

University of Pretoria Yearbook 2025

BSc in Ecology 4-year programme (02131009)

Department Zoology and Entomology

Minimum duration of study 4 years

Total credits 516

NQF level 07

Programme information

This is an extended BSc degree programme with a four-year curriculum that is only presented on a full-time basis. It is designed to enable students, who show academic potential, to obtain a BSc degree.

This programme is directed at a general formative education in the natural sciences. It provides the student with a broad academic basis to continue with postgraduate studies and prepares the student for active involvement in a wide variety of career possibilities.

1. Students who are admitted to one of the BSc four-year programmes register for one specific programme.
2. These programmes are followed by students who, as a result of exceptional circumstances, will benefit from an extended programme.
3. Students who do not comply with the normal three-year BSc entrance requirements for study in the Faculty of Natural and Agricultural Sciences, may nevertheless be admitted to the Faculty in one of the BSc four-year programmes. Generally, an extended programme means that the first study year is extended to take two years. The possibility of switching over to other faculties after one or two years in the four-year programmes exists. This depends on selection rules and other conditions stipulated by the other faculties.
4. Applications for admission to the BSc four-year programmes should be submitted in accordance with the UP applications process, with applications considered up to 30 June and in a second round in August/September. Details are obtainable from the Student Administration at the Faculty of Natural and Agricultural Sciences.
5. The rules and regulations applicable to the mainstream study programmes apply mutatis mutandis to the BSc four-year programmes, with exceptions as indicated in the regulations pertaining to the BSc four-year programmes. For instance, students admitted into the BSc four-year programmes must have a National Senior Certificate with admission for degree purposes.

Admission requirements

Important information for all prospective students for 2025

The admission requirements below apply to all who apply for admission to the University of Pretoria with a **National Senior Certificate (NSC)** and **Independent Examination Board (IEB)** qualifications. [Click here for this Faculty Brochure.](#)

Minimum requirements
Achievement level



English Home Language or English First Additional Language	Mathematics	Physical Sciences	APS
NSC/IEB	NSC/IEB	NSC/IEB	
58%	58%	58%	30

Life Orientation is excluded when calculating the APS.

Applicants currently in Grade 12 must apply with their final Grade 11 (or equivalent) results.

Applicants who have completed Grade 12 must apply with their final NSC or equivalent qualification results.

Please note that meeting the minimum academic requirements does not guarantee admission.

Only students that have completed school in the last two years and have not studied at a tertiary institution will be considered for this programme.

Successful candidates will be notified once admitted or conditionally admitted.

Unsuccessful candidates will also be notified.

Applicants should check their application status regularly on the UP Student Portal at [click here](#).

Applicants with qualifications other than the abovementioned should refer to the International undergraduate prospectus 2025: Applicants with a school leaving certificate not issued by Umalusi (South Africa), available at [click here](#).

International students: [Click here](#).

Examinations and pass requirements

Academic promotion requirements

Students who do not show progress during the first semester of the first year will be referred to the Admissions Committee of the Faculty.

It is expected of students who register for the first year of the BSc four-year programmes to pass all the prescribed modules of the first year.

Progression requirement

The first year is foundational to the mainstream modules that follow; students will be limited to repeating two foundation modules during year 2 of study. Students may apply for internal transfers at the end of year 2. Not all mainstream programmes will be accessible; the Faculty's transfer guide will clearly outline all possibilities and the overarching objective will be that approved transfers will not involve adding an additional year of study.

Curriculum: Year 1

Minimum credits: 100

Fundamental = 20

Core = 80

Fundamental modules

Academic information management 111 (AIM 111)

Module credits	4.00
NQF Level	05
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

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

Academic information management 121 (AIM 121)

Module credits	4.00
NQF Level	05
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion Faculty of Veterinary Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week

Language of tuition Module is presented in English

Department Informatics

Period of presentation Semester 2

Module content

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

Language, life and study skills 133 (LST 133)

Module credits 6.00

NQF Level 05

Service modules Faculty of Economic and Management Sciences

Prerequisites Admission into BSc Four-year programme

Contact time 1 lecture per week, Foundation Course, 2 tutorials 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 academic demands of scientific disciplines, with a strong focus on high order thinking skills and academic reading skills and strategies.

Language, life and study skills 143 (LST 143)

Module credits 6.00

NQF Level 05

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Economic and Management Sciences

Prerequisites LST 133

Contact time 2 tutorials per week, 1 lecture per week, Foundation Course

Language of tuition Module is presented in English

Department Unit for Academic Literacy

Period of presentation Semester 2

Module content

The module aims to equip students with the ability to cope with the academic demands of scientific disciplines, with a strong focus on high order thinking skills and academic/scientific writing skills.

Academic orientation 102 (UPO 102)

Module credits 0.00

NQF Level	00
Language of tuition	Module is presented in English
Department	Natural and Agricultural Sciences Dean's Office
Period of presentation	Year

Core modules

Foundational biology 137 (BIO 137)

Module credits	8.00
NQF Level	05
Prerequisites	Admission to relevant programme
Contact time	1 practical fortnightly, 1 tutorial fortnightly, Foundation Course, 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

In this module, students will embark on a journey to understand the nature and scope of biology, delving into its importance in unravelling the mysteries of life. They will explore the essential characteristics of living organisms, encompassing cellular structure, metabolic processes, growth, reproduction, and adaptation. The scientific method, serving as a structured framework for inquiry, hypothesis formulation, experimentation, and evidence-based conclusion making, will be examined. The molecular basis of life, encompassing carbohydrates, lipids, proteins, and nucleic acids, and their significance in cellular structure and function will be studied. The intricate workings of cells and organelles will be introduced, along with DNA structure and replication. Furthermore, they will explore the complexities of the cell cycle, including mitosis and meiosis, and their important roles in growth, development, and genetic inheritance. Hands-on laboratory activities will include microscope operation, specimen preparation, and techniques for calculating magnification.

Foundational biology 147 (BIO 147)

Module credits	8.00
NQF Level	05
Prerequisites	Admission to relevant programme
Contact time	1 tutorial fortnightly, Foundation Course, 1 practical fortnightly, 2 lectures per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2



Module content

In this module, students will explore various aspects of biology and ecology, starting with metabolic pathways like cellular respiration and photosynthesis, elucidating how cells obtain and utilize energy. They will delve into evolutionary principles such as natural selection, adaptation, and speciation, and their role in shaping the diversity of life. The concept of taxonomy will be introduced, clarifying its role in categorizing organisms based on shared characteristics. Additionally, students will explore the tree of life as a visual representation of the evolutionary lineage of all living beings. Ecological concepts such as trophic levels, biodiversity hotspots, and ecosystem services will be discussed to emphasize their critical role in sustaining life on Earth. The module will also showcase Africa's remarkable biodiversity, ranging from its megafauna to its diverse array of plant and microbial life. Students will delve into conservation ecology within the context of Africa, analyzing strategies aimed at preserving biodiversity, addressing human-wildlife conflicts, and fostering sustainable development practices. Lastly, the module will address global challenges such as food security and climate change, examining their profound implications for humanity's future.

Foundational chemistry 137 (CMY 137)

Module credits 8.00

NQF Level 05

Prerequisites Admission to relevant programme

Contact time 2 lectures per week, 1 tutorial fortnightly, Foundation Course, 1 practical fortnightly

Language of tuition Module is presented in English

Department Chemistry

Period of presentation Semester 1

Module content

The first semester of foundational chemistry will introduce scientific communication to students in terms of the language of chemistry and necessary mathematical skills. The semester will begin with an in-depth study of dimensional analysis which paves the way for mole concept calculations and complex stoichiometry. Chemical reactions, including equations, types of reactions and redox reactions will round off the first semester of study.

Foundational chemistry 147 (CMY 147)

Module credits 8.00

NQF Level 05

Prerequisites Admission to relevant programme.

Contact time 2 lectures per week, Foundation Course, 1 tutorial fortnightly, 1 practical fortnightly

Language of tuition Module is presented in English

Department Chemistry

Period of presentation Semester 2

Module content

The second semester of foundational chemistry will begin with naming, bonding and molecular geometries. Molecular geometry will form the basis for intermolecular forces, phases of matter and different domains of thinking within the chemistry discipline. Thinking on the macroscopic, submicroscopic and representational domains is essential for future scientists. Embedded throughout the course will be a systems thinking approach to chemistry, seeing chemistry as an integral part of a global whole.

Foundational physics 137 (PHY 137)

Module credits	8.00
NQF Level	05
Prerequisites	Admission to relevant programme.
Contact time	2 lectures per week, 1 practical fortnightly, 1 tutorial fortnightly, Foundation Course
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 1

Module content

This module introduces the fundamental principles and tools of physics. Students will gain mastery in measurement techniques, data analysis through graphical representations, and dimensional analysis to identify hidden relationships. Subsequently, the module focuses on one-dimensional kinematics, emphasizing the concepts of position, velocity, and acceleration. Further exploration delves into longitudinal and transverse waves, investigating their properties and propagation mechanisms. The module then introduces physical optics, exploring the behaviour of light through lenses and the formation of images. Finally, the foundations of thermodynamics are established, focusing on the concepts of heat, temperature, and heat capacity.

Foundational physics 147 (PHY 147)

Module credits	8.00
NQF Level	05
Prerequisites	Admission to relevant programme.
Contact time	1 tutorial fortnightly, 2 lectures per week, Foundation Course, 1 practical fortnightly
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 2

Module content

Building upon the previous semester, vector algebra will be introduced, including notation, addition, coordinate systems, and manipulation of magnitudes and angles. Kinematics expands to two- and three-dimensional motion, providing a comprehensive understanding of real-world scenarios. The core of the module focuses on mechanics, analysing the interplay of forces, inertia, and motion governed by Newton's laws. Concepts of momentum, impulse, and conservation laws are introduced. Further exploration investigates equilibrium of forces, friction, and the dynamics of circular motion. These concepts lead to energy principles including work, kinetic energy, the work-energy theorem and power, potential energy, conservative and non-conservative forces and collisions. The module concludes with an introduction to direct current circuits, exploring the flow of current in resistor-based circuits.

Foundational statistics 137 (STC 137)

Module credits 8.00

NQF Level 05

Prerequisites Admission to relevant programme.

Contact time 2 lectures per week, 1 tutorial per week, Foundation Course

Language of tuition Module is presented in English

Department Statistics

Period of presentation Semester 1

Module content

Data literacy in modern society: fundamental understanding of data and its presentation. Data ethics, importing, cleaning, manipulation and handling. Sources and types of data. Sampling methods and the collection of data. Statistical concepts are demonstrated and interpreted through Excel (practical coding) and simulation within a data science framework.

Foundational statistics 147 (STC 147)

Module credits 8.00

NQF Level 05

Prerequisites Admission to relevant programme.

Contact time 1 tutorial per week, Foundation Course, 2 lectures per week

Language of tuition Module is presented in English

Department Statistics

Period of presentation Semester 2

Module content

Exploratory data analysis: tabulation, data visualisation and descriptive measures of location and dispersion. Introduction to probability and counting techniques. Aims of data analysis: descriptive, inferential and predictive. Statistical concepts are demonstrated and interpreted through Excel (practical coding) and simulation within a data science framework.

Foundational mathematics 137 (WTW 137)

Module credits	8.00
NQF Level	05
Prerequisites	Admission to relevant programme.
Contact time	2 lectures per week, Foundation Course, 1 tutorial per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

This module serves as an introduction to algebra, functions, sequences, and trigonometry, and it aims to deepen students' conceptual understanding of real numbers, elementary set notation, exponents, radicals, algebraic expressions, fractional expressions, linear and quadratic equations, and inequalities. Coordinate geometry: lines, and circles are discussed. Functions are presented numerically, symbolically, graphically, and verbally, focusing on the definition, notation, piecewise-defined functions, domain and range, graphs, transformations of functions, symmetry, even and odd functions, combining functions, one-to-one functions and inverses, polynomial functions and zeros. Trigonometry: the relationship between degrees and radians measure is discussed, as well as the unit circle, trigonometric functions, fundamental identities, trigonometric graphs, trigonometric identities, double-angle, half-angle formulae, trigonometric equations, and applications.

Foundational mathematics 147 (WTW 147)

Module credits	8.00
NQF Level	05
Prerequisites	Admission to relevant programme.
Contact time	1 tutorial per week, Foundation Course, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

The second-semester mathematics module focuses on the mathematical order of numbers and applications: Arithmetic and geometric sequences and series, summation notation, infinite geometric series, compound interest, annuities and instalments, exponential and logarithmic equations, followed by the laws of logarithms. Furthermore, one-to-one functions are extended to exponential and logarithmic functions. An introduction to calculus focusing on finding limits numerically and graphically, finding limits algebraically, techniques for evaluating limits, and differentiation rules.

Curriculum: Year 2

Minimum credits: 128

Core modules = 128

Core modules

Biometry 120 (BME 120)

Module credits 16.00

NQF Level 05

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Natural and Agricultural Sciences
Faculty of Veterinary Science

Prerequisites At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123

Contact time 4 lectures per week, 1 practical per week

Language of tuition Module is presented in English

Department Statistics

Period of presentation Semester 2

Module content

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

Plants and society 161 (BOT 161)

Module credits 8.00

NQF Level 05

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

Prerequisites MLB 111 GS

Contact time 2 lectures per week, fortnightly practicals

Language of tuition Module is presented in English

Department Department of Plant and Soil Sciences

Period of presentation Semester 2



Module content

Botanical principles of structure and function; diversity of plants; introductory plant systematics and evolution; role of plants in agriculture and food security; principles and applications of plant biotechnology; economical and valuable medicinal products derived from plants; basic principles of plant ecology and their application in conservation and biodiversity management.

This content aligns with the United Nation's Sustainable Development Goals of No Poverty, Good Health and Well-being, Climate Action, Responsible Consumption and Production, and Life on Land.

General chemistry 117 (CMY 117)

Module credits 16.00

NQF Level 05

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

Prerequisites A candidate must have Mathematics for at least 60% and 60% for Physical Sciences.

Contact time 4 lectures per week, 1 practical 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 VSEPR-model. Nomenclature of inorganic ions and compounds. Classification of reactions: precipitation, acid-base, redox reactions and gas-forming reactions. Mole concept and stoichiometric calculations concerning chemical formulas and chemical reactions. Principles of reactivity: energy and chemical reactions. Physical behaviour gases, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to chemical kinetics.

General chemistry 127 (CMY 127)

Module credits 16.00

NQF Level 05

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

Prerequisites Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none

Contact time 1 practical per week, 4 lectures per week

Language of tuition Module is presented in English



Department Chemistry

Period of presentation Semester 2

Module content

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

Introductory genetics 161 (GTS 161)

Module credits 8.00

NQF Level 05

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

Prerequisites MLB 111 GS

Contact time fortnightly 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

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

Introduction to microbiology 161 (MBY 161)

Module credits 8.00

NQF Level 05

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites No prerequisites.

Contact time 2 lectures per week, fortnightly tutorials

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

Period of presentation Semester 2

Module content

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

Molecular and cell biology 111 (MLB 111)

Module credits 16.00

NQF Level 05

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

Prerequisites A candidate who has passed Mathematics with at least 60% in the Grade 12 examination

Contact time 4 lectures per week, 1 practical/tutorial per week

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

Period of presentation Semester 1

Module content

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

Physics for biology students 131 (PHY 131)

Module credits 16.00

NQF Level 05

Service modules
Faculty of Education
Faculty of Health Sciences
Faculty of Veterinary Science

Prerequisites A candidate must have passed Mathematics with at least 60% in the Grade 12 examination

Contact time 1 discussion class per week, 1 practical per week, 4 lectures per week

Language of tuition Module is presented in English

Department Physics



Period of presentation Semester 1

Module content

Note: PHY 131 is aimed at students who will not continue with physics. PHY 131 cannot be used as a substitute for PHY 114.

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, radioactivity.

Mathematics 134 (WTW 134)

Module credits 16.00

NQF Level 05

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

Prerequisites 50% for Mathematics in Grade 12

Contact time 1 tutorial per week, 4 lectures per week

Language of tuition Module is presented in English

Department Mathematics and Applied Mathematics

Period of presentation Semester 1

Module content

**Students will not be credited for more than one of the following modules for their degree: WTW 134, WTW 165, WTW 114, WTW 158. WTW 134 does not lead to admission to Mathematics at 200 level and is intended for students who require Mathematics at 100 level only. WTW 134 is offered as WTW 165 in the second semester only to students who have applied in the first semester of the current year for the approximately 65 MBChB, or the 5-6 BChD places becoming available in the second semester and who were therefore enrolled for MGW 112 in the first semester of the current year.*

Functions, derivatives, interpretation of the derivative, rules of differentiation, applications of differentiation, integration, interpretation of the definite integral, applications of integration. Matrices, solutions of systems of equations. All topics are studied in the context of applications.

Animal diversity 161 (ZEN 161)

Module credits 8.00

NQF Level 05

Service modules Faculty of Education
Faculty of Veterinary Science

Prerequisites No prerequisites.

Contact time 2 lectures per week, fortnightly practicals

Language of tuition Module is presented in English

Department Zoology and Entomology

Period of presentation Semester 2

Module content

Animal classification, phylogeny organisation and terminology. Evolution of the various animal phyla, morphological characteristics and life cycles of parasitic and non-parasitic animals. Structure and function of reproductive, respiratory, excretory, circulatory and digestive systems in various animal phyla. In-class discussion will address the sustainable development goals #3, 12, 13, 14 and 15 (Good Health and Well-being. Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land).

Curriculum: Year 3

Minimum credits: 144

Core modules	= 120
Elective modules	= 24

It is the student's responsibility to ensure that no clashes will occur between modules as well as that the necessary prerequisites have been met.

Core modules

Biometry 210 (BME 210)

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

Module content

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

South African flora and vegetation 251 (BOT 251)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Education
Prerequisites	BOT 161
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

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

Plant physiology and biotechnology 261 (BOT 261)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Education
Prerequisites	BOT 161 and CMY 127 GS.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Nitrogen metabolism in plants; nitrogen fixation in Agriculture; plant secondary metabolism and natural products; photosynthesis and carbohydrate metabolism in plants; applications in solar energy; plant growth regulation and the Green Revolution; plant responses to the environment; developing abiotic stress tolerant and disease resistant plants. Practicals: Basic laboratory skills in plant physiology; techniques used to investigate nitrogen metabolism, carbohydrate metabolism, pigment analysis, water transport in plant tissue and response of plants to hormone treatments.

Geographic information systems introduction 221 (GIS 221)

Module credits	12.00
NQF Level	06
Prerequisites	Prohibited combination GGY 283. Max 350 students.
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

Note: Enrolment is limited. Preference will be given based on choice of majors. Students should enquire at the department if they wish to register for the module, but are unable to do so.

*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. Examples used throughout the course are drawn from South African case studies.

Introductory soil science 250 (GKD 250)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	CMY 117 GS
Contact time	3 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Soil is a finite resource and with the global challenges we are facing, it is more important than ever to understand and sustainably manage soil. Our daily lives are impacted by soil in several ways, including the food we eat, the water we drink, and the environment we live in. In this Introductory Soils module, we will look at how basic and more advanced abiotic and biotic soil properties impact us and the larger environment. We will also examine the fundamental principles behind sustainable soil use management.

Molecular genetics 251 (GTS 251)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 161 GS
Contact time	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
NQF Level	06
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 251 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 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.

Invertebrate biology 251 (ZEN 251)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Education
Prerequisites	ZEN 161 GS
Contact time	2 lectures per week, 1 practical every 2nd week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Semester 1

Module content

Origin and extent of modern invertebrate diversity; parasites of man and domestic animals; biology and medical importance of arachnids and insects; insect life styles; the influence of the environment on insect life histories; insect herbivory; predation and parasitism; insect chemical, visual, and auditory communication. Examples used in the module are relevant to the sustainable development goals of Life on Land and Good Health and Well-being.

African vertebrates 261 (ZEN 261)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Education
Prerequisites	ZEN 161 GS
Contact time	2 lectures per week, 1 practical every 2nd week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Semester 2

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. The module addresses the sustainable development goals of Life below Water and Life on Land.

Elective modules

Introduction to proteins and enzymes 251 (BCM 251)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Health Sciences
Prerequisites	CMY 117 GS and CMY 127 GS and MLB 111 GS
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

Structural and ionic properties of amino acids. Peptides, the peptide bond, primary, secondary, tertiary and quaternary structure of proteins. Interactions that stabilise protein structure, denaturation and renaturation of proteins. Introduction to methods for the purification of proteins, amino acid composition, and sequence determinations. Enzyme kinetics and enzyme inhibition. Allosteric enzymes, regulation of enzyme activity, active centres and mechanisms of enzyme catalysis. Examples of industrial applications of enzymes and in clinical pathology as biomarkers of diseases. Online activities include introduction to practical laboratory techniques and Good Laboratory Practice; techniques for the quantitative and qualitative analysis of biological molecules; enzyme activity measurements; processing and presentation of scientific data.

Introductory biochemistry 257 (BCM 257)

Module credits	12.00
NQF Level	06
Prerequisites	CMY 117 GS and CMY 127 GS and MLB 111 GS
Contact time	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 1

Module content

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

Bacteriology 251 (MBY 251)

Module credits	12.00
NQF Level	06
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MBY 161 GS
Contact time	2 lectures per week, fortnightly practicals
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
NQF Level	06
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.

Introduction to crop protection 251 (PLG 251)

Module credits 12.00

NQF Level 06

Prerequisites No prerequisites.

Contact time 1 practical per week, 2 lectures per week

Language of tuition Module is presented in English

Department Department of Plant and Soil Sciences

Period of presentation Semester 1

Module content

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

Curriculum: Final year

Minimum credits: 144

Core modules = 144

Core modules

Plant ecophysiology 356 (BOT 356)

Module credits	18.00
NQF Level	07
Service modules	Faculty of Education
Prerequisites	BOT 161
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Introduction to plant ecophysiology and plants response to environmental stress. Understanding how various biotic and abiotic factors affect plant metabolic processes, including photosynthesis and respiration. Emphasis is placed on the efficiency of the mechanisms whereby C3-, C4 and CAM-plants bind CO₂ and how they are impacted by the environment. To understand the functioning of plants in diverse environments, the relevant structural properties of plants, the impact of soil composition, water flow in the soil-plant air continuum and long distance transport of assimilates will be discussed. Students will research a topic relevant to plant ecophysiology and present this in the form of an oral presentation. Students will conduct a practical project to study the effects of environmental factors on C3 and C4 plant growth and physiology. Students will present the report in a written format according to the guidelines of a relevant scientific journal. Relevant readings will be used to highlight the alignment of the module with the Sustainable Development Goals, with emphasis placed on climate action.

Plant ecology 358 (BOT 358)

Module credits	18.00
NQF Level	07
Prerequisites	BOT 161 and BOT 251.
Contact time	2 lectures per week, 2 days field-based practical, 1 practical per week
Language of tuition	Module is presented in 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. There is a compulsory field-based practical run over a weekend in the first month of the first semester.

Plant diversity 366 (BOT 366)

Module credits 18.00

NQF Level 07

Service modules Faculty of Education

Prerequisites BOT 161

Contact time 2 lectures per week, 1 practical per week

Language of tuition Module is presented in 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

NQF Level 07

Service modules Faculty of Education

Prerequisites No prerequisites.

Contact time 2 lectures per week, 1 practical per week

Language of tuition Module is presented in English

Department Zoology and Entomology

Period of presentation Semester 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, human population. Examples throughout the module are relevant to the sustainable development goals of Life on Land and Good Health and Well-being.

Community ecology 353 (ZEN 353)

Module credits 18.00

NQF Level 07

Service modules Faculty of Education

Prerequisites ZEN 351 GS or BOT 358 GS

Contact time 2 lectures per week, 1 practical per week

Language of tuition Module is presented in English

Department Zoology and Entomology

Period of presentation Semester 2

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. The module addresses the sustainable development goals Good Health and Well-being, Sustainable Cities and Communities, Climate Action and Life on Land.

Evolution and phylogeny 362 (ZEN 362)

Module credits 18.00

NQF Level 07

Service modules Faculty of Education

Prerequisites No prerequisites.

Contact time 1 practical per week, 2 lectures per week

Language of tuition Module is presented in English

Department Zoology and Entomology

Period of presentation Semester 2

Module content

This module focuses on micro and macro-evolutionary processes and patterns, from the population level (selection, drift, general population genetics) to clines, subspecies and species. Phylogeography, phylogenetic reconstruction, taxonomy and the genetic and developmental constraints operating at the different levels, are addressed. This module forms the basis for understanding and attaining sustainable development goals 14 and 15 (protection/conservation of aquatic and terrestrial ecosystems), and acknowledges the importance of biodiversity for the sustainability of our own species.

Behavioural ecology 363 (ZEN 363)

Module credits	18.00
NQF Level	07
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Semester 2

Module content

The history of behavioural ecology. A causal, developmental, evolutionary and adaptive approach. Sensory systems and communication. Sexual selection, mate choice and sperm competition. Kin selection and group living. Special reference to social insects. The behavioural ecology of humans. Phylogenetic basis of behavioural analysis. The role of behavioural ecology in conservation planning. The module covers sustainable development goals 1-10 and 12-15.

Conservation ecology 364 (ZEN 364)

Module credits	18.00
NQF Level	07
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Zoology and Entomology
Period of presentation	Semester 1

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. In addition, students will generate a multi-media project designed to inform the general public about a key conservation issue. Over the course of the module, students will be exposed to a number of issues that link directly to sustainable development goals Clean Water and Sanitation, Affordable and Clean Energy, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water & Life on Land, and gain valuable theoretical and practical experience in the field of conservation biology.

General Academic Regulations and Student Rules

The [General Academic Regulations \(G Regulations\)](#) and [General Student Rules](#) apply to all faculties and registered students of the University, as well as all prospective students who have accepted an offer of a place at the University of Pretoria. On registering for a programme, the student bears the responsibility of ensuring that they familiarise themselves with the General Academic Regulations applicable to their registration, as well as the relevant faculty-specific and programme-specific regulations and information as stipulated in the relevant yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations. The G Regulations are updated annually and may be amended after the publication of this information.

Regulations, degree requirements and information

The faculty regulations, information on and requirements for the degrees published here are subject to change and may be amended after the publication of this information.

University of Pretoria Programme Qualification Mix (PQM) verification project

The higher education sector has undergone an extensive alignment to the Higher Education Qualification Sub-Framework (HEQSF) across all institutions in South Africa. In order to comply with the HEQSF, all institutions are legally required to participate in a national initiative led by regulatory bodies such as the Department of Higher Education and Training (DHET), the Council on Higher Education (CHE), and the South African Qualifications Authority (SAQA). The University of Pretoria is presently engaged in an ongoing effort to align its qualifications and programmes with the HEQSF criteria. Current and prospective students should take note that changes to UP qualification and programme names, may occur as a result of the HEQSF initiative. Students are advised to contact their faculties if they have any questions.