management, making arrangements for shearing and preparing sheds and equipment, pens, dipping, drinking and feeding facilities. Optimum lamb production for both extensive and intensive flocks within commercial, communal and emerging production systems, recognising the Sustainable Development Goals (SDGs). Preparation and marketing of hides, wool, mohair and karakul. Lambing seasons and herd management. Management programmes for the production of wool, meat, karakul pelt and mohair according to the particular ecological region and for conditions of drought. Herd health programmes. Practical work: Formulation of lowest cost rations and practical work with small ruminants.

Livestock feed technology 420 (LFT 420)

Module credits	10.00
NQF Level	08
Prerequisites	Students must have completed all prescribed first, second and third year modules.
Contact time	2 lectures per week, fortnightly practicals
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

The principles of feed ingredients and feed quality assurance. Development of a quality assurance programme for a commercial feed mill. Theory and technical knowledge in feed manufacturing operations, regulations, materials handling and storage. Feed mill practises and regulations in South Africa. Ration formulation. Practical sessions on feed mixing and processing.

Poultry nutrition and production 420 (PVK 420)

Module credits	18.00
NQF Level	08
Prerequisites	VGE 320 and VKU 260 and simultaneously register for TLR 411 and DMN 410
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 1

Module content

Specialised nutrition of poultry in different physiological stages and production systems. Industrial science and management of production systems and feeding systems in poultry production units. Applied breeding of poultry. Design and utilisation of equipment and housing facilities. Product quality and marketing of poultry products. Hygiene and health programmes. The selection and genetic improvement of poultry. Practical work: The use of computer systems in feeding management of poultry in different production systems. Management of different poultry production systems.

Animal breeding 411 (TLR 411)

Module credits	16.00
NQF Level	08
Prerequisites	TLR 320 and GTS 261 and simultaneously register for GVK 420 and PVK 420
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 1

Module content

Molecular breeding and selection, including DNA markers, applications of genomics such as biodiversity management, parentage verification, MAS and genomic selection. Formulation and application of breeding objectives. Species-specific breeding systems. Breeding objectives and selection programmes for beef and dairy cattle, small stock and companion animals. Selection of traits of economic importance and the efficiency thereof. Crossbreeding systems in meat producing farm animals.

Monogastric nutrition and production 411 (VGE 411)

Module credits	16.00

NQF Level	08
Prerequisites	VGE 320 and VKU 260 and simultaneously register for BMN 420 and KVK 420
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Semester 2

Module content

Specialised nutrition of monogastric animals: pigs, horses and companion animals. Pig production and management – sow, boar and growing pigs. The design and utilisation of equipment and housing facilities are discussed and the impact of manure management on environmental health and sustainability. Hygiene and herd health programmes, product quality and marketing. The selection and genetic improvement of pigs. Practical work: The use of computer systems in managing the feeding of selected monogastric animals.

Research methodology 400 (VKU 400)

Module credits	16.00
NQF Level	08
Prerequisites	Must be able to register for all final-year modules (TLR 411, GVK 420, PVK 420, TLR 420, KVK 420, VGE 411, VSX 420, WDE 450)
Contact time	1 seminar per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Animal Science
Period of presentation	Year

Module content

Introduction to research methodology. Principles and terminology related to research in animal science. Scientific writing skills and communication. Popular articles, seminars and preparation of scientific manuscripts. Project proposals: approach to problem solving, methodology and appropriate referencing and reporting. Presentation of seminar. Multidisciplinary case studies in a Southern African context. Sustainable Development Goals (SDGs) are reviewed with the focus on the challenges and applications in South Africa and Africa.

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.

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.