University of Pretoria Yearbook 2016

BSc Information Technology Information and Knowledge Systems (12133211)

Duration of study	3 years
Total credits	475

Admission requirements

- In order to register NSC/IEB/Cambridge candidates must comply with the minimum requirements for degree studies as well as with the minimum requirements for the relevant study programme.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the provisional admission of prospective students.
- A valid National Senior Certificate (NSC) with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required. On first-year level a student has a choice between Afrikaans and English as language medium. In certain cases, tuition may be presented in English only, for example in electives, where the lecturer may not speak Afrikaans or in cases where it is not economically or practically viable.
- Provisional admission to the four-year programme in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.

Note

Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English or Afrikaans, 6 for Mathematics and 5 for Physical Science, will be considered for provisional admission to either the four-year programme or the ENGAGE programme based on the results of the compulsory NBT.

Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 4 in Physical Science, as well as an achievement level of 4 in Afrikaans or English, together with an APS of 25.

Students may apply directly to be considered for the ENGAGE programme.

Minimum requirments for 2016								
Achievement level								
Afrikaans or English				**Wiskunde**				**APS**
NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	

4	3	D	D	5	3	C	C	30 (26-29 admission based on the NBT)

Additional requirements

Please note that additional admission requirements may result from certain elective groups.

Candidates who do not comply with these requirements are advised to register for BSc IT (Four-year programme) if they comply with the admission requirements for the programme.

Promotion to next study year

General

a. A student must pass all the modules of the first year of study, before he or she is permitted to register for any module of the third year of study. Module prerequisites remain applicable. Exceptions to this rule will be considered by the relevant Head of Department and the Dean.
b. A student must pass all the modules of the second year of study, before he or she is permitted to register for any module of the fourth year of study (in the case of a four-year degree). Module prerequisites remain applicable. Exceptions to this rule will be considered by the relevant Head of Department and the Dean.
c. A new first-year student, who has failed in all the prescribed modules of the programme at the end of the first semester, will not be permitted to proceed to the second semester in the School of Information Technology.
d. A student who has not passed at least 70% of the credits of the current year of study after the November examinations will not be re-admitted to the School of Information Technology.
e. Students who fail a module for a second time, forfeit the privilege of registering for any modules of an advanced year of study.
f. Students whose academic progress is not acceptable can be suspended from further studies.

Procedure: Exclusion from and re-admission to further studies in the School of Information Technology

a. A student who is excluded from further studies in terms of the stipulations of the abovementioned regulations will be notified in writing by the Dean or admissions committee of the School of Information Technology at the end of the relevant semester.
b. A student who has been excluded from further studies may apply in writing to the admissions committee of the School of Information Technology on level 6 in the Engineering building I for re-admission.
c. Written applications for re-admission to the second semester must be submitted at least 7 days before lectures resume for the second semester.
d. Written applications for re-admission to the new academic year must be submitted before 12 January.
e. Late applications will be accepted only in exceptional circumstances after approval by the Dean.
f. Should a student not be re-admitted to further studies by the admissions committee of the School of Information Technology, he/she will be informed in writing.
g. A student who is not re-admitted by the admissions committee of the School of Information Technology has the right to appeal to the Appeals Committee: Admissions in the Administration building, room 3-13.
h. Any decision taken by the Appeals Committee: Admissions is final.
i. Should the student be re-admitted by the Admissions Committee, strict conditions will be set which the

student must comply with in order to proceed with his/her studies.

j. A student, who is repeating his or her year, may be permitted by the Dean, on recommendation of the relevant head(s) of department, to register for modules of the following year of study in addition to the outstanding modules he or she has failed, providing that he or she complies with the prerequisites of these modules and no timetable clashes occur. In no semester may the total credits for which a student registers, exceed the normal number of credits per semester by more than 16 credits, except with special permission from the relevant Head of Department.

Pass with distinction

A degree (undergraduate) in the School of IT is conferred with distinction on a student who did not repeat any module of his/her final year, obtained a weighted average of at least 75% in all the prescribed modules for the final year, provided that a subminimum of 65% is obtained in each of these modules and provided that the degree is completed in the prescribed minimum period of time. Ad hoc cases will be considered by the Dean, in consultation with the head of the relevant department.

Curriculum: Year 1

Minimum credits: 170

Fundamental modules

Academic information management 101 (AIM 101)

Module credits	6.00
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
Language of tuition	Both Afr and Eng
Academic organisation	Information Science
Period of presentation	Semester 1

Module content

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology. Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

Academic literacy for Information Technology 121 (ALL 121)

Module credits	6.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	1 web-based period per week, 2 lectures per week
Language of tuition	English
Academic organisation	Unit for Academic Literacy
Period of presentation	Semester 2

Module content

By the end of this module students should be able to cope more confidently and competently with the reading, writing and critical thinking demands that are characteristic of the field of Information Technology.

Academic orientation 112 (UPO 112)

Module credits	0.00
Language of tuition	Double Medium
Academic organisation	EBIT Dean's Office
Period of presentation	Year

Core modules

Program design: Introduction 110 (COS 110)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	COS 153 or COS 131 or COS 132 and Maths level 5 or WTW 133
Contact time	1 tutorial per week, 1 practical per week, 3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Computer Science
Period of presentation	Semester 2

Module content

The focus is on object-oriented (OO) programming. Concepts including inheritance and multiple inheritance, polymorphism, operator overloading, memory management (static and dynamic binding), interfaces, encapsulation, reuse, etc. will be covered in the module. The module teaches sound program design with the emphasis on modular code, leading to well structured, robust and documented programs. A modern OO programming language is used as the vehicle to develop these skills. The module will introduce the student to basic data structures, lists, stacks and queues.

Software modelling 121 (COS 121)

Module credits	16.00
Prerequisites	COS 153 or COS 131 or COS 132
Contact time	1 tutorial per week
Language of tuition	Both Afr and Eng
Academic organisation	Computer Science
Period of presentation	Semester 2

Module content

The module will introduce the concepts of model-driven analysis and design as a mechanism to develop and evaluate complex software systems. Systems will be decomposed into known entities, such as design patterns, classes, relationships, execution loops and process flow, in order to model the semantic aspects of the system in terms of structure and behaviour. An appropriate tool will be used to support the software modelling. The role of the software model in the enterprise will be highlighted. Students who successfully complete this module will be able to conceptualise and analyse problems and abstract a solution.

Introduction to computer science 151 (COS 151)

Module credits	8.00
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 1 practical per week
Language of tuition	Double Medium
Academic organisation	Computer Science
Period of presentation	Semester 1

Module content

This module introduces concepts and terminology related to the computer science discipline. Topics covered include the history of computing, machine level representation of data, Boolean logic and gates, basic computer systems organisation, algorithms and complexity and automata theory. The module also introduces some of the subdisciplines of computer science, such as computer networks, database systems, compilers, information security and intelligent systems.

Calculus 114 (WTW 114)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities
Prerequisites	Refer to Regulation 1.2. Mathematics 60% Grade 12.
Contact time	1 tutorial per week, 4 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 1

Module content

*This module serves as preparation for students majoring in Mathematics (including all students who intend to enrol for WTW 218 and WTW 220). Students will not be credited for more than one of the following modules for their degree: WTW 114, WTW 158, WTW 134, WTW 165.
Functions, limits and continuity. Differential calculus of single variable functions, rate of change, graph sketching, applications. The mean value theorem, the rule of L'Hospital. Definite and indefinite integrals, evaluating definite integrals using anti-derivatives, the substitution rule.

Discrete structures 115 (WTW 115)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences

Prerequisites	Refer to Regulation 1.2: A candidate must have passed Mathematics with at least 50% in the Grade 12 examination
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 1

Module content

Propositional logic: truth tables, logical equivalence, implication, arguments. Mathematical induction and well-ordering principle. Introduction to set theory. Counting techniques: elementary probability, multiplication and addition rules, permutations and combinations, binomial theorem, inclusion-exclusion rule.

Mathematics 134 (WTW 134)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science
Prerequisites	Refer to Regulation 1.2: At least 50% for Mathematics in the Grade 12 examination .
Contact time	4 lectures per week, 1 tutorial per week
Language of tuition	Both Afr and Eng
Academic organisation	Mathematics and Applied Maths
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.

Imperative programming 132 (COS 132)

Module credits	16.00
Service modules	Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	APS of 30 and level 5 (60-69%) Mathematics
Contact time	1 tutorial per week, 1 practical per week, 3 lectures per week
Language of tuition	Both Afr and Eng

Academic organisation	Computer Science
Period of presentation	Semester 1

Module content

*Note: All students registered for degrees within the School of IT, excluding the two four year programmes, BIS (Information Science) and BIS (Publishing), need to enrol for this module.
This module introduces imperative computer programming, which is a fundamental building block of computer science. The process of constructing a program for solving a given problem, of editing it, compiling (both manually and automatically), running and debugging it, is covered from the beginning. The aim is to master the elements of a programming language and be able to put them together in order to construct programs using types, control structures, arrays, functions and libraries. An introduction to object orientation will be given. After completing this module, the student should understand the fundamental elements of a program, the importance of good program design and user-friendly interfaces. Students should be able to conduct basic program analysis and write complete elementary programs.

Elective modules

Principles of marketing management 110 (BEM 110)

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

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.

Biometry 120 (BME 120)

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

Academic organisation	Statistics
Period of presentation	Semester 2

Module content

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

Plant biology 161 (BOT 161)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	MLB 111 GS
Contact time	fortnightly practicals, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Plant and Soil Sciences
Period of presentation	Semester 2

Module content

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

Philosophy 110 (FIL 110)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 1 discussion class per week
Language of tuition	Both Afr and Eng
Academic organisation	Philosophy
Period of presentation	Semester 1

Module content

Introduction to Philosophy
The two semester modules at first-year level introduce students to the four main subfields of Philosophy, namely epistemology and metaphysics, ethics and political philosophy. This module introduces students to two of these subfields. Students must contact the Department of Philosophy to ascertain which two subfields are covered in each semester as the choice may change from time to time due to availability of teaching staff. Students will become acquainted with the nature of philosophical reflection by exploring a number of classical philosophical themes in each subfield. Throughout the module there is an emphasis on developing those critical thinking, reading and writing skills that are required in Philosophy, while students become acquainted with the power of critique as critical judgment and discernment.

Philosophy 120 (FIL 120)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Philosophy
Period of presentation	Semester 2

Module content

Introduction to Philosophy
The two semester modules at first-year level introduce students to the four main subfields of Philosophy, namely epistemology and metaphysics, ethics and political philosophy. This module introduces students to two of these subfields. Students must contact the Department of Philosophy to ascertain which two subfields are covered in each semester as the choice may change from time to time due to availability of teaching staff. Students will become acquainted with the nature of philosophical reflection by exploring a number of classical philosophical themes in each subfield. Throughout the module there is an emphasis on developing those critical thinking, reading and writing skills that are required in Philosophy, while students become acquainted with the power of critique as critical judgment and discernment.

Financial accounting 111 (FRK 111)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Law Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	4 lectures per week
Language of tuition	Both Afr and Eng

Academic organisation	Accounting
Period of presentation	Semester 1

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.

Aspects of human geography 156 (GGY 156)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Health Sciences
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	English
Academic organisation	Geography, Geoinf + Meteor
Period of presentation	Quarter 2

Module content

This module begins by fostering an understanding of human geography. Then follows with the political ordering of space; cultural diversity as well as ethnic geography globally and locally; population geography of the world and South Africa: and four economic levels of development. The purpose is to place South Africa in a world setting and to understand the future of the country.

Southern African geomorphology 166 (GGY 166)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Health Sciences
Prerequisites	No prerequisites.
Contact time	4 lectures per week
Language of tuition	English
Academic organisation	Geography, Geoinf + Meteor
Period of presentation	Quarter 3

Module content

Investigating southern African landscapes and placing them in a theoretical and global context. The geomorphological evolution of southern Africa. Introduction to the concepts of Geomorphology and its relationships with other physical sciences (e.g. meteorology, climatology, geology, hydrology and biology). The processes and controls of landform and landscape evolution. Tutorial exercises cover basic techniques of geomorphological analysis, and topical issues in Geomorphology.

Cartography 110 (GMC 110)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 1 practical per week
Language of tuition	Double Medium
Academic organisation	Geography, Geoinf + Meteor
Period of presentation	Semester 1

Module content

History, present and future of cartography. Introductory geodesy: shape of the earth, graticule and grids, datum definition, elementary map projection theory, spherical calculations. Representation of geographical data on maps: Cartographic design, cartographic abstraction, levels of measurement and visual variables. Semiotics for cartography: signs, sign systems, map semantics and syntactics, explicit and implicit meaning of maps (map pragmatics).

Introductory genetics 161 (GTS 161)

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

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.

Introduction to history of music 110 (IMG 110)

Module credits	10.00

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	Admission into relevant programme
Contact time	2 lectures per week
Language of tuition	Double Medium
Academic organisation	Music
Period of presentation	Year

Module content

*Closed – requires departmental selection
Know and understand the elements of music and apply this to the history of western and African music, both classical and popular.

Informatics 154 (INF 154)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	Refer to Regulation 1.2(f): A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination
Contact time	2 practicals per week, 1 lecture per week
Language of tuition	Both Afr and Eng
Academic organisation	Informatics
Period of presentation	Semester 1

Module content

Introduction to programming.

Informatics 164 (INF 164)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	INF 154; Regulation 1.2(f): A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination; AIM 101 or AIM 102 or AIM 111 and AIM 121
Contact time	1 lecture per week, 2 practicals per week
Language of tuition	Both Afr and Eng
Academic organisation	Informatics
Period of presentation	Semester 2

Module content
Advanced programming, use of a computer-aided software engineering tool.

Commercial law 110 (KRG 110)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 1 tutorial per week
Language of tuition	Both Afr and Eng
Academic organisation	Mercantile Law
Period of presentation	Semester 1

Module content

General introduction.
General principles of the law of contract: introduction to the law of contract; consensus; contractual capacity; legality and physical possibility of performance; formalities; parties to the contract; conditions and related legal concepts; special terms and the interpretation of contracts; breach of contract and the termination of the contractual relationship.

Commercial law 120 (KRG 120)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	Examination entrance to KRG 110
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Mercantile Law
Period of presentation	Semester 2

Module content

Law of purchase and sale; law of lease; credit agreements; law of agency; law of security.

Criminology 110 (KRM 110)

Module credits	12.00
Service modules	Faculty of Law
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng

Academic organisation	Social Work and Criminology
Period of presentation	Semester 1

Module content

Part 1: Fundamental criminology
Introduction to criminology, definition of crime, crime tendencies, classical and positivistic explanations of crime.
Part 2: Violent crime
A brief analysis of causes, consequences and mechanisms to prevent and reduce violent crime within a South African context. Define violent crime in terms of interpersonal violence, homicide, violent crimes within the criminal justice system and property-related violent crimes.

Criminology 120 (KRM 120)

Module credits	12.00
Service modules	Faculty of Law
Prerequisites	KRM 110
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Social Work and Criminology
Period of presentation	Semester 2

Module content

Part 1: Penology
In Penology attention is given to the criminal justice system to emphasise the importance of using an integrated approach in the handling of offenders. The impact of overpopulation in prisons is critically evaluated. Attention is also given to awaiting trial offenders, the importance of community-based sentences as well as the re-integration of offenders in the community.
Part 2: Crime prevention and control
Responsibilities of the police and the community in crime prevention and control. Primary, secondary and tertiary crime prevention, crime prevention and reduction strategies in South Africa.

Introduction to microbiology 161 (MBY 161)

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

Module content

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

Molecular and cell biology 111 (MLB 111)

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

Module content

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

Music education 170 (MPE 170)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	Admission into relevant programme
Contact time	2 lectures per week
Language of tuition	Double Medium
Academic organisation	Music
Period of presentation	Year

Module content

*Closed – requires departmental selection
Know and understand aspects of world music, entrepreneurship and music technology.

Business management 114 (OBS 114)

Module credits	10.00

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	May not be included in the same curriculum as OBS 155
Contact time	3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Business Management
Period of presentation	Semester 1

Module content

Introduction to business management as a science; the environment in which the enterprise operates; the field of business, the mission and goals of an enterprise; management and entrepreneurship. The choice of a form of enterprise; the choice of products and/or services; profit and cost planning for different sizes of operating units; the choice of location; the nature of production processes and the layout of the plant or operating unit. Introduction to and overview of general management, especially regarding the five management tasks: strategic management; contemporary developments and management issues; financial management; marketing and public relations. Introduction to and overview of the value chain model; management of the input; management of the purchasing function; management of the transformation process with specific reference to production and operations management; human resources management and information management; corporate governance and black economic empowerment (BEE).

Business management 124 (OBS 124)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	Admission to the examination in OBS 114
Contact time	3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Business Management
Period of presentation	Semester 2

Module content

Responsible leadership and the role of a business in society. The nature and development of entrepreneurship; the individual entrepreneur and characteristics of South African entrepreneurs. Looking at the window of opportunity. Getting started (business start up). Exploring different routes to entrepreneurship: entering a family business, buying a franchise, home-based business and the business buyout. This semester also covers how entrepreneurs can network and find support in their environments. Case studies of successful entrepreneurs - also South African entrepreneurs - are studied.

Psychology 110 (SLK 110)

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

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.

Psychology 120 (SLK 120)

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

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.

Statistics 110 (STK 110)

Module credits	13.00

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	At least 5 (60-69%) in Mathematics in the Grade 12 examination. Candidates who do not qualify for STK 110 must register for STK 113 and STK 123
Contact time	1 tutorial per week, 1 practical per week, 3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Statistics
Period of presentation	Semester 1

Module content

Descriptive statistics:
Sampling and the collection of data; frequency distributions and graphical representations. Descriptive measures of location and dispersion.
Probability and inference:
Introductory probability theory and theoretical distributions. Sampling distributions. Estimation theory and hypothesis testing of sampling averages and proportions (one and two-sample cases). Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.

Statistics 120 (STK 120)

Module credits	13.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	STK 110 GS or both STK 113 GS and STK 123 GS or both WST 133 and WST 143 or STK 133 and STK 143 or STK 133 and STK 143
Contact time	1 practical per week, 3 lectures per week, 1 tutorial per week
Language of tuition	Both Afr and Eng
Academic organisation	Statistics
Period of presentation	Semester 2

Module content

Multivariate statistics:
Analysis of variance, categorical data analysis, distribution-free methods, curve fitting, regression and correlation, the analysis of time series and indices.
Statistical and economic applications of quantitative techniques:
Systems of linear equations: drafting, matrices, solving and application. Optimisation; linear functions (two and more independent variables), non-linear functions (one and two independent variables). Marginal and total functions. Stochastic and deterministic variables in statistical and economic context: producers' and consumers' surplus, distribution functions, probability distributions, probability density functions. Identification, use, evaluation, interpretation of statistical computer packages and statistical techniques.
This module is also presented as an anti-semester bilingual module.

Mathematical statistics 111 (WST 111)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	At least 5 (60-69%) in Mathematics in the Grade 12 examination
Contact time	4 lectures per week, 1 practical per week
Language of tuition	Both Afr and Eng
Academic organisation	Statistics
Period of presentation	Semester 1

Module content

Characterisation of a set of measurements: Graphical and numerical methods. Random sampling. Probability theory. Discrete and continuous random variables. Probability distributions. Generating functions and moments.

Mathematical statistics 121 (WST 121)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	WST 111 GS or WST 133, 143 and 153
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Statistics
Period of presentation	Semester 2

Module content

Sampling distributions and the central limit theorem. Statistical inference: Point and interval estimation. Hypothesis testing with applications in one and two-sample cases. Introductory methods for: Linear regression and correlation, analysis of variance, categorical data analysis and non-parametric statistics. Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.

Numerical analysis 123 (WTW 123)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	WTW 114 GS
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 2

Module content

Non-linear equations, numerical integration, initial value problems for differential equations, systems of linear equations. Algorithms for elementary numerical techniques are derived and implemented in computer programmes. Error estimates and convergence results are treated.

Financial accounting 122 (FRK 122)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law Faculty of Natural and Agricultural Sciences
Prerequisites	FRK 111 GS or FRK 133, FRK 143
Contact time	4 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Accounting
Period of presentation	Semester 2

Module content

Budgeting, payroll accounting, taxation – income tax and an introduction to other types of taxes, credit and the new Credit Act, insurance, accounting for inventories (focus on inventory and the accounting entries, not calculations), interpretation of financial statements.

Marketing applications 122 (BEM 122)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences

Prerequisites	BEM 110 GS
Language of tuition	Both Afr and Eng
Academic organisation	Marketing Management
Period of presentation	Semester 2

Module content

E-marketing, services marketing, not-for-profit marketing, business-to-business marketing, retailing, global marketing.

Introduction to environmental sciences 101 (ENV 101)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	English
Academic organisation	Geography, Geoinf + Meteor
Period of presentation	Quarter 1

Module content

Introducing the basic concepts and interrelationships required to understand the complexity of natural environmental problems, physical and human environment, human induced environmental problems, the ways in which the natural environment affects human society and biodiversity, an introduction to major environmental issues in Southern Africa and sustainable development in the context of environmental issues.

Informatics 171 (INF 171)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	Regulation 1.2: A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Informatics
Period of presentation	Year

Module content

General systems theory, creative problem solving, soft systems methodology. The systems analyst, systems development building blocks, systems development, systems analysis methods, process modelling.

Mathematics 124 (WTW 124)

Module credits	16.00
Prerequisites	WTW 114
Contact time	4 lectures per week, 1 tutorial per week
Language of tuition	Both Afr and Eng
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 2

Module content

*Students will not be credited for more than one of the following modules for their degree:
WTW 124, WTW 146, WTW 148 and WTW 164. This module serves as preparation for students majoring in Mathematics (including all students who intend to enrol for WTW 218, WTW 211 and WTW 220).

The vector space Rn, vector algebra with applications to lines and planes, matrix algebra, systems of linear equations, determinants. Complex numbers and factorisation of polynomials. Integration techniques and applications of integration. The formal definition of a limit. The fundamental theorem of Calculus and applications. Vector functions, polar curves and quadratic curves.

Curriculum: Year 2

Minimum credits: 170

Fundamental modules

Community-based project 202 (JCP 202)

Module credits	8.00
Service modules	Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Both Afr and Eng
Academic organisation	Informatics
Period of presentation	Year

Module content

This project-orientated module is a form of applied learning which is directed at specific community needs and is integrated into all undergraduate academic programmes offered by the Faculty of Engineering, Built Environment and Information Technology.
The main objectives with the module are as follows:
(1) The execution of a community-related project aimed at achieving a beneficial impact on a chosen section of society, preferably but not exclusively, by engagement with a section of society which is different from the student's own background.
(2) The development of an awareness of personal, social and cultural values, an attitude to be of service, and an understanding of social issues, for the purpose of being a responsible professional.
(3) The development of important multidisciplinary and life skills, such as communication, interpersonal and leadership skills.
Assessment in this module will include all or most of the following components: evaluation and approval of the project proposal, assessment of oral and/or written progress reports, peer assessment in the event of team projects, written report-back by those at which the project was aimed at, and final assessment on grounds of the submission of a portfolio and a written report.

Core modules

Data structures and algorithms 212 (COS 212)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	COS 110
Contact time	1 practical per week, 4 lectures per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 1

Module content

Data abstraction is a fundamental concept in the design and implementation of correct and efficient software. In prior modules, students are introduced to the basic data structures of lists, stacks and queues. This module continues with advanced data structures such as trees, hash tables, heaps and graphs, and goes into depth with the algorithms needed to manipulate them efficiently. Classical algorithms for sorting, searching, traversing, packing and game playing are included, with an emphasis on comparative implementations and efficiency. At the end of this module, students will be able to identify and recognise all the classical data structures; implement them in different ways; know how to measure the efficiency of implementations and algorithms; and have further developed their programming skills, especially with recursion and polymorphism.

Netcentric computer systems 216 (COS 216)

Module credits	16.00
Prerequisites	COS 110
Contact time	1 practical per week, 4 lectures per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 1

Module content

This module introduces the principles of netcentric computing that can be applied to the WWW and internet as well as to distributed applications. After completing this module, a student will have gained, as outcomes, knowledge of how to integrate various programming and web-based technologies. Particular outcomes include gaining knowledge on the concepts of client and server side programming, web-based applications, port and socket interaction, writing programmes that require remote function calls and achieving database connectivity using remote SQL calls. The supporting technologies of mark-up languages like HTML and scripting languages like JavaScript are also studied. In order to practically demonstrate that a student has reached these outcomes, students will be required to use, integrate and maintain the necessary software and hardware by completing a number of smaller practical assignments whereafter integrating all these technologies into a comprehensive and practical netcentric programming project is required.

Operating systems 222 (COS 222)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	COS 153 or COS 131 or COS 132
Contact time	1 practical per week
Language of tuition	Both Afr and Eng
Academic organisation	Computer Science
Period of presentation	Semester 2

Module content

Fundamental concepts of modern operating systems in terms of their structure and the mechanisms they use are studied in this module. After completing this module, students will have gained, as outcomes, knowledge of real time, multimedia and multiple processor systems, as these will be defined and analysed. In addition, students will have gained knowledge on modern design issues of process management, deadlock and concurrency control, memory management, input/output management, file systems and operating system security. In order to experience a hands-on approach to the knowledge students would have gained from studying the abovementioned concepts, students will have produced a number of practical implementations of these concepts using the Windows and Linux operating systems.

Concurrent systems 226 (COS 226)

Module credits	16.00
Prerequisites	COS 153 or COS 131 or COS 132
Contact time	1 practical per week, 4 lectures per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 2

Module content

Computer science courses mostly deal with sequential programs. This module looks at the fundamentals of concurrency; what it means, how it can be exploited, and what facilities are available to determine program correctness. Concurrent systems are designed, analysed and implemented.

Computer organisation and architecture 284 (COS 284)

Module credits	16.00
Prerequisites	COS 110
Contact time	1 practical per week, 4 lectures per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 2

Module content

This module provides the foundations on which other modules build by enabling a deeper understanding of how software interacts with hardware. It will teach the design and operation of modern digital computers by studying each of the components that make up a digital computer and the interaction between these components. Specific areas of interest, but not limited to, are: representation of data on the machine-level; organisation of the machine on the assembly level; the architecture and organisation of memory; inter- and intra-component interfacing and communication; data paths and control; and parallelism. Topic-level detail and learning outcomes for each of these areas are given by the first 6 units of 'Architecture and Organisation' knowledge area as specified by the ACM/IEEE Computer Science Curriculum 2013.
The concepts presented in the theory lectures will be reinforced during the practical sessions by requiring design and implementation of the concepts in simulators and assembly language using an open source operating system.

Informatics 214 (INF 214)

Module credits	14.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	AIM 101 or AIM 111 and AIM 121
Contact time	2 practicals per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Informatics
Period of presentation	Semester 1

Module content

Database design: the relational model, structured query language (SQL), entity relationship modelling, normalisation, database development life cycle; practical introduction to database design. Databases: advanced entity relationship modelling and normalisation, object-oriented databases, database development life cycle, advanced practical database design.

Information science 240 (INL 240)

Module credits	20.00
Service modules	Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	3 practicals per week, 3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Information Science
Period of presentation	Semester 1

Module content

Social and ethical impact. This module examines moral and legal regulation practices related to information in print and digital environments. Different ethical theories are identified and applied to privacy, access to information, information poverty and censorship. The interpretation and enforcement of rules and regulations are discussed.

Discrete structures 285 (WTW 285)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	WTW 115
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	English
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 2

Module content

Setting up and solving recurrence relations. Equivalence and partial order relations. Graphs: paths, cycles, trees, isomorphism. Graph algorithms: Kruskal, Prim, Fleury. Finite state automata.

Elective modules

Engineering statistics 220 (BES 220)

Module credits	8.00
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Industrial and Systems Eng
Period of presentation	Semester 2

Module content

Engineering systems are often subjected to variation, uncertainty and incomplete information. Mathematical statistics provides the basis for effectively handling and quantifying the effect of these factors. This module provides an introduction to the concepts of mathematical statistics and will include the following syllabus themes: data analysis, probability theory, stochastic modelling, statistical inference and regression analysis.

Philosophy 210 (FIL 210)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	At least one of FIL 110, 120

Contact time	2 lectures per week, 1 discussion class per week
Language of tuition	Both Afr and Eng
Academic organisation	Philosophy
Period of presentation	Semester 1

Module content

History of modern philosophy I and II

A concise history of modern philosophy. The following are examples of themes that may be explored: The Renaissance, the Scientific Revolution, the foundations of the modern worldview (in contrast to the premodern), the European Enlightenment, Romanticism, German Idealism (Kant and Hegel), Marx and Marxism, Kierkegaard and Existentialism, the philosophy of Nietzsche. A selection of contemporary critical responses to modern philosophy may be explored; these may include for example African philosophy, analytical (Anglo-American) philosophy, postmodernism, neo-Marxism, etc.

Philosophy 220 (FIL 220)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	At least one of FIL 110, 120
Contact time	2 lectures per week, 1 discussion class per week
Language of tuition	Both Afr and Eng
Academic organisation	Philosophy
Period of presentation	Semester 2

Module content

Political philosophy and ethics

In this module the ways in which human reality is reflected on in practical philosophy, are examined. Both the analytical, interpretative perspective and the normative perspective are covered. This is done with the aid of a selection of key themes and texts from the history of philosophy, but with special attention to their contemporary relevance. The first of the two foci of this semester module will be on political philosophy. Among the issues that may be covered are justice, power, ideology, authority, the social contract, law, legitimacy, recognition, etc. The second focus of this semester module will be on ethics. Among the issues that may be covered are the formation of rules, principles, ideal, dispositions and the capability to judge that regulate such diverse phenomena as freedom, equality, rights, distribution, oppression. pluralism, and others. The classical approaches to ethics - virtue ethics, deontology, consequentialism - will form the backdrop against which moral philosophy will be discussed. In this module, in general, the student can expect to be exposed to the work of Plato, Aristotle, Augustine, Aquinas, Machiavelli, Hobbes, Locke, Kant, Hegel, Marx, Sidgwick, Nietzsche, Weber, Mead, Arendt, Habermas, Rawls, Ricoeur, Walzer, Young, Sen, Honneth, and others.

Introductory geographic information systems 283 (GGY 283)

Module credits	12.00

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities
Prerequisites	Only available to students studying the following:12132022, 12132002, 12132004, 02133312, 02133383, 02133361, 02133385, 09133040 and 01130001
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Geography, Geoinf + Meteor
Period of presentation	Semester 1

Module content

*This is a closed module, only available to students studying [BTandRP] (12132022), [BSc(Arch)] (12132002), [BSc(LArch)] (12132004), BSc Meteorology (02133312), BSc Geoinformatics (02133383), BSc Environmental Science (02133361), BSc Geography (02133385), BEd Further Education and Training (General) (09133040), BA (01130001) or as approved by the head of department. The content of this module is the same as GIS 221 and students are not allowed to earn credits for both GGY 283 and GIS 221.
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.

Geographic data analysis 220 (GIS 220)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Geography, Geoinf + Meteor
Period of presentation	Semester 2

Module content

The nature of geographical data and measurement. Probability, probability distributions and densities, expected values and variances, Central Limit theorem. Sampling techniques. Exploratory data analysis, descriptive statistics, statistical estimation, hypothesis testing, correlation analysis and regression analysis.

Remote sensing 220 (GMA 220)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	English
Academic organisation	Geography, Geoinf + Meteor

Period of presentation	Semester 1

Module content

This module will provide a thorough introduction to the basic scientific principles involved in remote sensing, and some of the applications to studies of the Earth's surface. This includes examining the basic physics of electromagnetic radiation and the complex interactions of radiation with the surface and atmosphere (i.e. spectral signatures). In addition, basic concepts of photogrammetry will be discussed. The theoretical background laid out in the first half of the module will provide the tools for examining various remote sensing applications using data obtained in different parts of the electromagnetic spectrum. The applications will include uses of satellite remote sensing data for mapping and monitoring vegetation, soils and minerals, snow and ice, water resources and quality, and urban landscapes. The laboratory section will include hands-on experience with various satellite image data sets.

Molecular genetics 251 (GTS 251)

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

Module content

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

Genetic diversity and evolution 261 (GTS 261)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 251 GS
Contact time	2 lectures per week, fortnightly practicals
Language of tuition	English
Academic organisation	Genetics
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.

Introduction to history of music 210 (IMG 210)

Module credits	15.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	Admission into relevant programme
Contact time	3 lectures per week
Language of tuition	Double Medium
Academic organisation	Music
Period of presentation	Year

Module content

*Closed – requires departmental selection
Know and understand the characteristics of music with special reference to 20th century genres, western and African, classical and popular.

Multimedia 210 (IMY 210)

Module credits	16.00
Prerequisites	IMY 110 or equivalent HTML knowledge
Contact time	2 lectures per week, 2 practicals per week
Language of tuition	English
Academic organisation	Information Science
Period of presentation	Semester 1

Module content

*Closed – requires departmental selection.
Advanced Markup Languages. This module investigates XML and its related technologies (such as XSLT, XPath, XSL-FO, DTD, XML Schema, and namespaces) as a vital part of the web development process.

Multimedia 220 (IMY 220)

Module credits	16.00
Prerequisites	IMY 210
Contact time	2 practicals per week, 2 lectures per week
Language of tuition	English
Academic organisation	Information Science

Period of presentation	Semester 2

Module content

*Closed - requires departmental selection.
Advanced Markup Languages 2 – This module assumes knowledge of dynamic scripts and basic web based technologies such as PHP as well as the use of relational databases like MySQL. The module explores the interplay between scripting languages, databases, and current industry standard web technologies, from both the server-side and client-side perspectives. The module has a focus on developing hands-on practical skills.

Informatics 261 (INF 261)

Module credits	7.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	INF 214
Contact time	1 lecture per week, 1 practical per week
Language of tuition	Both Afr and Eng
Academic organisation	Informatics
Period of presentation	Semester 2

Module content

Database management: transaction management, concurrent processes, recovery, database administration: new developments: distributed databases, client-server databases: practical implementation of databases.

Informatics 271 (INF 271)

Module credits	14.00
Service modules	Faculty of Education
Prerequisites	AIM 101 or AIM 102 or AIM 111 and AIM 121, INF 163, 164
Contact time	1 practical per week, 1 lecture per week, 2 discussion classes per week
Language of tuition	Both Afr and Eng
Academic organisation	Informatics
Period of presentation	Year

Module content

Systems analysis. Systems design: construction; application architecture; input design; output design; interface design; internal controls; program design; object design; project management; system implementation; use of computer-aided development tools.

Commercial law 200 (KRG 200)

Module credits	24.00

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	KRG 120
Contact time	3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Mercantile Law
Period of presentation	Year

Module content

Company law, law concerning close corporations, law of partnerships, labour law, law of arbitration and transport, law of insurance, law concerning negotiable documents, law of insolvency, law of succession and trusts.

Criminology 210 (KRM 210)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	KRM 110,120
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Social Work and Criminology
Period of presentation	Semester 1

Module content

Part 1: Forensic criminalistics
Crime investigation; obtaining information through communication; post-mortem examinations; serological examinations; fingerprints.
Part 2: Youth misbehaviour
Influence of the family, school and peer group; gang behaviour; use of drugs; theoretical explanations, as well as prevention and control of youth misbehaviour.

Criminology 220 (KRM 220)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	KRM 110, 120, 210
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Social Work and Criminology
Period of presentation	Semester 2

Module content
Part 1: Victimology
Scope of victimology, contemporary issues in victimology, position of the victim within the criminal justice system, victim-based legislation, restorative justice.
Part 2: Political offences
The state as offender; crime directed at the state; formal and informal suppression; riots; terrorism; assassination; treason; sexual violence during war; children in organized armed violence and conflict.

Bacteriology 251 (MBY 251)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MBY 161 GS
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Microbiology and Plant Path
Period of presentation	Semester 1

Module content

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

Mycology 261 (MBY 261)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MBY 161
Contact time	1 practical per week, 2 lectures per week
Language of tuition	English
Academic organisation	Microbiology and Plant Path
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.

Music technology 302 (MCS 302)

Module credits	15.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	Admission into relevant programme
Contact time	2 lectures per week
Language of tuition	Double Medium
Academic organisation	Music
Period of presentation	Year

Module content

*Closed – requires departmental selection
A foundation of music technology tailored towards the educational needs of the musician.

Business management 210 (OBS 210)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	OBS 114 or 124 with admission to the examination in the other
Contact time	3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Business Management
Period of presentation	Semester 1

Module content

Logistics management
The role of logistics in an enterprise; definition and scope of customer service; electronic and other logistics information systems; inventory management; materials management with special reference to Japanese systems; management of the supply chain. Methods of transport and transport costs; types and costs of warehousing; electronic aids in materials handling; cost and price determination of purchases; organising for logistics management; methods for improving logistics performance.

Business management 220 (OBS 220)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	OBS 114 or 124 with admission to the examination in the other
Contact time	3 lectures per week
Language of tuition	Both Afr and Eng

Academic organisation	Business Management
Period of presentation	Semester 2

Module content

Project management: Introduction
Project management concepts; needs identification; the project, the project manager and the project team; types of project organisations; project communication and documentation.
Planning and control: planning, scheduling and schedule control of projects; resource considerations and allocations; cost planning and performance evaluation.

Psychology 210 (SLK 210)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	SLK 110, SLK 120(GS)
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Psychology
Period of presentation	Semester 1

Module content

In this module human development from conception through adolescence to adulthood is discussed with reference to various psychological theories. Incorporated are the developmental changes related to cognitive, physical, emotional and social functioning of the individual and the context of work in adulthood. Traditional and contemporary theories of human development explaining and describing these stages are studied in order to address the key issues related to both childhood and adulthood.

Psychology 220 (SLK 220)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	SLK 110, SLK 120(GS) and (RES 210 recommended)
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Psychology
Period of presentation	Semester 2

Module content

This module is a social-psychological perspective on interpersonal and group processes. Themes that are covered include communication, pro-social behaviour, social influence and persuasion, political transformation, violence, and group behaviour.

Mathematical statistics 211 (WST 211)

Module credits	24.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	WST 111, WST 121, WTW 114 GS and WTW 124 GS
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Double Medium
Academic organisation	Statistics
Period of presentation	Semester 1

Module content

Set theory. Probability measure functions. Random variables. Distribution functions. Probability mass functions. Density functions. Expected values. Moments. Moment generating functions. Special probability distributions: Bernoulli, binomial, hypergeometric, geometric, negative binomial, Poisson, Poisson process, discrete uniform, uniform, gamma,exponential, Weibull, Pareto, normal. Joint distributions: Multinomial, extended hypergeometric, joint continuous distributions. Marginal distributions. Independent random variables. Conditional distributions. Covariance, correlation. Conditional expected values. Transformation of random variables: Convolution formula. Order statistics. Stochastic convergence: Convergence in distribution. Central limit theorem. Practical applications. Practical statistical modelling and analysis using statistical computer packages and the interpretation of the output.

Mathematical statistics 221 (WST 221)

Module credits	24.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	WST 211 GS
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Double Medium
Academic organisation	Statistics
Period of presentation	Semester 2

Module content

Stochastic convergence: Asymptotic normal distributions, convergence in probability. Statistics and sampling distributions: Chi-squared distribution. Distribution of the sample mean and sample variance for random samples from a normal population. T-distribution. F-distribution. Beta distribution. Point estimation: Method of moments. Maximum likelihood estimation. Unbiased estimators. Uniform minimum variance unbiased estimators. Cramer-Rao inequality. Efficiency. Consistency. Asymptotic relative efficiency.
Bayes estimators. Sufficient statistics. Completeness. The exponential class. Confidence intervals. Test of statistical hypotheses. Reliability and survival distributions. Practical applications. Practical statistical modelling and analysis using statistical computer packages and the interpretation of the output.

Linear algebra 211 (WTW 211)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	WTW 124
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 1

Module content

This is an introduction to linear algebra on Rn. Matrices and linear equations, linear combinations and spans, linear independence, subspaces, basis and dimension, eigenvalues, eigenvectors, similarity and diagonalisation of matrices, linear transformations.

Calculus 218 (WTW 218)

Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	WTW 114 and WTW 124
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 1

Module content

Calculus of multivariable functions, directional derivatives. Extrema and Lagrange multipliers. Multiple integrals, polar, cylindrical and spherical coordinates.

Professional ethics 211 (BPE 211)

Module credits	6.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Both Afr and Eng
Academic organisation	Philosophy
Period of presentation	Semester 1

Module content

In the first quarter of this module students are equipped with an understanding of the moral issues influencing human agency in economic and political contexts. In particular philosophy equips students with analytical reasoning skills necessary to understand and solve complex moral problems related to economic and political decision making. We demonstrate to students how the biggest questions concerning the socio-economic aspects of our lives can be broken down and illuminated through reasoned debate. Examples of themes which may be covered in the module include justice and the common good, a moral consideration of the nature and role of economic markets on society, issues concerning justice and equality, and dilemmas of loyalty. The works of philosophers covered may for instance include that of Aristotle, Locke, Bentham, Mill, Kant, Rawls, Friedman, Nozick, Bernstein, Dworkin, Sandel, Walzer, and MacIntyre. In the second quarter of the module the focus is on professionalism, careers and ethics. Codes of ethics in business and professions, professional codes, as well as ethical issues in the accountancy profession are discussed.

Curriculum: Final year

Minimum credits: 144

Core modules

Software engineering 301 (COS 301)

Module credits	27.00
Prerequisites	COS 110 and COS 121
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Year

Module content

The module exposes students to problems associated with software development on an industrial scale. Overall goals of the module are: to become familiar with the latest trends in software engineering; to understand the software engineering process and to appreciate its complexity; to be exposed to a variety of methodologies for tackling different stages of the software lifecycle; to understand and apply the concepts of systems administration and maintenance; to complete the development of a fairly large object orientation-based software product. The focus of the module is on a project that lasts the whole year. The project is completed in groups of approximately four (4) students and teaches students to take responsibility for a variety of roles within a group, and to understand the different requirements for these; to experience the advantages and problems of working in a group; professionalism with regards to particularly colleagues and clients.
After the successful completion of this module, the student will be able to: understand the psychology of a client; work in groups; and have an appreciation for planning, designing, implementing and maintaining large projects. These qualities should place the students in a position in which they are able to handle software development in the corporate environment.

Computer networks 332 (COS 332)

Module credits	18.00
Prerequisites	COS 216
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 1

Module content

The objective of this module is to acquaint the student with the terminology of communication systems and to establish a thorough understanding of exactly how data is transferred in such communication networks, as well as applications that can be found in such environments. The study material includes: concepts and terminology, the hierarchy of protocols according to the OSI and TCP/IP models, protocols on the data level, physical level and network level as well as higher level protocols. The practical component of the module involves programming TCP/IP sockets using a high level language. The emphasis throughout is on the technical aspects underlying the operation of networks, rather than the application of networks.

Programming languages 333 (COS 333)

Module credits	18.00
Prerequisites	COS 110
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 2

Module content

Programming languages are the backbone for software development. Each language has its own different syntax and semantics, but there are many common concepts that can be studied and then illustrated through the languages. The module concentrates on issues of object orientation, including delegation, iteration and polymorphism. It surveys how languages provide the basic building blocks for data and control, as well as exception handling and concurrency. At the end of the module, students will be able to appreciate the rich history behind programming languages, leading to independent principles that evolve over time. They will be skilled at using a variety of programming languages, including new paradigms such as functional, logical and scripting, and will know how to learn a new language with ease. From this experience, they will be able to apply evaluation criteria for choosing an appropriate programming language in a given scenario.

Multimedia 310 (IMY 310)

Module credits	30.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 practicals per week
Language of tuition	English
Academic organisation	Information Science
Period of presentation	Semester 1

Module content

*Closed - requires departmental selection.
Human-computer Interaction. This module involves a study of human-computer interaction and human-information interaction; humans as computer and information users; and the ethical aspects relating to the creation of multimedia information products. A detailed study of the role, composition and functioning of an interface, underlying principles in the design and evaluation of interfaces, will also be undertaken.

Computer security and ethics 330 (COS 330)

Module credits	18.00
Prerequisites	COS 110
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 2

Module content

This module develops an appreciation of the fundamentals and design principles for information assurance and security. Students will develop a clear understanding of the basic information security services and mechanisms, enabling them to design and evaluate the integration of solutions into the user application environment. Emphasis will be placed on services such as authorisation and confidentiality. Students will acquire knowledge and skills of Security Models such as the Bell-LaPadula, Harrison-Ruzzo Ullman and Chinese Wall Model. Students will develop a detailed understanding of the confidentiality service by focusing on cryptology and the practical implementation thereof. The student will be introduced to professional and philosophical ethics. At the end of the module students will be able to engage in a debate regarding the impact (local and global) of computers on individuals, organisations and society. The professionalism of IT staff will be discussed against national and international codes of practices such as those of the CSSA, ACM and IEEE.

Elective modules

Artificial intelligence 314 (COS 314)

Module credits	18.00
Prerequisites	COS 131 or COS 110
Contact time	1 practical per week, 2 lectures per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 1

Module content

The main objective of this module is to introduce a selection of topics from artificial intelligence (AI), and to provide the student with the background to implement AI techniques for solving complex problems.
This module will cover topics from classical AI, as well as more recent AI paradigms. These topics include: search methods, game playing, knowledge representation and reasoning, machine learning, neural networks, genetic algorithms, artificial life, planning methods, and intelligent agents. In the practical part of this module, students will get experience in implementing
(1) game trees and evolving game-playing agents;
(2) a neural network and applying it to solve a real-world problem; and
(3) a genetic algorithm and applying it to solve a real-world problem.

Database systems 326 (COS 326)

Module credits	18.00
Prerequisites	INF 214 or TDH
Contact time	1 lecture per week, 2 practicals per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 2

Module content

This module builds on a prior introductory module on database technology and provides more advanced theoretical and practical study material.

Computer graphics 344 (COS 344)

Module credits	18.00
Prerequisites	COS 110 and WTW 126
Contact time	1 practical per week, 2 lectures per week
Language of tuition	English
Academic organisation	Computer Science
Period of presentation	Semester 1

Module content

The aim of this module is to acquire a sound knowledge of the basic theory of interactive computer graphics and basic computer graphics programming techniques. The theory will cover graphics systems and models, graphics programming, input and interaction, geometric objects and transformations, viewing in 3D, shading, rendering techniques, and introduce advanced concepts, such as object-oriented computer graphics and discrete techniques. The module includes a practical component that enables students to apply and test their knowledge in computer graphics. The OpenGL graphics library and the C programming language will be used for this purpose.

Philosophy 310 (FIL 310)

Module credits	30.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	At least three of FIL 110, 120, 210, 220
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Philosophy
Period of presentation	Semester 1

Module content

Philosophical anthropology and cognitive philosophy In this module the focus is on the quest to understand humankind and its relations to reality and knowledge. Both the analytical, interpretative perspective and the normative perspective are covered. This is done with the aid of a selection of key themes and texts from the history of philosophy, but with special attention to their contemporary relevance. The first of the two foci of this semester module is philosophical anthropology or contemporary metaphysics. Themes covered may include: Is a human more than the sum total of its properties?; the relation between consciousness, self-consciousness and the human unconscious; the meaning of life; the nature of personal identity; the issue of free will, and others. The second focus of the semester module is the congnitive disciplines of philosophy, such as philosophy of science, philosophy of mind and epistemology. In philosophy of science, themes covered may include the types of reasoning in science, the nature and role of explanations in science, the scientific realism debate, the nature of scientific progress, justification of scientific theories, the role of truth in science, and others. In philosophy of mind, themes covered may include the relation between spriit, psyche and body - the mind-body problem, the nature of consciousness and qualia, dualism, materialism, functionalism, physicalism, supervenience, intentionality, and others. In epistemology themes covered may include rationalism, empiricism, transcendental, idealism and Kant foundationalism coherentism, epistemic internalism and externalism, radical scepticism, and others.

Philosophy 320 (FIL 320)

Module credits	30.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	FIL 110, 120, 210, 220 and 310
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Philosophy
Period of presentation	Semester 2

Module content

Philosophical hermeneutics and social philosophy
The first of the two foci of this semester module is a discussion and analysis of philosophical perspectives on the hermeneutical problem (the problem of understanding and interpretation), with particular attention to contemporary thinkers such as Nietzsche, Heidegger, Gadamer and Derrida. The second focus of the semester module is social philosophy where philosophical questions on social forms, structures, institutions, practices, habitus and ethos will be raised. A range of themes may be investigated, such as structure and agency, social imaginaries, new social formations, institutional cultures, gender and sexuality, subject constitution, and others. Furthermore, the framing of these themes in a spectrum of approaches including Critical Theory, Theory of Ideology, Constractariansim, Social Action Theory, Metaphorology, Critical Race Theory, Genealogy, and others will be analysed and explored.

Geographic information systems 310 (GIS 310)

Module credits	24.00
Service modules	Faculty of Engineering, Built Environment and Information Technology

Prerequisites	GGY 283 or GIS 221
Contact time	1 practical per week, 2 lectures per week
Language of tuition	English
Academic organisation	Geography, Geoinf + Meteor
Period of presentation	Semester 1

Module content

Advanced theory and practice of Geographic Information Systems; GIS applications; design and implementation of GIS applications.

Spatial analysis 320 (GIS 320)

Module credits	24.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GIS 310 or TDH
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Geography, Geoinf + Meteor
Period of presentation	Semester 2

Module content

Construction of Raster Geovisualisations, spatial model construction and use, multi-criteria decision analysis. Factor analysis: Principle component analysis. Geostatistics: Spatial dependence modelling, ordinary kriging. Markov chains and cellular Automata, combined models.

Informatics 354 (INF 354)

Module credits	15.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	INF 261, INF 225, INF 271 and INF 272
Contact time	2 lectures per week, 2 practicals per week
Language of tuition	Both Afr and Eng
Academic organisation	Informatics
Period of presentation	Semester 1

Module content

Advanced programming.

Criminology 310 (KRM 310)

Module credits	30.00

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	KRM 210, 220
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Social Work and Criminology
Period of presentation	Semester 1

Module content

Part 1: Theories of crime
Theories explaining the causes and different aspects of crime.
Part 2: Psychocriminology
Nature of human behaviour; aggression and violence; offenders with mental disorders; sexual offences; terrorism and hostage taking.

Criminology 320 (KRM 320)

Module credits	30.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	KRM 210, 220, 310 (GS)
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Social Work and Criminology
Period of presentation	Semester 2

Module content

Part 1: Female crime
Nature and extent of female crime; crimes committed by women; theoretical explanations.
Part 2: Contemporary criminology issues
Contemporary crime phenomena such as hate crimes, road rage, corruption, white-collar crimes, organised crime, ecological crime as well as the problems associated with contemporary crimes (e.g. babies behind bars and HIV/Aids) are addressed. In conjunction with this, attention is given to forensic report writing, preparation of children and youths to testify in court and restorative justice.

Information and communications technology law 420 (KUB 420)

Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	5 practicals per week
Language of tuition	Double Medium
Academic organisation	Mercantile Law

Period of presentation	Semester 2

Module content

*For LLB
(a) Introduction to the study of information and communications technology law:
- The place of information and communications technology law in the legal system
- The nature and scope of information and communications technology law
- Sources of information and communications technology law
- Inception and influence of the Internet

(b) Regulation of the Internet:
- National/International
- Jurisdiction

(c) Aspects of intellectual property law and the Internet
(d) E-commerce activities and the Internet:
- Aspects of jurisdiction and signing of contracts
- Data protection and encryption
- Liability of Internet service providers

(e) Advertising and the Internet
(f) Criminal liability in information and communications technology law
(g) Constitutional aspects in information and communications technology law:
- The right to privacy/freedom of expression/information

Capita selecta: Music 402 (MCS 402)

Module credits	40.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	Admission into relevant programme
Contact time	2 lectures per week
Language of tuition	English
Academic organisation	Music
Period of presentation	Year

Module content

*Closed – requires departmental selection
Aspects of music technology or African music.

Business management 310 (OBS 310)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	OBS 114 or 124 with admission to the examination in the other
Contact time	3 lectures per week

Language of tuition	Both Afr and Eng
Academic organisation	Business Management
Period of presentation	Semester 1

Module content

Human resource management and development
The environment in which human resource management takes place; job analysis; strategic human resource planning; equal employment opportunities; planning and management of training; development and careers; functioning in a global environment.
Negotiation and collective bargaining
The nature of negotiation; preparation for negotiation; negotiating for purposes of climate creation; persuasive communication; handling conflict and aggression; specialised negotiation and collective bargaining in the South African context.

Business management 320 (OBS 320)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	OBS 114 or 124 with admission to the examination in the other
Contact time	3 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Business Management
Period of presentation	Semester 2

Module content

Strategic management analysis and formulation
Basic concepts; formulation of mission; policy and objectives; external evaluation of the business environment; internal evaluation of the enterprise; including intellectual assets; the formulation and development of a strategic plan.
Strategic management implementation
The role of management in strategy implementation; budgets as instrument in the implementation process; leading processes of change within enterprises; supporting policies, procedures and information systems for implementation in the various functional areas; evaluation and control of implementation.

International business management 359 (OBS 359)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	OBS 114 or OBS 124 with admission to the examination in the other
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Business Management

Period of presentation	Semester 1

Module content

Introduction to international management
International business management; the process of internationalisation; growth in international trade and investment; the evolution of multinational enterprises; management perspectives on international trade and international trade theories; international trade regulation; economic integration; the formation of trading blocks, and free-trade areas.
The international business environment
The cultural environment of international business; the political and legal environments as well as the economic environment of international business; the international monetary system; the foreign exchange market; and international capital markets.

International business management 369 (OBS 369)

Module credits	20.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	Admission to the exam in OBS 359
Contact time	2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Business Management
Period of presentation	Semester 2

Module content

International financial management
Purpose, scope and principles of international financial management; international cashflow management; foreign exchange risk and foreign exchange risk management; international investment and financing decisions; import and export management; import and export financing, and international purchasing and sourcing.
International management, leadership and market entry
International management and leadership; dimensions of strategic international human resource management; international market entry and introduction to international marketing strategy, and future perspectives on Southern Africa as an emerging market.

Psychology 310 (SLK 310)

Module credits	30.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	SLK 210(GS), SLK 220(GS)
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Psychology
Period of presentation	Semester 1

Module content

Identification of abnormal behaviour in children based on knowledge of normal childhood development; introduction to the study of various models pertaining to abnormal behaviour; understanding and application of basic concepts in child psychopathology. This module also provides an introduction to psychopathology and symptomatology of adult abnormal behaviour. Terminology, definitions of abnormal behaviour, problems in diagnosis, labelling, and myths regarding abnormal behaviour are discussed. Neurosis as a specific mental disorder is studied critically from a multidimensional perspective, including intrapsychic, interpersonal and social-cultural explanations.

Psychology 320 (SLK 320)

Module credits	30.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	SLK 310(GS)
Contact time	2 lectures per week, 2 discussion classes per week
Language of tuition	Both Afr and Eng
Academic organisation	Psychology
Period of presentation	Semester 2

Module content

This module deals with a community psychological perspective on human behaviour and psychological interventions and also critically explores the contribution of various perspectives in psychology. The module focuses on themes such as definitions of key concepts, principles and aims of community psychology, and the role of the community psychologist as well as the impact of earlier thought frameworks on contemporary perspectives. The implications of these ideas for practical initiatives focussed on mental health in communities, are discussed. The module further focuses on critical psychology. Critical psychology is an orientation towards psychology that is critical towards the assumptions and practices of psychology as it is practiced in the mainstream. It attempts to address power issues as they manifest in the practice of mainstream psychology. The focus is on examining how the practice and theories of mainstream psychology contribute to these power issues impacting on marginalised groups.

Financial engineering 354 (WTW 354)

Module credits	18.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	WST 211, WTW 211 and WTW 218
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Double Medium
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 1

Module content
Mean variance portfolio theory. Market equilibrium models such as the capital asset pricing model. Factor models and arbitrage pricing theory. Measures of investment risk. Efficient market hypothesis. Stochastic models of security prices

Geometry 389 (WTW 389)

Module credits	18.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities
Prerequisites	WTW 211
Contact time	2 lectures per week, 1 tutorial per week
Language of tuition	Double Medium
Academic organisation	Mathematics and Applied Maths
Period of presentation	Semester 2

Module content
Axiomatic development of neutral, Euclidean and hyperbolic geometry. Using models of geometries to show that the parallel postulate is independent of the other postulates of Euclid.

Industrial analysis 313 (BAN 313)

Module credits	8.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	English
Academic organisation	Industrial and Systems Eng
Period of presentation	Semester 1

Module content
Mathematical statistics provides the basis for a number of important applications in the engineering environment. This module provides an introduction to the most important of these applications and will include the following syllabus themes: Monte Carlo simulation, decision analysis, forecasting and data-dependent modelling.

Operational research 312 (BOZ 312)

Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 1 tutorial per week

Language of tuition	English
Academic organisation	Industrial and Systems Eng
Period of presentation	Semester 1

Module content

Introduction to Operations Research, and more specifically the branch of optimisation and its application to industrial problems. In the module the topics of linear and integer linear programming are introduced. The focus is on identifying and scoping appropriate problems, the subsequent formulation of problems, solution algorithms, and post-optimisation sensitivity analysis. Students are exposed to solving problems using optimisation software.

Genome evolution and phylogenetics 354 (GTS 354)

Module credits	18.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GTS 251 GS and GTS 261 GS
Contact time	1 practical per week, 2 lectures per week
Language of tuition	English
Academic organisation	Genetics
Period of presentation	Semester 1

Module content

Mechanisms involved in the evolutions of genomes. Comparison of the molecular organisation of viral, archaea, eubacterial and eukarytotic genomes. Genome project design, DNA sequencing methods and annotation. Molecular evolution. Phylogenetic inference methods. Applications of phylogenetics and contemporary genome research.

Population and evolutionary genetics 367 (GTS 367)

Module credits	18.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GTS 251 and GTS 261
Contact time	1 practical per week, 2 lectures per week
Language of tuition	English
Academic organisation	Genetics
Period of presentation	Semester 2

Module content

Genetic and phenotypic variation. Organisation of genetic variation. Random genetic drift. Mutation and the neutral theory. Darwinian selection. Inbreeding, population subdivision and migration. Evolutionary quantitative genetics. Population genomics. Human population genetics. Levels of selection and individuality. Arms races and irreversibility. Complexity. Applied evolution.

Plant genetics and crop biotechnology 361 (BTC 361)

Module credits	18.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GTS 251 and {GTS 261 GS or BOT 261} and {GTS 351 and GTS 352 are recommended}
Contact time	2 lectures per week, 1 practical per week
Language of tuition	English
Academic organisation	Genetics
Period of presentation	Semester 2

Module content

Plant genetics and genomics: gene control in plants, epigenetics, co-suppression, forward and reverse genetics, structural and functional genomics. Plant development: signal perception, cell death, control of cell division. Plant-environment interactions. Crop genetic modification: food security, GMO regulation, plant transformation, whole-chromosome transformation, synthetic biology, homologous recombination. Crop molecular markers: marker types, genotyping, QTL mapping, marker-assisted breeding. Future of crop biotechnology: applications of genomics, biopharming, genetical genomics, systems biology

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