



University of Pretoria Yearbook 2020

BScAgric Animal Science (02133411)

| | |
|----------------------------------|---------|
| NQF level | 08 |
| Minimum duration of study | 4 years |
| Total credits | 560 |

Admission requirements

- 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 are in possession of a certificate that is deemed by the University to be equivalent to the required National Senior Certificate 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 from the calculation of the Admission Point Score (APS).
- Grade 11 results are used for the conditional admission of prospective students. Final admission is based on Grade 12 results.
- Please note that the Faculty does not accept GED and School of Tomorrow qualifications for entry into our programmes.

Transferring students

- **Candidates previously registered at UP or at another university**
 - The faculty's Admissions Committee considers applications of candidates who have already completed the final NSC or equivalent qualification examination and/or were previously registered at UP or another university, on grounds of their final NSC or equivalent qualification results as well as academic merit.
- **Candidates previously registered at a FET college or a university of technology**
 - The faculty's Admissions Committee considers the application of these candidates on the grounds of their final NSC or equivalent qualification results as well as academic merit.

Qualifications from countries other than South Africa

- Citizens from countries other than South Africa and South African citizens with foreign qualifications must comply with all the other admission requirements and the prerequisites for subjects/modules.
- Candidates must have completed the National Senior Certificate with admission to degree studies or a certificate of conditional exemption on the basis of a candidate's foreign qualifications, the so-called "Immigrant" or "Foreign Conditional Exemption". The only condition for the "Foreign Conditional Exemption" that is accepted is: 'completion of the degree course'. The exemption certificate is obtainable from Universities South Africa (USAf). Detailed information is available on the website at [click here](#).

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



National Benchmark Test website: [click here](#)

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

| | | Mathematics | | Physical Sciences | | APS |
|---------|----------|-------------|----------|-------------------|----------|-----------|
| NSC/IEB | AS Level | NSC/IEB | AS Level | NSC/IEB | AS Level | |
| 5 | C | 5 | C | 5 | C | 32 |

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. Students in the Cambridge system must offer both Physics AND Chemistry with performance at the level specified for NSC Physical Sciences in the table above.

* International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission. Students in the IB system must offer both Physics AND Chemistry with performance at the level specified for NSC Physical Sciences in the table above.

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. This programme takes a year longer than the normal programmes to complete.

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 | AS Level | NSC/IEB | AS Level | NSC/IEB | AS Level | |
| 4 | D | 4 | D | 4 | D | 26 |

Other programme-specific information

Compilation of curriculum

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

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

Promotion to next study year

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



relevant head of department, to modules of the following year of study to a maximum of 48 credits, provided that it will fit in with both the lecture and examination timetable.

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

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

Fundamental = 12

Core modules = 128

Additional information:

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

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

Fundamental modules

Academic information management 102 (AIM 102)

Module 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 and Religion
Faculty of Veterinary Science

Prerequisites No prerequisites.

Contact time 2 lectures per week

Language of tuition Module is presented in English

Department Information Science

Period of presentation Semester 2

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 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 |

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

| | |
|-------------------------------|---|
| 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 |

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.

Module credits 6.00



| | |
|-------------------------------|---|
| 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 |

Academic orientation 102 (UPO 102)

| | |
|-------------------------------|--|
| Module credits | 0.00 |
| 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 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 | Module is presented in English |
| Department | 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 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

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 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

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 Module is presented in English

Department 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, extensions and modifications of basic principles.. Probability studies. Sex determination and sex linked traits. Pedigree analysis. 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 2 lectures per week, fortnightly tutorials

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

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.

| | |
|-------------------------------|--|
| Module credits | 8.00 |
| 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 |

Molecular and cell biology 111 (MLB 111)

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.

| | |
|-------------------------------|---|
| Module credits | 16.00 |
| Service modules | Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science |
| Prerequisites | A candidate who has passed Mathematics with at least 60% in the Grade 12 examination |
| Contact time | 1 practical/tutorial per week, 4 lectures per week |
| Language of tuition | Module is presented in English |
| Department | Biochemistry, Genetics and Microbiology |
| Period of presentation | Semester 1 |

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.

| | |
|-----------------------|-------|
| Module credits | 16.00 |
|-----------------------|-------|



| | |
|-------------------------------|--|
| Service modules | Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science |
| Prerequisites | A candidate must have passed Mathematics with at least 60% in the Grade 12 examination |
| Contact time | 1 discussion class per week, 1 practical per week, 4 lectures per week |
| Language of tuition | Module is presented in English |
| Department | Physics |
| Period of presentation | Semester 1 |

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.

Module credits 16.00

| | |
|-------------------------------|---|
| Service modules | Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science |
| Prerequisites | 50% for Mathematics in Grade 12 |
| Contact time | 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 |

Animal diversity 161 (ZEN 161)

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).



| | |
|-------------------------------|---|
| Module credits | 8.00 |
| 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 |



Curriculum: Year 2

Minimum credits: 147

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. Enzyme kinetics and enzyme inhibition. Allosteric enzymes, regulation of enzyme activity, active centres and mechanisms of enzyme catalysis. Examples of industrial applications of enzymes and in clinical pathology as biomarkers of diseases. Introduction to practical laboratory techniques and Good Laboratory Practice. Techniques for the quantitative and qualitative analysis of biological molecules, enzyme activity measurements. Processing and presentation of scientific data.

Module credits 12.00

Service modules Faculty of Health Sciences

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

Contact time 1 tutorial per week, 2 lectures per week

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

Period of presentation Semester 1

Carbohydrate metabolism 252 (BCM 252)

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. Practical 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.

Module credits 12.00

Service modules Faculty of Education
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

Lipid and nitrogen metabolism 261 (BCM 261)

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. Practical 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.

Module credits 12.00

Service modules Faculty of Health Sciences

Prerequisites BCM 251 GS and BCM 252 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

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, starvation, marasmus and kwashiorkor. 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. 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. Examples of genetic abnormalities, phenotypes and frequencies. Examples of toxins: biochemical mechanisms of common toxins and their antidotes. Natural toxins from fungi, plants and animals: goitrogens, cyanogens, cholinesterase inhibitors, ergotoxin, aflatoxins Practical training in scientific writing skills: evaluating scientific findings. Introduction to practical techniques in nutrition and toxicology. Experimental design and calculations in experiments: determining nutritional value of metabolites and studying the ADME of toxins.

Module credits 12.00

Service modules Faculty of Health Sciences

Prerequisites BCM 251 GS and BCM 252 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 |

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.

| | |
|-----------------------|-------|
| Module credits | 32.00 |
|-----------------------|-------|

| | |
|----------------------|------------|
| 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 and Wildlife Sciences |
|-------------------|------------------------------|

| | |
|-------------------------------|------|
| Period of presentation | Year |
|-------------------------------|------|

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.

| | |
|-----------------------|-------|
| Module credits | 12.00 |
|-----------------------|-------|

| | |
|------------------------|--|
| 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 |
|-------------------------------|------------|



Molecular genetics 251 (GTS 251)

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.

| | |
|-------------------------------|--|
| Module credits | 12.00 |
| 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 |

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.

| | |
|-------------------------------|--|
| Module credits | 12.00 |
| 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 |

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.

| | |
|-----------------------|-------|
| Module credits | 15.00 |
|-----------------------|-------|



| | |
|-------------------------------|---|
| 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 |

Animal science 250 (VKU 250)

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.

| | |
|-------------------------------|--------------------------------|
| Module credits | 8.00 |
| Contact time | 2 lectures per week |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | 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.

| | |
|-------------------------------|---|
| Module credits | 8.00 |
| Prerequisites | VKU 250 GS |
| Contact time | 1 practical per week, 2 lectures per week |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | Semester 2 |



Curriculum: Year 3

Minimum credits: 140

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 1 practical per week, 4 lectures per week

Language of tuition Module is presented in English

Department 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 GS

Contact time 2 lectures per week

Language of tuition Module is presented in English

Department 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.

| | |
|-------------------------------|--------------------------------|
| Module credits | 12.00 |
| Prerequisites | DFS 311 GS |
| Contact time | 1 practical every 2nd week |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | 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.

| | |
|-------------------------------|---|
| Module credits | 12.00 |
| Service modules | Faculty of Economic and Management Sciences |
| Prerequisites | No prerequisites. |
| Contact time | 3 lectures per week |
| Language of tuition | Module is presented in English |
| Department | Agricultural Economics Extension and Rural Develo |
| Period of presentation | Semester 1 |

Reproduction science 310 (RPL 310)

Module content:

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

| | |
|-----------------------|------------|
| Module credits | 8.00 |
| Prerequisites | DAF 200 GS |



| | |
|-------------------------------|--|
| Contact time | 1 lecture per week, 1 practical per week |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | 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.

| | |
|-------------------------------|---|
| Module credits | 10.00 |
| Prerequisites | RPL 310 GS |
| Contact time | 1 practical per week, 2 lectures per week |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | 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.

| | |
|-------------------------------|---|
| Module credits | 12.00 |
| Prerequisites | GTS 261 GS |
| Contact time | 2 lectures per week, fortnightly practicals |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | Semester 2 |

Nutrition science 310 (VGE 310)

Module content:

Basic principles of chemistry, biochemistry of feed constituents, digestion and metabolism in all livestock species. Description of the characteristics of commonly used feedstuffs, such as forages, silage and hay protein and



energy concentrates and by-products.

| | |
|-------------------------------|---|
| Module credits | 14.00 |
| 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 and Wildlife Sciences |
| Period of presentation | Semester 1 |

Nutrition science 320 (VGE 320)

Module content:

Evaluation of energy and nutrient content of feedstuffs and assessment of nutritional requirements, and feeding standards for maintenance, growth, reproduction and lactation.

| | |
|-------------------------------|---|
| Module credits | 14.00 |
| Prerequisites | VGE 310 GS |
| Contact time | 3 lectures per week, Fortnightly practicals |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | Semester 2 |

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 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.

| | |
|-------------------------------|---|
| Module credits | 12.00 |
| 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 |



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.

| | |
|-------------------------------|---|
| Module credits | 12.00 |
| 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 |



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

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 in an environmentally friendly manner, with reference to the role of Sustainable Development Goals (SDGs) in a Southern African context. 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.

| | |
|-------------------------------|---|
| Module credits | 18.00 |
| Prerequisites | VGE 320, and VKU 260 and simultaneously register for TLR 411 and PVK 420. |
| Contact time | 1 practical per week, 4 lectures per week |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | 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. 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.

| | |
|-----------------------|--|
| Module credits | 18.00 |
| Prerequisites | VGE 320, and VKU 260 and simultaneously register for TLR 420 and VSX 420 |
| Contact time | 1 practical per week, 4 lectures per week |



| | |
|-------------------------------|--------------------------------|
| Language of tuition | Module is presented in English |
| Department | 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 320 and VKU 260 and simultaneously register for TLR 411 and GVK 420 |
| Contact time | 1 practical per week, 4 lectures per week |
| Language of tuition | Module is presented in English |
| Department | 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 GTS 261 and simultaneously register for GVK 420 and PVK 420 |
| Contact time | 1 practical per week, 2 lectures per week |
| Language of tuition | Module is presented in English |
| Department | 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.

| | |
|-------------------------------|--|
| Module credits | 12.00 |
| Prerequisites | TLR 411 GS and simultaneously register for KVK 420 and VSX 420 |
| Contact time | 2 lectures per week, fortnightly practicals |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | 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. 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. Practical work: The use of computer systems in managing the feeding of selected monogastric animals.

| | |
|-------------------------------|--|
| Module credits | 16.00 |
| Prerequisites | VGE 320 and VKU 260 and simultaneously register for TRL 420, VSX 420 and KVK 420 |
| Contact time | 1 practical per week, 2 lectures per week |
| Language of tuition | Module is presented in English |
| Department | Animal and Wildlife Sciences |
| Period of presentation | 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. Sustainable Development Goals (SDGs) are reviewed with the focus on the challenges and applications in South Africa and Africa.

| | |
|----------------------------|--|
| Module credits | 16.00 |
| 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 and Wildlife Sciences |



Period of presentation Year

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.

Module credits 8.00

Prerequisites DFS 320 GS

Contact time 2 lectures per week

Language of tuition Module is presented in English

Department Animal and Wildlife Sciences

Period of presentation Semester 2

Advanced pasture science 450 (WDE 450)

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.

Module credits 15.00

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

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.