



# University of Pretoria Yearbook 2017

## BScAgric Animal Science (02133411)

**Duration of study** 4 years

**Total credits** 561

### Admission requirements

- In order to register NSC/IEB/Cambridge candidates must comply with the minimum requirements for degree studies as well as the minimum requirements for the relevant programme.
- Life Orientation is excluded in the calculation of the Admission Point Score (APS).
- Grade 11 results are used for the provisional admission of prospective students. Final admission is based on the Grade 12 results.

Minimum requirements												
Achievement level												
Afrikaans or English				Mathematics				Physical Science				APS
NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
5	3	C	C	5	3	C	C	5	3	C	C	30

Candidates who do not comply with the minimum admission requirements may be considered for admission to the BSc (Extended Programme) based on the results of the NBT. Please note that students who are placed in the BSc (Extended Programme) will take a minimum of five years to complete the BSc Agric programme.

### BSc - Extended programme for the Biological and Agricultural Sciences:

Minimum requirements													
Achievement level													
	Afrikaans or English				Mathematics				Physical Science				APS
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BSc - Extended programme for the Biological and Agricultural Sciences	4	3	D	D	4	3	D	D	4	3	D	D	24



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## 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 head of department, approve deviations from the prescribed curriculum.

### Promotion to next study year

A student will be promoted to the following year of study if he or she passed 100 credits of the prescribed credits for a year of study, unless the Dean on the recommendation of the 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 head of department, to modules of the following year of study to a maximum of 48 credits, provided that it will fit in with both the lecture and examination timetable.

### Pass with distinction

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



## Curriculum: Year 1

**Minimum credits: 140**

**Minimum credits:**

Fundamental = 12

Core = 128

**Additional information:**

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

### Fundamental modules

#### Academic information management 111 (AIM 111)

**Module content:**

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

**Module credits** 4.00

**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

**Prerequisites** No prerequisites.

**Contact time** MAMELODI, 2 lectures per week

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

**Academic organisation** Information Science

**Period of presentation** Semester 1

#### Academic information management 121 (AIM 121)

**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.

**Module credits** 4.00



<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology Faculty of Veterinary Science
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week, MAMELODI
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Academic organisation</b>	Informatics
<b>Period of presentation</b>	Semester 2

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

#### Module content:

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

<b>Module credits</b>	6.00
<b>Service modules</b>	Faculty of Natural and Agricultural Sciences Faculty of Veterinary Science
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Unit for Academic Literacy
<b>Period of presentation</b>	Semester 1

### Academic orientation 102 (UPO 102)

<b>Module credits</b>	0.00
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Natural + Agric Sciences Dean
<b>Period of presentation</b>	Year

### Academic information management 102 (AIM 102)

#### Module content:

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



technology. Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

**Module credits** 6.00

**Service modules**  
Faculty of Education  
Faculty of Economic and Management Sciences  
Faculty of Humanities  
Faculty of Law  
Faculty of Health Sciences  
Faculty of Natural and Agricultural Sciences  
Faculty of Theology  
Faculty of Veterinary Science

**Contact time** 2 lectures per week

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

**Academic organisation** Information Science

**Period of presentation** Semester 2

## Core modules

### Biometry 120 (BME 120)

#### 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.

**Module credits** 16.00

**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** Separate classes for Afrikaans and English

**Academic organisation** Statistics

**Period of presentation** Semester 2



## Plant biology 161 (BOT 161)

### Module content:

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

**Module credits** 8.00

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

**Prerequisites** MLB 111 GS

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

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

**Academic organisation** Plant and Soil Sciences

**Period of presentation** Semester 2

## General chemistry 117 (CMY 117)

### 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.

**Module credits** 16.00

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

**Prerequisites** Final Grade 12 marks of at least 60% for Mathematics and 60% for Physical Sciences.

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

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

**Academic organisation** Chemistry

**Period of presentation** Semester 1

## General chemistry 127 (CMY 127)

### 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.

**Module credits** 16.00

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

**Prerequisites** 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** Separate classes for Afrikaans and English

**Academic organisation** Chemistry

**Period of presentation** Semester 2

### Introductory genetics 161 (GTS 161)

#### Module content:

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

**Module credits** 8.00

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

**Prerequisites** MLB 111 GS

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

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

**Academic organisation** Genetics

**Period of presentation** Semester 2

### Introduction to microbiology 161 (MBY 161)

#### 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.

<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	MLB 111 GS
<b>Contact time</b>	2 lectures per week, 1 practical per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Academic organisation</b>	Microbiology and Plant Path
<b>Period of presentation</b>	Semester 2

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

#### Module content:

Introductory study of the ultra structure, function and composition of representative cells and cell components. General principles of cell metabolism, molecular genetics, cell growth, cell division and differentiation.

<b>Module credits</b>	16.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
<b>Prerequisites</b>	Refer to Regulation 1.2: A candidate who has passed Mathematics with at least 50% in the Grade 12 examination
<b>Contact time</b>	4 lectures per week, 1 practical per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Academic organisation</b>	Genetics
<b>Period of presentation</b>	Semester 1

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

#### 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.

<b>Module credits</b>	16.00
<b>Service modules</b>	Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
<b>Prerequisites</b>	Refer to Regulation 1.2: A candidate must have passed Mathematics with at least 50% in the Grade 12 examination





<b>Contact time</b>	1 practical per week, 4 lectures per week, 1 discussion class per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Academic organisation</b>	Physics
<b>Period of presentation</b>	Semester 1

## Mathematics 134 (WTW 134)

### 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.

<b>Module credits</b>	16.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science
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<b>Prerequisites</b>	Refer to Regulation 1.2: At least 50% for Mathematics in the Grade 12 examination .
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<b>Contact time</b>	4 lectures per week, 1 tutorial per week
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<b>Language of tuition</b>	Separate classes for Afrikaans and English
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<b>Academic organisation</b>	Mathematics and Applied Maths
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<b>Period of presentation</b>	Semester 1
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## Animal diversity 161 (ZEN 161)

### Module content:

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

<b>Module credits</b>	8.00
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<b>Service modules</b>	Faculty of Education Faculty of Veterinary Science
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<b>Prerequisites</b>	MLB 111 GS or TDH
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<b>Contact time</b>	2 lectures per week, fortnightly practicals
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**Language of tuition** Separate classes for Afrikaans and English

**Academic organisation** Zoology and Entomology

**Period of presentation** Semester 2



## Curriculum: Year 2

**Minimum credits: 156**

**Minimum credits:**

Core = 156

### Core modules

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

**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. Introduction to enzyme kinetics and enzyme inhibition. Allosteric enzymes, regulation of enzyme activity, active centres and mechanisms of enzyme catalysis. Examples of industrial applications of enzymes. Practical training in laboratory techniques and Good Laboratory Practice. Techniques for the quantitative and qualitative analysis of biological molecules. Processing and presentation of scientific data.

**Module credits** 12.00

**Service modules** Faculty of Health Sciences

**Prerequisites** [CMY117 GS] and [CMY127 GS] and [MLB111 GS]

**Contact time** 2 lectures per week, 90 minute practical per week

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

**Academic organisation** Biochemistry

**Period of presentation** Semester 1

#### Carbohydrate metabolism 252 (BCM 252)

**Module content:**

Biochemistry of carbohydrates. Thermodynamics and bioenergetics. Glycolysis, citric acid cycle and electron transport. Glycogen metabolism, pentose-phosphate pathway, gluconeogenesis and photosynthesis. Practical training in study and analysis of metabolic pathways and enzymes. Scientific method and design: Hypothesis design and testing, method design and scientific controls.

**Module credits** 12.00

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

**Prerequisites** [CMY117 GS] and [CMY127 GS] and [MLB111 GS]

**Contact time** 90 minute practical per week, 2 lectures per week

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



**Academic organisation** Biochemistry

**Period of presentation** Semester 1

## Lipid and nitrogen metabolism 261 (BCM 261)

### Module content:

Biochemistry of lipids, membrane structure, anabolism and catabolism of lipids. 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. Practical training in scientific writing skills: evaluation of a scientific report. Techniques for separation and analysis of biological molecules

**Module credits** 12.00

**Service modules** Faculty of Health Sciences

**Prerequisites** [CMY117 GS] and [CMY127 GS] and [MLB111 GS]

**Contact time** 2 lectures per week, 90 minute practical per week

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

**Academic organisation** Biochemistry

**Period of presentation** Semester 2

## Biochemical principles of nutrition and toxicology 262 (BCM 262)

### Module content:

Biochemistry of nutrition and toxicology. Proximate analysis of nutrients. Review of energy requirements and expenditure. Respiratory quotient. Requirements and function of water, vitamins and minerals. Interpretation and modification of RDA values for specific diets, eg growth, exercise, pregnancy and lactation, aging and starvation. Interactions between nutrients. Comparison of monogastric and ruminant metabolism. Cholesterol, polyunsaturated, essential fatty acids and dietary anti-oxidants. Oxidation of fats. Biochemical mechanisms of water- and fat-soluble vitamins and assessment of vitamin status. Mineral requirements, biochemical mechanisms, imbalances and diarrhoea. Biochemistry of xenobiotics: absorption, distribution, metabolism and excretion (ADME); detoxification reactions: oxidation/reduction (Phase I), conjugations (Phase II), export from cells (Phase III); factors affecting metabolism and disposition. Toxic responses: tissue damage and physiological effects, teratogenesis, immunotoxicity, mutagenesis and carcinogenesis. Examples of toxins: biochemical mechanisms of common toxins and their antidotes. Antibiotics and resistance. Natural toxins from fungi, plants and animals: goitrogens, cyanogens, cholinesterase inhibitors, ergotoxin, aflatoxins. Practical training in analyses of nutrients, fatty acids separations, antioxidant determination, and enzyme activity measurements, PO ratio of mitochondria, electrophoresis, extraction, solubility and gel permeation techniques.

**Module credits** 12.00

**Service modules** Faculty of Health Sciences

**Prerequisites** [CMY117 GS] and [CMY127 GS] and [MLB111 GS]



<b>Contact time</b>	2 lectures per week, 90 minute practical per week
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Biochemistry
<b>Period of presentation</b>	Semester 2

## Animal anatomy and physiology 200 (DAF 200)

### 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.

<b>Module credits</b>	32.00
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<b>Prerequisites</b>	CMY 127 or TDH
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<b>Contact time</b>	1 practical every 2nd week, 4 lectures per week
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<b>Language of tuition</b>	Module is presented in English
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<b>Academic organisation</b>	Animal and Wildlife Sciences
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<b>Period of presentation</b>	Year
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## Introductory soil science 250 (GKD 250)

### 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.

<b>Module credits</b>	12.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
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<b>Prerequisites</b>	CMY 117 GS or TDH
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<b>Contact time</b>	1 practical per week, 3 lectures per week
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<b>Language of tuition</b>	Separate classes for Afrikaans and English
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<b>Academic organisation</b>	Plant and Soil Sciences
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<b>Period of presentation</b>	Semester 1
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## Molecular genetics 251 (GTS 251)

### Module content:

Chemical nature of DNA. Replication transcription, RNA processing and translation. Control of gene expression in prokaryotes and eukaryotes. Recombinant DNA technology and its applications in gene analysis and manipulation.

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

## Genetic diversity and evolution 261 (GTS 261)

### 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.

<b>Module credits</b>	12.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	GTS 251 GS
<b>Contact time</b>	2 lectures per week, fortnightly practicals
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Genetics
<b>Period of presentation</b>	Semester 2

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

### 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.

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

## Animal science 250 (VKU 250)

### Module content:

A brief perspective on the South African livestock industry. 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.

<b>Module credits</b>	8.00
<b>Contact time</b>	2 lectures per week, 1 practical per week
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 1

## Animal Science 260 (VKU 260)

### 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.

<b>Module credits</b>	8.00
<b>Prerequisites</b>	VKU 250 GS or TDH
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 2



## Curriculum: Year 3

**Minimum credits: 154**

**Minimum credits:**

Core = 154

### Core modules

#### Biometry 210 (BME 210)

**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.

**Module credits** 24.00

**Service modules** Faculty of Natural and Agricultural Sciences

**Prerequisites** BME 120

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

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

**Academic organisation** Statistics

**Period of presentation** Semester 1

#### Animal physiology 311 (DFS 311)

**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.

**Module credits** 10.00

**Prerequisites** DAF 200

**Contact time** 2 lectures per week

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

**Academic organisation** Animal and Wildlife Sciences

**Period of presentation** Semester 1





## Growth physiology 320 (DFS 320)

### 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.

<b>Module credits</b>	12.00
<b>Prerequisites</b>	DFS 311
<b>Contact time</b>	1 practical every 2nd week
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 2

## Introduction to agricultural economics 210 (LEK 210)

### Module content:

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

<b>Module credits</b>	12.00
<b>Service modules</b>	Faculty of Economic and Management Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Agric Econ, Ext + Rural Dev
<b>Period of presentation</b>	Semester 1

## Reproduction science 310 (RPL 310)

### Module content:

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



the sexual functions.

<b>Module credits</b>	8.00
<b>Prerequisites</b>	DAF 200
<b>Contact time</b>	1 lecture per week, 1 practical per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 1

### Reproduction science 320 (RPL 320)

#### 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.

<b>Module credits</b>	10.00
<b>Prerequisites</b>	RPL 310
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 2

### Animal breeding 320 (TLR 320)

#### Module content:

Karyotyping of farm animals; breed and specie differences and the influence on classification of breeds. Influence of chromosomal aberrations. Phenotypic expression of genes and gene-interaction in farm animals. Single gene, major genes and polygenes. Variation in traits of economic importance and statistical description. Use of genetic variation. Estimation of breeding values and family indices on traits determined by single genes. Principles of breeding systems.

<b>Module credits</b>	12.00
<b>Prerequisites</b>	GTS 261
<b>Contact time</b>	fortnightly practicals, 2 lectures per week
<b>Language of tuition</b>	Separate classes for Afrikaans and English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 2



## Nutrition science 301 (VGE 301)

### Module content:

Basic principles of chemistry, biochemistry of feed constituents, digestion and metabolism in all livestock species. Evaluation of energy and nutrient content of feedstuffs and assessment of nutritional requirements and ration formulation. Description of the characteristics of commonly used feedstuffs, such as forages, protein and energy concentrates and by-products.

<b>Module credits</b>	28.00
<b>Prerequisites</b>	BCM 261 and BCM 262 and DAF 200 and VKU 250 and VKU 260
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Year

## Principles of veld management 310 (WDE 310)

### 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.

<b>Module credits</b>	12.00
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	fortnightly practicals, 2 lectures per week
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Plant and Soil Sciences
<b>Period of presentation</b>	Semester 1

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

### 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.

<b>Module credits</b>	12.00
<b>Prerequisites</b>	WDE 310



<b>Contact time</b>	2 lectures per week, fortnightly practicals
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2



## Curriculum: Final year

**Minimum credits: 148**

**Minimum credits:**

Core = 148

### Core modules

#### Large stock nutrition and production 420 (GVK 420)

**Module content:**

Production management of large stock. Aspects of business management of the large-stock enterprise. Management programmes, production systems and techniques applicable to beef cattle, dairy cattle and horses. Specialised nutrition of beef and dairy cattle according to production systems. The use of computer systems in feeding management. Design and planning of farm buildings and structures. Storage and handling of fodder. The handling and management of refuse. Hygiene and herd health programmes. Practical work: This will include compiling rations based on requirements and least cost formulations, specialised assignments and on-farm experiential training.

<b>Module credits</b>	18.00
<b>Prerequisites</b>	RPL 320, VGE 301, VKU 250 and VKU 260
<b>Contact time</b>	1 practical per week, 4 lectures per week
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 1

#### Small stock nutrition and production 420 (KVK 420)

**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. 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.

<b>Module credits</b>	18.00
<b>Prerequisites</b>	RPL 320, VGE 301, VKU 250 and VKU 260
<b>Contact time</b>	4 lectures per week, 1 practical per week
<b>Language of tuition</b>	Afrikaans and English is used in one class



**Academic organisation** Animal and Wildlife Sciences

**Period of presentation** Semester 2

## Poultry nutrition and production 420 (PVK 420)

### 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. Practical work: The use of computer systems in feeding management of poultry in different production systems. Management of different poultry production systems.

**Module credits** 18.00

**Prerequisites** VGE 301 and VKU 250

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

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

**Academic organisation** Animal and Wildlife Sciences

**Period of presentation** Semester 1

## Animal breeding 411 (TLR 411)

### Module content:

Components of animal performance. 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. Application of breeding values and prerequisites for accuracy. Breeding and selection for reproduction and growth. Principles of QTLs.

**Module credits** 12.00

**Prerequisites** TLR 320 and simultaneously register for GVK 420, PVK420, KVK420

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

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

**Academic organisation** Animal and Wildlife Sciences

**Period of presentation** Semester 1

## Applied animal breeding 420 (TLR 420)

### Module content:

Formulation and application of breeding objectives. Animal recording systems and international guidelines for evaluation. Specie-specific breeding systems. Breeding objectives and selection programmes for beef and dairy cattle, small stock, poultry, pigs and companion animals. Selection of traits of economic importance and the efficiency thereof. Crossbreeding systems in meat producing farm animals. Breed development.



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<b>Module credits</b>	12.00
<b>Prerequisites</b>	TLR 411
<b>Contact time</b>	fortnightly practicals, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 2

### Monogastric nutrition and production 411 (VGE 411)

#### Module content:

Specialised nutrition of monogastric animals: poultry, pigs, horses and selected freshwater aquatic organisms. Pig production and management - sow, boar and growing pigs. Feeding and housing systems. Hygiene and herd health programmes, product quality and marketing. Practical work: The use of computer systems in managing the feeding of selected monogastric animals.

<b>Module credits</b>	16.00
<b>Prerequisites</b>	VGE 301
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 2

### Animal science pharmacology 411 (VKF 411)

#### Module content:

The pharmacology, laws, control and use of substances for animal production.

<b>Module credits</b>	8.00
<b>Prerequisites</b>	DFS 320 and VGE 301
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 1

### Meat and dairy science 420 (VSX 420)

#### Module content:

Meat industry. Meat species. Composition of carcass and meat, slaughtering process, meat quality, and the consumer. Dairy industry. Composition and nutritional value of milk and factors that influence it. Milk production,



milk quality and distribution.

<b>Module credits</b>	8.00
<b>Prerequisites</b>	DFS 320
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 2

## Wildlife science 420 (WKE 420)

### Module content:

Introductory aspects of wildlife conservation, habitat management, wildlife nutrition and keeping wildlife in zoological gardens.

<b>Module credits</b>	8.00
<b>Prerequisites</b>	VEG 301 or TDH
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Afrikaans and English is used in one class
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Semester 2

## Research methodology 400 (VKU 400)

### 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.

<b>Module credits</b>	16.00
<b>Prerequisites</b>	Simultaneously register GVK 420, TLR 411
<b>Contact time</b>	1 seminar per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Academic organisation</b>	Animal and Wildlife Sciences
<b>Period of presentation</b>	Year

The information published here is subject to change and may be amended after the publication of this information. The





**General Regulations (G Regulations)** apply to all faculties of the University of Pretoria. It is expected of each student to familiarise himself or herself well with these regulations as well as with the information contained in the **General Rules** section. Ignorance concerning these regulations and rules will not be accepted as an excuse for any transgression.