



# University of Pretoria Yearbook 2016

## BSc Extended programme - Biological and Agricultural Sciences (02130008)

**Duration of study** 4 years

**Total credits** 492

### Admission requirements

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

Minimum requirements for 2016												
Achievement level												
Afrikaans or English				Mathematics				Physical Sciences				APS
NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
4	3	D	D	4	3	D	D	4	3	D	D	24

NBT compulsory

### Additional requirements

- Students who are admitted to one of the BSc four-year programmes register for one specific programme. Three extended programmes are available:
  - BSc (Four-year programme) – Mathematical Sciences
  - BSc (Four-year programme) – Biological and Agricultural Sciences
  - BSc (Four-year programme) – Physical Sciences
- These programmes are followed by students who, as a result of exceptional circumstances, will benefit from an extended programme.
- 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 by being placed on the BSc (Four-year programme). Generally the BSc (Four-year programme) means that the first study year in Mathematics, Physics, Biology and Chemistry is extended to take two years. After completing the BSc (Four-year programme) successfully, students join the second year of the normal BSc programme to complete their degrees. The possibility of switching over to other faculties such as Engineering, Built Environment and



- Information Technology, Veterinary Science and Health Sciences, after one or two years in the four-year programme, exists. This depends on selection rules and other conditions stipulated by the other faculties.
- d. Students who wish to follow one of the BSc four-year programmes will be subjected to an Institutional Proficiency Test and will be considered for admission by the Admissions Committee. Information in this regard is available at the Client Services Centre.
  - e. Applications for admission to the BSc (Four-year programme) should be submitted before 30 September each year. Details are obtainable from the Student Administration at the Faculty of Natural and Agricultural Sciences.
  - f. The rules and regulations applicable to the normal study programmes apply mutatis mutandis to the BSc (Four-year programme), with exceptions as indicated in the regulations pertaining to the BSc (Four-year programme). For instance, students placed in the BSc (Four-year programme) must have a National Senior Certificate with admission for degree purposes.
  - g. An admissions committee considers applications for the BSc (Four-year programme) annually. Regarding subject choices, admitted students are individually placed on the BSc (Four-year programme) according to their prospective field of study. Students may NOT change this placement without the permission of the Chairperson of the admissions committee.

## Other programme-specific information

With regard to the rest of the third semester modules(second year, first semester) and the second semester, prescribed modules must be selected from the normal BSc programme of the student's choice.

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 ascertain, 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

### Academic promotion requirements

It is expected of students who register for the first year of the BSc (Four-year programme) to pass all the prescribed modules of the first year.

It is expected of students accepted into the BSc (Four-year programme) to finish a complete corresponding BSc first year within the two years of enrolment in the BSc (Four-year programme). Students who do not show progress during the first semester of the first year will be referred to the Admissions Committee of the Faculty.



## Curriculum: Year 1

**Minimum credits: 88**

### Fundamental modules

#### Language, life and study skills 133 (LST 133)

**Module content:**

In this module students use different information and time management strategies, build academic vocabulary, revise basic grammar concepts and dictionary skills, examine learning styles, memory and note-taking techniques, practise academic reading skills and explore basic research and referencing techniques, learn how to use discourse markers and construct definitions, and are introduced to paragraph writing. The work is set in the context of the students' field of study.

**Module credits** 8.00

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

**Prerequisites** As for BSc Four-year programme and BCom Four-year programme

**Contact time** 4 discussion classes per week, Foundation Course, MAMELODI

**Language of tuition** English

**Academic organisation** Natural + Agric Sciences Dean

**Period of presentation** Semester 1

#### Language, life and study skills 143 (LST 143)

**Module content:**

In this module students learn how to interpret and use visual literacy conventions. Students write more advance paragraphs, and also learn how to structure academic writing, how to refine their use of discourse markers and referencing techniques and how to structure their own academic arguments. Students' writing is expected to be rational, clear and concise. As a final assignment all aspects of the LST 133 and LST 143 modules are combined in a research assignment. In this project, students work in writing teams to produce a chapter on a career and to present an oral presentation of aspects of the chapter. The work is set in the context of the students' field of study.

**Module credits** 8.00

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

**Prerequisites** LST 133

**Contact time** Foundation Course, 4 discussion classes per week, MAMELODI

**Language of tuition** English

**Academic organisation** Natural + Agric Sciences Dean

**Period of presentation** Semester 2



## Academic information management 111 (AIM 111)

### Module content:

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

**Module credits** 4.00

### Service modules

Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Economic and Management Sciences  
Faculty of Humanities  
Faculty of Law  
Faculty of Health Sciences  
Faculty of Natural and Agricultural Sciences  
Faculty of Theology

**Prerequisites** No prerequisites.

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

**Language of tuition** Both Afr and Eng

**Academic organisation** Information Science

**Period of presentation** Semester 1

## Academic information management 121 (AIM 121)

### Module content:

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

**Module credits** 4.00

### 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  
Faculty of Veterinary Science

**Prerequisites** No prerequisites.

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

**Language of tuition** Both Afr and Eng

**Academic organisation** Information Science

**Period of presentation** Semester 2



## Academic orientation 120 (UPO 120)

<b>Module credits</b>	0.00
<b>Language of tuition</b>	Double Medium
<b>Academic organisation</b>	Humanities Dean's Office
<b>Period of presentation</b>	Year

## Core modules

### Chemistry 133 (CMY 133)

#### Module content:

The field of Chemistry – an overview; Mathematics in Chemistry; atomic theory: historical overview; atoms, molecules and ions; relative atomic mass; electronic structure of atoms; the periodic table; periodicity; chemical bonding.

<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	As for BSc Four-year programme
<b>Contact time</b>	Fortnightly practicals, Foundation Course, 3 discussion classes per week, 2 lectures per week, MAMELODI
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Chemistry
<b>Period of presentation</b>	Semester 1

### Chemistry 143 (CMY 143)

#### Module content:

Bonding and molecular geometry: VSEPR theory; bonding and organic compounds (structural formulas, classification and nomenclature); matter and its properties; mole concept; reaction stoichiometry; reactions in aqueous solutions: precipitation, acid base and redox.

<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	CMY 133
<b>Contact time</b>	2 lectures per week, MAMELODI, 3 discussion classes per week, Foundation Course, Fortnightly practicals
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Chemistry



**Period of presentation** Semester 1

### **Molecular and cell biology 133 (MLB 133)**

**Module content:**

The scientific method, the meaning of life, principles of microscopy, introduction to taxonomy and systematics, introductory study of the structure, function and composition of akaryotes, HIV/ Aids, the immune system and other health issues, ecosystems and human interference.

**Module credits** 8.00

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

**Prerequisites** As for BSc Four-year programme

**Contact time** MAMELODI, 2 discussion classes per week, 2 practicals per week, 2 lectures per week, Foundation Course

**Language of tuition** English

**Academic organisation** Plant and Soil Sciences

**Period of presentation** Semester 1

### **Molecular and cell biology 143 (MLB 143)**

**Module content:**

Chemistry of the cell, introduction to the structure, function and composition of prokaryotic and eukaryotic cells, energy and cellular metabolism, photosynthesis.

**Module credits** 8.00

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

**Prerequisites** MLB 133

**Contact time** 2 practicals per week, 2 lectures per week, MAMELODI, Foundation Course, 2 discussion classes per week

**Language of tuition** English

**Academic organisation** Plant and Soil Sciences

**Period of presentation** Semester 2

### **Physics 133 (PHY 133)**

**Module content:**

Heat: temperature and scales, the kinetic molecular model, work, energy and heat, calorimetry, specific heat, expansion, heat transfer. Measurements: SI-units, measuring error and uncertainty, (graphs), significant figures, mathematical modelling. Geometrical optics: reflection, refraction, dispersion, mirrors, thin lenses, instruments.

**Module credits** 8.00



<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	As for BSc Four-year programme
<b>Contact time</b>	MAMELODI, 2 practicals per week, 2 lectures per week, Foundation Course, 2 discussion classes per week
<b>Language of tuition</b>	English
<b>Academic organisation</b>	Physics
<b>Period of presentation</b>	Semester 1

## Precalculus 133 (WTW 133)

### Module content:

Real numbers, elementary set notation, exponents and radicals. Algebraic expressions, fractional expressions, linear and quadratic equations, inequalities. Coordinate geometry: lines, circles. Functions: 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.

Sequences, summation notation, arithmetic, geometric sequences, infinite geometric series, annuities and instalments. Degrees and radians, unit circle, trigonometric functions, fundamental identities, trigonometric graphs, trigonometric identities, double-angle, half-angle formulae, trigonometric equations, applications.

This module is only offered in English at the Mamelodi Campus for the BSc Extended programme. At the Hatfield and Groenkloof campuses it is offered in English and Afrikaans.

**Module credits** 8.00

<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Health Sciences
<b>Prerequisites</b>	BSc and BCom students: At least 3 (40-49%) in Mathematics in the Grade 12 examination and must be taken concurrently with WTW133
<b>Contact time</b>	3 lectures per week, Foundation Course, MAMELODI, 1 practical per week
<b>Language of tuition</b>	English
<b>Academic organisation</b>	Mathematics and Applied Maths
<b>Period of presentation</b>	Semester 1

## Calculus 144 (WTW 144)

### Module content:

Functions: Rate of change, exponential functions, the natural logarithm, exponential growth and decay, proportionality, power functions, fitting formulas to data. Rates of change and the derivative: Instantaneous rate of change, the derivative function, interpretations of the derivative, the second derivative.

Differentiation: Formulas and rules, applications, extremes of a function. All topics are studied in the context of



applications.

<b>Module credits</b>	8.00
<b>Prerequisites</b>	WTW 133
<b>Contact time</b>	Foundation Course, MAMELODI, 1 tutorial per week, 3 lectures per week
<b>Language of tuition</b>	English
<b>Academic organisation</b>	Mathematics and Applied Maths
<b>Period of presentation</b>	Semester 2

## Physics 144 (PHY 144)

### Module content:

The main topics covered in this module are Mechanics and Thermodynamics. Kinematics: Basic types of motion, one-dimensional motion, two- and three dimensional motion, linear momentum and its conservation, multi-object systems and the centre of mass.

Forces: Types of forces, Newton's Laws of Mechanics and applications, friction.

Energy: Work, heat, conservation of mechanical energy.

Thermodynamics: First law of thermodynamics, empirical gas laws, mechanical model of the ideal gas, energy of the ideal gas, basic thermodynamic processes.

<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Education
<b>Prerequisites</b>	PHY 133
<b>Contact time</b>	1 practical per week, 4 lectures per week, MAMELODI, Foundation Course
<b>Language of tuition</b>	English
<b>Academic organisation</b>	Physics
<b>Period of presentation</b>	Semester 2





## Curriculum: Year 2

**Minimum credits: 32**

### Core modules

#### Chemistry 154 (CMY 154)

**Module content:**

Principles of reactivity: energy and chemical reactions. Physical behaviour of gasses, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to Chemical kinetics. Introduction to chemical equilibrium. Introduction to organic chemistry: hybridisation, isomers (structural, geometrical and conformational), additions reactions and reaction mechanisms.

**Module credits** 8.00

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

**Prerequisites** CMY 133 and CMY 143

**Contact time** 3 lectures per week, 2 tutorials per week, fortnightly practicals, Foundation Course

**Language of tuition** English

**Academic organisation** Chemistry

**Period of presentation** Semester 1

#### Molecular and cell biology 153 (MLB 153)

**Module content:**

Cell growth and cell division, Mendelian and human genetics, principles of molecular genetics, principles of recombinant DNA technology and its application.

**Module credits** 8.00

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

**Prerequisites** MLB 143

**Contact time** Foundation Course, 2 lectures per week, 2 practicals per week

**Language of tuition** English

**Academic organisation** Genetics

**Period of presentation** Semester 1

#### Physics 154 (PHY 154)

**Module content:**

The main topic in this module is Electricity, Sound, Optics, and Modern Physics.

Static Electricity: Electric charge and force, electric field, the electric energy, electric potential, conservation of



electrical energy.

Flow of charge: Capacitors, application of charge flow to nerves.

Sound: Vibrations, waves in unconfined and confined media, applications to human hearing.

Optics: Reflection, refraction, applications to optometry and ophthalmology.

Atomic physics: Atomic models, x-rays.

Nuclear physics: The stable atomic nucleus, radioactivity, nuclear spin and applications to medical diagnostics.

**Module credits** 8.00

**Service modules** Faculty of Education

**Prerequisites** PHY 143

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

**Language of tuition** English

**Academic organisation** Physics

**Period of presentation** Semester 1

## Finite mathematics 154 (WTW 154)

### Module content:

Integration: Accumulated change, the definite integral, anti-derivatives, the definite integral as an area, interpretations of the definite integral.

Matrices and systems of linear equations: Matrix addition and scalar multiplication, matrix multiplication, systems of linear equations. All topics are studied in the context of applications.

**Module credits** 8.00

**Service modules** Faculty of Education

**Prerequisites** WTW 144

**Contact time** 3 lectures per week, 1 tutorial per week, Foundation Course

**Language of tuition** English

**Academic organisation** Mathematics and Applied Maths

**Period of presentation** Semester 1

## Elective modules

### Principles of marketing management 110 (BEM 110)

#### Module content:

Principles of marketing management and marketing instruments, customer centricity, the process of marketing management, market segmentation, positioning and marketing information systems, environmental analysis, identification of target markets, value creation, positioning strategies, consumer behaviour, relationship marketing, relationship intention, application of product, price, marketing communication and distribution strategies.



<b>Module credits</b>	10.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Marketing Management
<b>Period of presentation</b>	Semester 1

## Biometry 120 (BME 120)

### Module content:

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

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

## Plant biology 161 (BOT 161)

### Module content:

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

<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education



<b>Prerequisites</b>	MLB 111 GS
<b>Contact time</b>	fortnightly practicals, 2 lectures per week
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

## General chemistry 127 (CMY 127)

### Module content:

Theory: General physical-analytical chemistry: Physical behaviour of gases, liquids and solids, intermolecular forces, solutions. Principles of reactivity: energy and chemical reactions, 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 amino acids. Practical: Molecular structure (model building), synthesis and properties of simple organic compounds.

<b>Module credits</b>	16.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
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<b>Prerequisites</b>	Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none
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<b>Contact time</b>	1 practical per week, 4 lectures per week
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<b>Language of tuition</b>	Both Afr and Eng
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<b>Academic organisation</b>	Chemistry
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<b>Period of presentation</b>	Semester 2
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## Science and world views 155 (FIL 155)

### Module content:

This is a broad introduction to the philosophy and history of science. Examples of themes and historical periods which are covered include: world views in ancient Greece; Socrates; Plato – the founder of Western thought; Aristotle – the foundation of a new tradition; Leonardo da Vinci; the foundation of modern science; the wonder years of the seventeenth century – the flourishing of the sciences and philosophy; the rising of mechanization; a drastic turn in man's vision – the rise of psychology; how the theory of relativity changed our view of the cosmos; quantum theory and its implications for the modern world view; the biological sciences and the secrets of life; the rise and role of psychology; the neuro-sciences; the place, role and benefit of philosophical thought in the sciences.

<b>Module credits</b>	6.00
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<b>Service modules</b>	Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 lecture per week
<b>Language of tuition</b>	English
<b>Academic organisation</b>	Philosophy
<b>Period of presentation</b>	Semester 1

## Financial accounting 111 (FRK 111)

### Module content:

The nature and function of accounting; the development of accounting; financial position; financial result; the recording process; processing of accounting data; treatment of VAT; elementary income statement and balance sheet; flow of documents; accounting systems; introduction to internal control and internal control measures; bank reconciliations; control accounts; adjustments; financial statements of a sole proprietorship; the accounting framework.

**Module credits** 10.00

<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Law Faculty of Natural and Agricultural Sciences
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**Prerequisites** No prerequisites.

**Contact time** 4 lectures per week

**Language of tuition** Both Afr and Eng

**Academic organisation** Accounting

**Period of presentation** Semester 1

## Financial accounting 121 (FRK 121)

### Module content:

Property, plant and equipment; intangible assets; inventories; liabilities; presentation of financial statements; enterprises without profit motive; partnerships; companies; close corporations; cash flow statements; analysis and interpretation of financial statements.

**Module credits** 12.00

<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
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**Prerequisites** FRK 111 GS

**Contact time** 4 lectures per week



**Language of tuition** Both Afr and Eng

**Academic organisation** Accounting

**Period of presentation** Semester 2

## Physiology 110 (FSG 110)

### Module content:

Introduction (terminology and anatomical orientation); chemical principles; cytology and histology; neuro-physiology and the senses; haematology and body fluids; cardiovascular system.

**Module credits** 6.00

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

**Prerequisites** No prerequisites.

**Contact time** 3 lectures per week

**Language of tuition** Both Afr and Eng

**Academic organisation** Physiology

**Period of presentation** Semester 1

## Physiology 120 (FSG 120)

### Module content:

Respiratory system; nutrition; digestion and metabolism; kidneys and acid-base equilibrium; endocrinology; reproduction physiology and reproduction; skin and body temperatures.

**Module credits** 6.00

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

**Prerequisites** FSG 110

**Contact time** 3 lectures per week

**Language of tuition** Both Afr and Eng

**Academic organisation** Physiology

**Period of presentation** Semester 2

## Introductory genetics 161 (GTS 161)

### Module content:

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



<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science
<b>Prerequisites</b>	MLB 111 GS
<b>Contact time</b>	fortnightly practicals, 2 lectures per week
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Genetics
<b>Period of presentation</b>	Semester 2

### Introduction to microbiology 161 (MBY 161)

#### Module content:

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

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

### General physics 141 (PHY 141)

#### Module content:

\*This is an anti-semester presentation of the module PHY 131 General Physics 131. Refer to PHY 131 for the content description. Students will not be credited for both PHY 131 and PHY 141 for degree purposes.

<b>Module credits</b>	16.00
<b>Service modules</b>	Faculty of Health Sciences
<b>Prerequisites</b>	PHY 131 GS as well as 50% minimum for the practical component of PHY 131 or TDH
<b>Contact time</b>	1 lecture per week, 2 tutorials per week



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<b>Language of tuition</b>	English
<b>Academic organisation</b>	Physics
<b>Period of presentation</b>	Semester 2

## Psychology 110 (SLK 110)

### Module content:

This module is a general orientation to Psychology. An introduction is given to various theoretical approaches in Psychology, and the development of Psychology as a science is discussed. Selected themes from everyday life are explored and integrated with psychological principles. This module focuses on major personality theories. An introduction is given to various paradigmatic approaches in Psychology.

<b>Module credits</b>	12.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	No prerequisites.
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<b>Contact time</b>	2 discussion classes per week, 2 lectures per week
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<b>Language of tuition</b>	Both Afr and Eng
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<b>Academic organisation</b>	Psychology
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<b>Period of presentation</b>	Semester 1
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## Psychology 120 (SLK 120)

### Module content:

This module introduces the student to a basic knowledge and understanding of the biological basis of human behaviour. The module addresses the key concepts and terminology related to the biological subsystem, the rules and principles guiding biological psychology, and identification of the interrelatedness of different biological systems and subsystems. In this module various cognitive processes are studied, including perception, memory, thinking, intelligence and creativity. Illustrations are given of various thinking processes, such as problem solving, critical, analytic and integrative thinking.

<b>Module credits</b>	12.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	No prerequisites.
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<b>Contact time</b>	2 lectures per week, 2 discussion classes per week
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<b>Language of tuition</b>	Both Afr and Eng
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**Academic organisation** Psychology

**Period of presentation** Semester 2

### Animal diversity 161 (ZEN 161)

#### Module content:

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

**Module credits** 8.00

**Service modules** Faculty of Education  
Faculty of Veterinary Science

**Prerequisites** MLB 111 GS or TDH

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

**Language of tuition** Both Afr and Eng

**Academic organisation** Zoology and Entomology

**Period of presentation** Semester 2

### Basic food preparation 121 (VDS 121)

#### Module content:

Module 1: Principles and practices of food preparation and cooking techniques. Mise en place, weighing and measurement techniques, equipment and terminology as applied in food preparation. Basic food quality control.  
Module 2: Food preparation basics of the following: starches and cereals

**Module credits** 6.00

**Service modules** Faculty of Health Sciences

**Prerequisites** VDS 111

**Contact time** 1 practical per week, 1 lecture per week

**Language of tuition** Double Medium

**Academic organisation** Consumer Science

**Period of presentation** Semester 2



## Curriculum: Final year

**Minimum credits: 32**

### Core modules

#### Chemistry 154 (CMY 154)

**Module content:**

Principles of reactivity: energy and chemical reactions. Physical behaviour of gasses, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to Chemical kinetics. Introduction to chemical equilibrium. Introduction to organic chemistry: hybridisation, isomers (structural, geometrical and conformational), additions reactions and reaction mechanisms.

<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
<b>Prerequisites</b>	CMY 133 and CMY 143
<b>Contact time</b>	3 lectures per week, 2 tutorials per week, fortnightly practicals, Foundation Course
<b>Language of tuition</b>	English
<b>Academic organisation</b>	Chemistry
<b>Period of presentation</b>	Semester 1

#### Molecular and cell biology 153 (MLB 153)

**Module content:**

Cell growth and cell division, Mendelian and human genetics, principles of molecular genetics, principles of recombinant DNA technology and its application.

<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	MLB 143
<b>Contact time</b>	Foundation Course, 2 lectures per week, 2 practicals per week
<b>Language of tuition</b>	English
<b>Academic organisation</b>	Genetics
<b>Period of presentation</b>	Semester 1

#### Physics 154 (PHY 154)

**Module content:**

The main topic in this module is Electricity, Sound, Optics, and Modern Physics.

Static Electricity: Electric charge and force, electric field, the electric energy, electric potential, conservation of



electrical energy.

Flow of charge: Capacitors, application of charge flow to nerves.

Sound: Vibrations, waves in unconfined and confined media, applications to human hearing.

Optics: Reflection, refraction, applications to optometry and ophthalmology.

Atomic physics: Atomic models, x-rays.

Nuclear physics: The stable atomic nucleus, radioactivity, nuclear spin and applications to medical diagnostics.

**Module credits** 8.00

**Service modules** Faculty of Education

**Prerequisites** PHY 143

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

**Language of tuition** English

**Academic organisation** Physics

**Period of presentation** Semester 1

## Finite mathematics 154 (WTW 154)

### Module content:

Integration: Accumulated change, the definite integral, anti-derivatives, the definite integral as an area, interpretations of the definite integral.

Matrices and systems of linear equations: Matrix addition and scalar multiplication, matrix multiplication, systems of linear equations. All topics are studied in the context of applications.

**Module credits** 8.00

**Service modules** Faculty of Education

**Prerequisites** WTW 144

**Contact time** 3 lectures per week, 1 tutorial per week, Foundation Course

**Language of tuition** English

**Academic organisation** Mathematics and Applied Maths

**Period of presentation** Semester 1

## Elective modules

### Principles of marketing management 110 (BEM 110)

#### Module content:

Principles of marketing management and marketing instruments, customer centricity, the process of marketing management, market segmentation, positioning and marketing information systems, environmental analysis, identification of target markets, value creation, positioning strategies, consumer behaviour, relationship marketing, relationship intention, application of product, price, marketing communication and distribution strategies.



<b>Module credits</b>	10.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Marketing Management
<b>Period of presentation</b>	Semester 1

## Biometry 120 (BME 120)

### Module content:

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

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

## Plant biology 161 (BOT 161)

### Module content:

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

<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education



<b>Prerequisites</b>	MLB 111 GS
<b>Contact time</b>	fortnightly practicals, 2 lectures per week
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Plant and Soil Sciences
<b>Period of presentation</b>	Semester 2

## General chemistry 127 (CMY 127)

### Module content:

Theory: General physical-analytical chemistry: Physical behaviour of gases, liquids and solids, intermolecular forces, solutions. Principles of reactivity: energy and chemical reactions, 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 amino acids. Practical: Molecular structure (model building), synthesis and properties of simple organic compounds.

<b>Module credits</b>	16.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
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<b>Prerequisites</b>	Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none
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<b>Contact time</b>	1 practical per week, 4 lectures per week
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<b>Language of tuition</b>	Both Afr and Eng
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<b>Academic organisation</b>	Chemistry
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<b>Period of presentation</b>	Semester 2
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## Science and world views 155 (FIL 155)

### Module content:

This is a broad introduction to the philosophy and history of science. Examples of themes and historical periods which are covered include: world views in ancient Greece; Socrates; Plato – the founder of Western thought; Aristotle – the foundation of a new tradition; Leonardo da Vinci; the foundation of modern science; the wonder years of the seventeenth century – the flourishing of the sciences and philosophy; the rising of mechanization; a drastic turn in man's vision – the rise of psychology; how the theory of relativity changed our view of the cosmos; quantum theory and its implications for the modern world view; the biological sciences and the secrets of life; the rise and role of psychology; the neuro-sciences; the place, role and benefit of philosophical thought in the sciences.

<b>Module credits</b>	6.00
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<b>Service modules</b>	Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 lecture per week
<b>Language of tuition</b>	English
<b>Academic organisation</b>	Philosophy
<b>Period of presentation</b>	Semester 1

## Financial accounting 111 (FRK 111)

### Module content:

The nature and function of accounting; the development of accounting; financial position; financial result; the recording process; processing of accounting data; treatment of VAT; elementary income statement and balance sheet; flow of documents; accounting systems; introduction to internal control and internal control measures; bank reconciliations; control accounts; adjustments; financial statements of a sole proprietorship; the accounting framework.

<b>Module credits</b>	10.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Law Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	No prerequisites.
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<b>Contact time</b>	4 lectures per week
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<b>Language of tuition</b>	Both Afr and Eng
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<b>Academic organisation</b>	Accounting
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<b>Period of presentation</b>	Semester 1
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## Financial accounting 121 (FRK 121)

### Module content:

Property, plant and equipment; intangible assets; inventories; liabilities; presentation of financial statements; enterprises without profit motive; partnerships; companies; close corporations; cash flow statements; analysis and interpretation of financial statements.

<b>Module credits</b>	12.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	FRK 111 GS
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<b>Contact time</b>	4 lectures per week
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**Language of tuition** Both Afr and Eng

**Academic organisation** Accounting

**Period of presentation** Semester 2

## Physiology 110 (FSG 110)

### Module content:

Introduction (terminology and anatomical orientation); chemical principles; cytology and histology; neuro-physiology and the senses; haematology and body fluids; cardiovascular system.

**Module credits** 6.00

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

**Prerequisites** No prerequisites.

**Contact time** 3 lectures per week

**Language of tuition** Both Afr and Eng

**Academic organisation** Physiology

**Period of presentation** Semester 1

## Physiology 120 (FSG 120)

### Module content:

Respiratory system; nutrition; digestion and metabolism; kidneys and acid-base equilibrium; endocrinology; reproduction physiology and reproduction; skin and body temperatures.

**Module credits** 6.00

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

**Prerequisites** FSG 110

**Contact time** 3 lectures per week

**Language of tuition** Both Afr and Eng

**Academic organisation** Physiology

**Period of presentation** Semester 2

## Introductory genetics 161 (GTS 161)

### Module content:

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



<b>Module credits</b>	8.00
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science
<b>Prerequisites</b>	MLB 111 GS
<b>Contact time</b>	fortnightly practicals, 2 lectures per week
<b>Language of tuition</b>	Both Afr and Eng
<b>Academic organisation</b>	Genetics
<b>Period of presentation</b>	Semester 2

### Introduction to microbiology 161 (MBY 161)

#### Module content:

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

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

### General physics 141 (PHY 141)

#### Module content:

\*This is an anti-semester presentation of the module PHY 131 General Physics 131. Refer to PHY 131 for the content description. Students will not be credited for both PHY 131 and PHY 141 for degree purposes.

<b>Module credits</b>	16.00
<b>Service modules</b>	Faculty of Health Sciences
<b>Prerequisites</b>	PHY 131 GS as well as 50% minimum for the practical component of PHY 131 or TDH
<b>Contact time</b>	1 lecture per week, 2 tutorials per week





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<b>Language of tuition</b>	English
<b>Academic organisation</b>	Physics
<b>Period of presentation</b>	Semester 2

## Psychology 110 (SLK 110)

### Module content:

This module is a general orientation to Psychology. An introduction is given to various theoretical approaches in Psychology, and the development of Psychology as a science is discussed. Selected themes from everyday life are explored and integrated with psychological principles. This module focuses on major personality theories. An introduction is given to various paradigmatic approaches in Psychology.

<b>Module credits</b>	12.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	No prerequisites.
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<b>Contact time</b>	2 discussion classes per week, 2 lectures per week
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<b>Language of tuition</b>	Both Afr and Eng
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<b>Academic organisation</b>	Psychology
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<b>Period of presentation</b>	Semester 1
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## Psychology 120 (SLK 120)

### Module content:

This module introduces the student to a basic knowledge and understanding of the biological basis of human behaviour. The module addresses the key concepts and terminology related to the biological subsystem, the rules and principles guiding biological psychology, and identification of the interrelatedness of different biological systems and subsystems. In this module various cognitive processes are studied, including perception, memory, thinking, intelligence and creativity. Illustrations are given of various thinking processes, such as problem solving, critical, analytic and integrative thinking.

<b>Module credits</b>	12.00
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	No prerequisites.
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<b>Contact time</b>	2 lectures per week, 2 discussion classes per week
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<b>Language of tuition</b>	Both Afr and Eng
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**Academic organisation** Psychology

**Period of presentation** Semester 2

### Animal diversity 161 (ZEN 161)

#### Module content:

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

**Module credits** 8.00

**Service modules** Faculty of Education  
Faculty of Veterinary Science

**Prerequisites** MLB 111 GS or TDH

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

**Language of tuition** Both Afr and Eng

**Academic organisation** Zoology and Entomology

**Period of presentation** Semester 2

### Basic food preparation 121 (VDS 121)

#### Module content:

Module 1: Principles and practices of food preparation and cooking techniques. Mise en place, weighing and measurement techniques, equipment and terminology as applied in food preparation. Basic food quality control.  
Module 2: Food preparation basics of the following: starches and cereals

**Module credits** 6.00

**Service modules** Faculty of Health Sciences

**Prerequisites** VDS 111

**Contact time** 1 practical per week, 1 lecture per week

**Language of tuition** Double Medium

**Academic organisation** Consumer Science

**Period of presentation** Semester 2

The information published here is subject to change and may be amended after the publication of this information. The [General Regulations \(G Regulations\)](#) apply to all faculties of the University of Pretoria. It is expected of each student to familiarise himself or herself well with these regulations as well as with the information contained in the [General Rules](#) section. Ignorance concerning these regulations and rules will not be accepted as an excuse for any transgression.