University of Pretoria Yearbook 2019

BSc Ecology (02133400)

Minimum duration of study	3 years
Total credits	428

Admission requirements

- The following persons will be considered for admission: a candidate who is in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement, a candidate who is a graduate from another tertiary institution or has been granted the status of a graduate of such an institution, and a candidate who is a graduate of another faculty at the University of Pretoria.
- Life Orientation is excluded in 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 the Grade 12 results.

Minimum requirements Achievement level English Home Language or English First Additional Language		**Mathematics**		**Physical Science**		**APS**
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	**30**

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Candidates who do not comply with the minimum admission requirements for BSc (Ecology), may be considered for admission to the BSc – Extended programme for the Biological and Agricultural Sciences. The BSc – Extended programme takes place over a period of four years instead of the normal three years.

BSc Extended Programme for the Biological and Agricultural Sciences

Minimum requirements Achievement level English Home Language or English First Additional Language		**Mathematics**		**Physical Science**		**APS**
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
4	D	4	D	4	D	**24**

Other programme-specific information

Electives are chosen as follows:

Second year – 12 credits

A student must pass all the minimum prescribed and elective module credits as set out at the end of each year within a programme as well as the total required credits to comply with the particular degree programme. Please refer to the curricula of the respective programmes. At least 144 credits must be obtained at 300-/400-level, or otherwise as indicated by curriculum. The minimum module credits needed to comply with degree requirements is set out at the end of each study programme. Subject to the programmes as indicated a maximum of 150 credits will be recognised at 100-level. A student may, in consultation with the relevant head of department and subject to the permission by the Dean, select or replace prescribed module credits not indicated in BSc three-year study programmes to the equivalent of a maximum of 36 module credits.

It is important that the total number of prescribed module credits is completed during the course of the study programme. The Dean may, on the recommendation of the relevant head of department, approve deviations in this regard. Subject to the programmes as indicated in the respective curricula, a student may not register for more than 75 module credits per semester at first-year level subject to permission by the Dean. A student may be permitted to register for up to 80 module credits in a the first semester during the first year provided that he or she obtained a final mark of no less than 70% for grade 12 Mathematics and achieved an APS of 34 or more in the NSC.

Students who are already in possession of a bachelor’s degree, will not receive credit for modules of which the content overlap with modules from the degree that was already conferred. Credits will not be considered for more than half the credits passed previously for an uncompleted degree. No credits at the final-year or 300- and 400-level will be granted.

The Dean may, on the recommendation of the programme manager, approve deviations with regard to the composition of the study programme.

Please note: Where elective modules are not specified, these may be chosen from any modules appearing in the list of modules.

It remains the student’s responsibility to acertain, prior to registration, whether they comply with the prerequisites of the modules they want to register for.

The prerequisites are listed in the Alphabetical list of modules.

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.

General promotion requirements in the faculty

All students whose academic progress is not acceptable can be suspended from further studies.

- A student who is excluded from further studies in terms of the stipulations of the abovementioned regulations, will be notified in writing by the Dean or Admissions Committee at the end of the relevant semester.
- A student who has been excluded from further studies may apply in writing to the Admissions Committee of the Faculty of Natural and Agricultural Sciences for re-admission.
- Should the student be re-admitted by the Admissions Committee, strict conditions will be set which the student must comply with in order to proceed with his/her studies.
- Should the student not be re-admitted to further studies by the Admissions Committee, he/she will be informed in writing.
- Students who are not re-admitted by the Admissions Committee have the right to appeal to the Senior Appeals Committee.
- Any decision taken by the Senior Appeals Committee is final.

Pass with distinction

A student obtains his or her degree with distinction if all prescribed modules at 300-level (or higher) are passed in one academic year with a weighted average of at least 75%, and obtain at least a subminimum of 65% in each of the relevant modules.

Curriculum: Year 1

Minimum credits: 140

Minimum credits: 140

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 102 (AIM 102)

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

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.

Academic information management 111 (AIM 111)

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

Module content

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

Academic information management 121 (AIM 121)

Module credits	4.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion Faculty of Veterinary Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Module content

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

Language and study skills 110 (LST 110)

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

Module content

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

Academic orientation 102 (UPO 102)

Module credits	0.00
Language of tuition	Module is presented in English
Department	Natural and Agricultural Sciences Deans Office
Period of presentation	Year

Core modules

Biometry 120 (BME 120)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences Faculty of Veterinary Science
Prerequisites	At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 2

Module content

Simple statistical analysis: Data collection and analysis: Samples, tabulation, graphical representation, describing location, spread and skewness. Introductory probability and distribution theory. Sampling distributions and the central limit theorem. Statistical inference: Basic principles, estimation and testing in the one- and two-sample cases (parametric and non-parametric). Introduction to experimental design. One- and twoway designs, randomised blocks. Multiple statistical analysis: Bivariate data sets: Curve fitting (linear and non-linear), growth curves. Statistical inference in the simple regression case. Categorical analysis: Testing goodness of fit and contingency tables. Multiple regression and correlation: Fitting and testing of models. Residual analysis. Computer literacy: Use of computer packages in data analysis and report writing.

Plant biology 161 (BOT 161)

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

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.

General chemistry 117 (CMY 117)

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

Module content

General introduction to inorganic, analytical and physical chemistry. Atomic structure and periodicity. Molecular structure and chemical bonding using the VSEOR model. Nomenclature of inorganic ions and compounds. Classification of reactions: precipitation, acid-base, redox reactions and gas-forming reactions. Mole concept and stoichiometric calculations concerning chemical formulas and chemical reactions. Principles of reactivity: energy and chemical reactions. Physical behaviour gases, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to chemical kinetics.

General chemistry 127 (CMY 127)

Module credits	16.00
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	4 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Semester 2

Module content

Theory: General physical-analytical chemistry: Chemical equilibrium, acids and bases, buffers, solubility equilibrium, entropy and free energy, electrochemistry. Organic chemistry: Structure (bonding), nomenclature, isomerism, introductory stereochemistry, introduction to chemical reactions and chemical properties of organic compounds and biological compounds, i.e. carbohydrates and aminoacids. Practical: Molecular structure (model building), synthesis and properties of simple organic compounds.

Introductory genetics 161 (GTS 161)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science
Prerequisites	MLB 111 GS
Contact time	2 lectures per week, fortnightly tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

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

Introduction to microbiology 161 (MBY 161)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MLB 111 GS
Contact time	2 lectures per week, fortnightly tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

The module will introduce the student to the field of Microbiology. Basic Microbiological aspects that will be covered include introduction into the diversity of the microbial world (bacteria, archaea, eukaryotic microorganisms and viruses), basic principles of cell structure and function, microbial nutrition and microbial growth and growth control. Applications in Microbiology will be illustrated by specific examples i.e. bioremediation, animal-microbial symbiosis, plant-microbial symbiosis and the use of microorganisms in industrial microbiology. Wastewater treatment, microbial diseases and food will be introduced using specific examples.

Molecular and cell biology 111 (MLB 111)

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

Module content

Introduction to the molecular structure and function of the cell. Basic chemistry of the cell. Structure and composition of prokaryotic and eukaryotic cells. Ultrastructure and function of cellular organelles, membranes and the cytoskeleton. General principles of energy, enzymes and cell metabolism. Selected processes, e.g. glycolysis, respiration and/or photosynthesis. Introduction to molecular genetics: DNA structure and replication, transcription, translation. Cell growth and cell division.

Physics for biology students 131 (PHY 131)

Module credits	16.00
Service modules	Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
Prerequisites	A candidate must have passed Mathematics with at least 60% in the Grade 12 examination
Contact time	1 discussion class per week, 1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 1

Module content

Units, vectors, one dimensional kinematics, dynamics, work, equilibrium, sound, liquids, heat, thermodynamic processes, electric potential and capacitance, direct current and alternating current, optics, modern physics, radio activity.

Mathematics 134 (WTW 134)

Module credits	16.00
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	4 lectures per week, 1 tutorial per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

**Students will not be credited for more than one of the following modules for their degree: WTW 134, WTW 165, WTW 114, WTW 158. WTW 134 does not lead to admission to Mathematics at 200 level and is intended for students who require Mathematics at 100 level only. WTW 134 is offered as WTW 165 in the second semester only to students who have applied in the first semester of the current year for the approximately 65 MBChB, or the 5-6 BChD places becoming available in the second semester and who were therefore enrolled for MGW 112 in the first semester of the current year.*
Functions, derivatives, interpretation of the derivative, rules of differentiation, applications of differentiation, integration, interpretation of the definite integral, applications of integration. Matrices, solutions of systems of equations. All topics are studied in the context of applications.

Animal diversity 161 (ZEN 161)

Module credits	8.00
Service modules	Faculty of Education Faculty of Veterinary Science
Prerequisites	MLB 111 GS or permission from the HOD.
Contact time	2 lectures per week, fortnightly practicals
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Semester 2

Module content

Animal classification, phylogeny, 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.

Curriculum: Year 2

Minimum credits: 144

Minimum credits: 144

Core = 132

Elective = 12

Core modules

Introduction to proteins and enzymes 251 (BCM 251)

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

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.

South African flora and vegetation 251 (BOT 251)

Module credits	12.00
Service modules	Faculty of Education
Prerequisites	BOT 161 or permission from head of department
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Origin and affinity of South African flora and vegetation types; principles of plant geography; plant diversity in southern Africa; characteristics, environments and vegetation of South African biomes and associated key ecological processes; centra of plant endemism; rare and threatened plant species; biodiversity conservation and ecosystem management; invasion biology; conservation status of South African vegetation types.

Plant physiology and biotechnology 261 (BOT 261)

Module credits	12.00
Service modules	Faculty of Education
Prerequisites	BOT 161, CMY 117, CMY 127 or permission from head of department
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Separate classes for Afrikaans and English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Nitrogen metabolism in plants; nitrogen fixation in Agriculture; plant secondary metabolism and natural products; photosynthesis and carbohydrate metabolism in plants; applications in solar energy; plant growth regulation and the Green Revolution; plant responses to the environment; developing drought tolerant and disease resistant plants.

Geographic information systems introduction 221 (GIS 221)

Module credits	12.00
Prerequisites	Prohibited combination GGY 283
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Semester 2

Module content

*GIS 221 does not lead to admission to any module at 300 level.
Introduction to Geographic Information Systems (GIS), theoretical concepts and applications of GIS. The focus will be on the GIS process of data input, data analysis, data output and associated technologies.This module teaches students to use GIS as a tool.

Introductory soil science 250 (GKD 250)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	CMY 117 GS or permission from the HOD
Contact time	3 lectures per week, 1 practical per week

Language of tuition	Separate classes for Afrikaans and English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Origin and development of soil, weathering and soil formation processes. Profile differentiation and morphology. Physical characteristics: texture, structure, soil water, atmosphere and temperature. Chemical characteristics: clay minerals, ion exchange, pH, buffer action, soil acidification and salinisation of soil. Soil fertility and fertilisation. Soil classification. Practical work: Laboratory evaluation of simple soil characteristics. Field practicals on soil formation in the Pretoria area.

Molecular genetics 251 (GTS 251)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 161 GS
Contact time	fortnightly tutorials, 2 lectures per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

The chemical nature of DNA. The processes of DNA replication, transcription, RNA processing, translation. Control of gene expression in prokaryotes and eukaryotes. Recombinant DNA technology and its applications in gene analysis and manipulation.

Genetic diversity and evolution 261 (GTS 261)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 251 GS
Contact time	2 lectures per week, fortnightly tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

Chromosome structure and transposable elements. Mutation and DNA repair. Genomics and proteomics. Organelle genomes. Introduction to genetic analysis of populations: allele and genotypic frequencies, Hardy Weinberg Law, its extensions and implications for different mating systems. Introduction to quantitative and evolutionary genetics.

Bacteriology 251 (MBY 251)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MBY 161 GS
Contact time	fortnightly practicals, 2 lectures per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

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

Mycology 261 (MBY 261)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MBY 161 GS
Contact time	Fortnightly practicals/tutorials, 2 lectures per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

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

Invertebrate biology 251 (ZEN 251)

Module credits	12.00
Service modules	Faculty of Education
Prerequisites	ZEN 161 GS or permission from the HOD.
Contact time	4 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology

Period of presentation	Quarter 1

Module content

Origin and extent of modern invertebrate diversity; parasites of man and domestic animals; biology and medical importance of arachnids; insect life styles; the influence of the environment on insect life histories; insect phytophagy, predation and parasitism; insect chemical, visual, and auditory communication; freshwater invertebrates and their use as biological indicators.

African vertebrates 261 (ZEN 261)

Module credits	12.00
Service modules	Faculty of Education
Prerequisites	ZEN 161 GS or permission from the HOD.
Contact time	4 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Quarter 3

Module content

Introduction to general vertebrate diversity; African vertebrate diversity; vertebrate structure and function; vertebrate evolution; vertebrate relationships; aquatic vertebrates; terrestrial ectotherms; terrestrial endotherms; vertebrate characteristics; classification; structural adaptations; habits; habitats; conservation problems; impact of humans on other vertebrates.

Elective modules

Carbohydrate metabolism 252 (BCM 252)

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

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.

Lipid and nitrogen metabolism 261 (BCM 261)

Module credits	12.00
Service modules	Faculty of Health Sciences
Prerequisites	CMY 117 GS and CMY 127 GS and MLB 111 GS
Contact time	2 lectures per week, 1 tutorial per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

Biochemistry of lipids, membrane structure, anabolism and catabolism of lipids. Total ATP yield from the complete catabolism of lipids. Nitrogen metabolism, amino acid biosynthesis and catabolism. Biosynthesis of neurotransmitters, pigments, hormones and nucleotides from amino acids. Catabolism of pureness 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.

Biochemical principles of nutrition and toxicology 262 (BCM 262)

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 2

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, cholineesterase 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.

Introduction to crop protection 251 (PLG 251)

Module credits	12.00
Prerequisites	No prerequisites.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Development and importance of crop protection. Basic principles in crop protection i.e. epidemic development of disease and insect pest populations, ecology of plant diseases and abiotic factors that affect plant health i.e. environmental pollution and pesticides, nutrient deficiencies and extreme environmental conditions. Ecological aspects of plant diseases, pest outbreaks and weed invasion. Important agricultural pests and weeds. Life cycles of typical disease causing organisms. Basic principles of integrated pest and disease management.

Principles of plant pathology 262 (PLG 262)

Module credits	12.00
Prerequisites	MBY 161
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Afrikaans and English are used in one class
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Fundamental principles of plant pathology. The concept of disease in plants. Causes of plant diseases. Stages in development of plant diseases. Disease cycles. Diagnosis of plant diseases.

Curriculum: Final year

Minimum credits: 144

Minimum credits: 144

Core = 144

Core modules

Plant ecophysiology 356 (BOT 356)

Module credits	18.00
Service modules	Faculty of Education
Prerequisites	BOT 161 or permission from head of department
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Separate classes for Afrikaans and English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

The emphasis is on the efficiency of the mechanisms whereby C3-, C4 and CAM-plants bind CO2 and how it impacted upon by environmental factors. The mechanisms and factors which determine the respiratory conversion of carbon skeletons and how production is affected thereby will be discussed. Insight into the ecological distribution and manipulation of plants for increased production is gained by discussing the internal mechanisms whereby carbon allocation, hormone production, growth, flowering and fruitset are influenced by external factors. To understand the functioning of plants in diverse environments, the relevant structural properties of plants, and the impact of soil composition, water flow in the soil-plant air continuum and long distance transport of assimilates will be discussed. Various important techniques will be used in the practicals to investigate aspects such as water-use efficiency, photosynthesis and respiration of plants.

Plant ecology 358 (BOT 358)

Module credits	18.00
Prerequisites	BOT 161 and BOT 251 or permission from head of department
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Separate classes for Afrikaans and English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Theory of plant community concepts, floristic and structural composition, plant diversity, ecological succession, landscape ecology. Data processing techniques. Species interactions and an evaluation of their effects on interacting species. Fundamentals of plant population biology: life tables; plant breeding systems and pollination; population dynamics; life history strategies; intraspecific competition; interspecific competition and co-existence.

Plant diversity 366 (BOT 366)

Module credits	18.00
Service modules	Faculty of Education
Prerequisites	BOT 161 or permission from head of department
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Basic principles and methods of plant classification. Sources of plant variation. Modern methods to ascertain evolutionary relationships among plants. The extent and significance of vascular plant diversity. General structural and biological characteristics of evolutionary and ecologically important plant groups. Botanical nomenclature. Plant identification in practice; identification methods, keys, herbaria and botanical gardens. Diagnostic characters for the field identification of trees, wild flowers and grasses. Family recognition of southern African plants. Available literature for plant identification. Methods to conduct floristic surveys. Nature and significance of voucher specimens.

Population ecology 351 (ZEN 351)

Module credits	18.00
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Quarter 1

Module content

Scientific approach to ecology; evolution and ecology; the individual and its environment; population characteristics and demography; competition; predation; plant-herbivore interactions; regulation of populations; population manipulation.

Community ecology 353 (ZEN 353)

Module credits	18.00

Service modules	Faculty of Education
Prerequisites	ZEN 351 (50%) (Note: Prerequisite not applicable to students enrolled for a dual major in Zoology and Plant Science).
Contact time	4 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Quarter 4

Module content

The scientific approach; characteristics of the community; the community as a superorganism; community changes; competition as a factor determining community structure; disturbance as a determinant of community structure; community stability; macroecological environmental gradients and communities. A field trip will be conducted during the September vacation to the Sani Pass region of the Maloti-Drakensberg Mountains.

Physiological processes 361 (ZEN 361)

Module credits	18.00
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	4 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Quarter 3

Module content

This module focuses on the means by which animals can sense and respond to the external and internal environment. Topics covered include: (i) the structure and function of biological membranes; (ii) neurons and nervous systems; (iii) sensing the environment; (iv) glands, hormones and regulation of development and growth; (v) muscles and animal movement and (vi) the initiation and control of behaviour. The implications of these physiological processes for animal conservation and management will be emphasised. A comparative approach will be adopted throughout the module to highlight the commonalities as well as the ways in which animal lineages have achieved similar functional outcomes from different structural adaptations.

Evolution and phylogeny 362 (ZEN 362)

Module credits	18.00
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	4 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology

Period of presentation	Quarter 3

Module content

Evolution as a process and pattern, prime movers in evolution: Selection, drift, general population genetics. Population differentiation, clines, subspecies and species, adaptation as a major force in evolution and the panglossian paradigm, molecular evolution. Phylogeography, phylogenetic reconstruction. Evolutionary biogeography. Adaptation, Darwin's formulation, proximate and ultimate causation, genetic and developmental constraints, optimality. Phenotypic models, the comparative method, convergent evolution. Evolution of complex biological systems, origin of life and sex, macro-evolution, punctuated equilibrium, human evolution. Levels of selection. Species concepts.

Conservation ecology 364 (ZEN 364)

Module credits	18.00
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	4 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Quarter 2

Module content

This module is intended to provide students with the skills and knowledge that are essential for the conservation of biodiversity. The module focuses on conservation theory and practice (e.g. endangered species, habitat loss, overexploitation, climate change), and has a practical component. The students will be actively involved in planning and executing field projects, and will be responsible for analysing and presenting the results. The students will gain valuable theoretical and practical experience in the field of conservation ecology by being exposed to a number of different taxa.

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 students to familiarise themselves 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.