

# University of Pretoria Yearbook 2021

## BCom (07130222)

**Department** Economics

**Minimum duration of study** 3 years

**Total credits** 376

**NQF level** 07

### Programme information

The programme is aimed at the training of students in the Economic and Management Sciences, but it does not lead to a specific vocational outcome. However, students are able to compile their own curricula with a view to work opportunities in all sectors.

Students who achieved 70% and above in English Home Language (an A or a B), and 80% and above in English First Additional Language (only an A) in the NSC (or equivalent) will be exempted from ALL 124 and therefore do not have to register and pass this module to complete their degrees. Students who achieved 69% and below in English Home Language (a C and below), and 79% and below in English First Additional Language (a B and below) have to register for ALL 124 and pass this module in order to be awarded their degrees.

### Admission requirements

- The closing date is an administrative admission guideline for non-selection programmes. Once a non-selection programme is full and has reached the institutional targets, then that programme will be closed for further admissions, irrespective of the closing date. However, if the institutional targets have not been met by the closing date, then that programme will remain open for admissions until the institutional targets are met.
- The following persons will be considered for admission: Candidates who are in possession of a certificate that is deemed by the University to be equivalent to the National Senior Certificate (NSC) with admission to bachelor's degree studies; candidates who are graduates from other tertiary institutions or have been granted the status of graduates of such institutions; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.

#### **Transferring students**

##### **Candidates previously registered for the BCom — Extended programme**

The Admissions Committee of the faculty considers applications of candidates who were previously registered for the BCom — Extended programme according to specific guidelines as stipulated in the Transfer Guide of the Faculty of Economic and Management Sciences as published on the EMS Faculty website.

##### **Candidates previously registered at UP or at another university**

The Admissions Committee of the faculty considers applications of candidates who have already completed the final NSC or equivalent qualification and/or were previously registered at UP or at another university according to specific guidelines as stipulated in the Transfer Guide of the Faculty of Economic and Management Sciences as

published on the EMS Faculty website. A complete academic record, as well as the final school leaving results, are required for such applications.

**NB:** Candidates who are still registered at another university must submit an academic record of their studies to the faculty as soon as possible after their final examinations. The closing date for these applications is **30 September**.

### **Qualifications from countries other than South Africa**

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

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

#### **Minimum requirements**

##### **Achievement level**

##### **English Home Language or English First Additional Language**

NSC/IEB

5

AS Level

C

##### **Mathematics**

NSC/IEB

4

AS Level

D

##### **APS**

**30**

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

**Note:** Accountancy is not a subject requirement for any of the BCom or BAdmin programmes.

## **Additional requirements**

- General Regulations G.1 to G.15 (with the exception of Regulation G.11.2(c)) apply to a bachelor's degree.
- A student may not take more than the prescribed number of modules per semester unless the Dean decides otherwise.
- A student may take a module not listed as an elective module only if the prior approval of the Dean has been obtained.
- A student who is in possession of a bachelor's degree may not present any modules passed for that degree for another field of specialisation or degree in this Faculty. (See General Regulations G.8 and G.9)
- A module already passed may only be repeated with the approval of the Dean.
- A module passed may not be taken into account for more than one degree or field of specialisation.
- It remains the student's responsibility to ascertain, prior to registration, whether all the modules he/she intends taking can be accommodated in the class, test and examination timetables.
- The Faculty of Economic and Management Sciences supports an outcomes-based education system and places a high premium on the development of specific academic competences. Class attendance in all modules and for the full duration of all programmes is therefore compulsory for all students.
- The Dean has the right of authorisation regarding matters not provided for in the General Regulations or the

Faculty Regulations.

## Other programme-specific information

### Please note:

- If BER 210 and BER 220 are chosen as core modules at 200-level, the elective modules will total 40 credits and the core modules 93 credits at 100-level.
- If WTW or WST is chosen as core modules, the credits will be higher.
- If BAC 200 is chosen, INF 281 (3 additional credits) is compulsory.
- FRK 122 is a terminating module. If FRK 122 is selected, a candidate will not be able to continue with Financial Accounting at the 200- and 300- level. Also note that FRK 121 may be a prerequisite for a number of other modules (eg BEL 200) and it is the responsibility of the candidate to ensure that he/she makes the appropriate choice between FRK 121 and 122.
- FBS 212 and 222 are terminating modules. Candidates will not be able to continue with Financial management at 300-level.
- BER 210 and 220 may not be included in the same curriculum as KRG 110, 120.
- Mathematical statistics and Mathematics are not mutually exclusive and may be taken simultaneously. WTW 114, 126, 128, 211, 218 must be taken if WST will be taken up to 300-level.
- OBS 310 may not be included in the same curriculum as BDO 319, 329 for degree purposes.
- Informatics 281 (INF 281) (with 3 additional credits), is compulsory if Business accounting 200, (BAC 200) is chosen.

Please consult the alphabetical list of modules for prerequisites of all applicable modules.

**Specialisation modules:** Any prescribed modules at 300-level which is preceded by the appropriate modules at 200-level.

"Major subject"

To be considered a "major subject" the equivalent of four 14-week modules, including two at 300-level, must be passed provided that:

- a module passed at 300-level shall only be recognised for degree purposes if the corresponding prescribed module(s) at 200-level has/have been passed, unless the Dean decides otherwise;
- the following modules which are offered at 300-level only, are also considered "major subjects": Labour law 311 (ABR 311), Labour relations 320 (ABV 320), and International business management 359 and 369 (OBS 359 and 369); and
- only two 14-week modules, or the equivalent thereof, that are not preceded by the 100- and 200-level modules, may be taken for degree purposes. In other words, at least four 14-week modules must be taken at 300-level that are preceded by the 100- and 200-level, except for modules offered on 200- and 300-level only.

It is thus the responsibility of students to ensure before registration, that their curricula comply with all the requirements of the applicable regulations.

## Promotion to next study year

*According to General Regulation G.3 students have to comply with certain requirements as set by the Faculty Board.*

- a. A student must pass at least 4 core semester or 2 core year modules to be admitted to the subsequent year of study.
- b. If a student has passed less than the required minimum of 4 core semester or 2 core year modules, he/she

will not be readmitted to the Faculty of Economic and Management Sciences. Such a student may apply in writing to the Faculty's Admissions Committee to be readmitted conditionally – with the proviso that the Admissions Committee may set further conditions with regards to the student's academic progress. The Faculty's Admissions Committee may deny a student's application for readmission.

- c. If a student has been readmitted conditionally, his/her academic progress will be monitored after the first semester examinations to determine whether he/she has complied with the requirements set by the Admissions Committee. If not, his/her studies will be suspended.
- d. A student whose studies have been suspended because of his/her poor academic performance has the right to appeal against the decision of the Faculty's Admissions Committee.
- e. A student may be refused promotion to a subsequent year of study if the prescribed tuition fees are not paid.
- f. A student may be refused admission to the examination, or promotion to a subsequent year of study or promotion in a module (if applicable) if he/ she fails to fulfil the attendance requirements. Class attendance in all modules and for the full duration of all programmes is compulsory for all students.

## Pass with distinction

- a. A degree may be awarded with distinction provided the candidate meets the following criteria:
  - i. Completes the degree within three years;
  - ii. Obtains a Cumulative Grade Point Average (CGPA) of 75%;
  - iii. Repeated passed modules will not be considered. The initial pass mark of module will be used when calculating the GPA.
- b. A degree will only be awarded with distinction to transferees from other degrees in the Faculty of Economic and Management Sciences, other faculties and from other universities who still complete their bachelor degrees within three years (including the years registered for the other degree and credits transferred and recognised).
- c. The GPA will be not be rounded up to a whole number.
- d. Exceptional cases will be considered by the Dean.

## General information

### **Minimum requirements for bachelor's degrees; semester and year modules; new regulations**

1. Students who commenced their studies before 2015 must complete the programme in terms of the curriculum of the year in which they commenced their studies, or in terms of the curriculum of the year in which they switched to their current field of specialisation. Students who prefer to do so may, however, apply to change over to the latest curriculum, but then they should comply with all the requirements thereof and they may not revert to the regulations of an earlier year.
2. Students who are registering for a degree programme for the first time from 2015 onward must take the modules indicated under the particular field of specialisation.

## Curriculum: Year 1

### Minimum credits: 125

(STK 113,123 or STK 110 & STK 120) and (WST 111 & WST 121) cannot be included in the same curriculum. Choose only one set.

### Fundamental modules

#### Academic information management 111 (AIM 111)

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

#### Module content

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

#### Academic information management 121 (AIM 121)

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



**Language of tuition** Module is presented in English

**Department** Informatics

**Period of presentation** Semester 2

#### Module content

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

### Academic literacy for Economic and Management Sciences 124 (ALL 124)

**Module credits** 6.00

**NQF Level** 05

**Service modules** Faculty of Economic and Management Sciences

**Prerequisites** No prerequisites.

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Unit for Academic Literacy

**Period of presentation** Semester 1 and Semester 2

#### Module content

This module is intended to equip students with the competence in reading and writing required in the four high impact modules: Business Management, Financial Accounting, Statistics and Economics. Students will also be equipped to interpret and draw figures and graphs and to do computations and manage relevant formulas. Students attend two lectures per week during semester two.

*This module is offered by the Faculty of Humanities.*

### Academic orientation 107 (UPO 107)

**Module credits** 0.00

**NQF Level** 00

**Language of tuition** Module is presented in English

**Department** Economic and Management Sciences Deans Office

**Period of presentation** Year

### Core modules

#### Economics 110 (EKN 110)

**Module credits** 10.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

**Prerequisites** No prerequisites.

**Contact time** 1 discussion class per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Economics

**Period of presentation** Semester 1

### Module content

This module deals with the core principles of economics. A distinction between macroeconomics and microeconomics is made. A discussion of the market system and circular flow of goods, services and money is followed by a section dealing with microeconomic principles, including demand and supply analysis, consumer behaviour and utility maximisation, production and the costs thereof, and the different market models and firm behaviour. Labour market institutions and issues, wage determination, as well as income inequality and poverty are also addressed. A section of money, banking, interest rates and monetary policy concludes the course.

## Economics 120 (EKN 120)

**Module credits** 10.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

**Prerequisites** EKN 110 GS or EKN 113 GS and at least 4 (50-59%) in Mathematics in the Grade 12 examination or 60% in STK 113 and concurrently registered for STK 123

**Contact time** 1 discussion class per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Economics

**Period of presentation** Semester 2

### Module content

This module deals with the core principles of economics, especially macroeconomic measurement the private and public sectors of the South African economy receive attention, while basic macroeconomic relationships and the measurement of domestic output and national income are discussed. Aggregate demand and supply analysis stands core to this course which is also used to introduce students to the analysis of economic growth, unemployment and inflation. The microeconomics of government is addressed in a separate section, followed by a section on international economics, focusing on international trade, exchange rates and the balance of payments. The economics of developing countries and South Africa in the global economy conclude the course.





### Financial accounting 111 (FRK 111)

**Module credits** 10.00

**NQF Level** 05

**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** Module is presented in English

**Department** 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.

### Financial accounting 121 (FRK 121)

**Module credits** 12.00

**NQF Level** 05

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

**Prerequisites** FRK 111 GS

**Contact time** 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Accounting

**Period of presentation** Semester 2

#### Module content

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

### Financial accounting 122 (FRK 122)

**Module credits** 12.00

**NQF Level** 05





<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Law Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	FRK 111 GS or FRK 133, FRK 143
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<b>Contact time</b>	4 lectures per week
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<b>Language of tuition</b>	Module is presented in English
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<b>Department</b>	Accounting
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<b>Period of presentation</b>	Semester 2
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#### 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.

### Informatics 183 (INF 183)

<b>Module credits</b>	3.00
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<b>NQF Level</b>	05
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<b>Prerequisites</b>	No prerequisites.
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<b>Contact time</b>	1 practical per week
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<b>Language of tuition</b>	Module is presented in English
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<b>Department</b>	Informatics
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<b>Period of presentation</b>	Year
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#### Module content

Computer processing of accounting information.

### Business management 114 (OBS 114)

<b>Module credits</b>	10.00
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<b>NQF Level</b>	05
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	May not be included in the same curriculum as OBS 155
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<b>Contact time</b>	3 lectures per week
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<b>Language of tuition</b>	Module is presented in English
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<b>Department</b>	Business Management
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<b>Period of presentation</b>	Semester 1
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### Module content

The entrepreneurial mind-set; managers and managing; values, attitudes, emotions, and culture: the manager as a person; ethics and social responsibility; decision making; leadership and responsible leadership; effective groups and teams; managing organizational structure and culture inclusive of the different functions of a generic organisation and how they interact (marketing; finance; operations; human resources and general management); contextualising Sustainable Development Goals (SDG) in each of the topics.

## Business management 124 (OBS 124)

**Module credits** 10.00

**NQF Level** 05

**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** Module is presented in English

**Department** Business Management

**Period of presentation** Semester 2

### Module content

Value chain management: functional strategies for competitive advantage; human resource management; managing diverse employees in a multicultural environment; motivation and performance; using advanced information technology to increase performance; production and operations management; financial management; corporate entrepreneurship.

## Statistics 110 (STK 110)

**Module credits** 13.00

**NQF Level** 05

**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 practical per week, 1 tutorial per week, 3 lectures per week

**Language of tuition** Module is presented in English

**Department** 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). Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

## Statistics 113 (STK 113)

**Module credits** 11.00

**NQF Level** 05

**Service modules** Faculty of Humanities

**Prerequisites** No prerequisites.

**Contact time** 1 practical per week, 1 tutorial per week, 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Statistics

**Period of presentation** Semester 1

## Module content

\*On its own, STK 113 and 123 will not be recognised for degree purposes, but exemption will be granted for STK 110.

Data operations and transformations: Introductory concepts, the role of statistic, various types of data and the number system. Concepts underlying linear, quadratic, exponential, hyperbolic, logarithmic transformations of quantitative data, graphical representations, solving of equations, interpretations. Determining linear equations in practical situations. Characteristics of logarithmic functions. The relationship between the exponential and logarithmic functions in economic and related problems. Systems of equations in equilibrium. Additional concepts relating to data processing, functions and inverse functions, sigma notation, factorial notation, sequences and series, inequalities (strong, weak, absolute, conditional, double) and absolute values. Descriptive statistics – Univariate: Sampling and the collection of data, frequency distributions and graphical representations. Descriptive measures of location and dispersion. Probability: Introductory probability theory. Theoretical probability distributions. Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques. The weekly one hour practical is presented during the last seven weeks of the semester.

## Statistics 120 (STK 120)

**Module credits** 13.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

<b>Prerequisites</b>	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
<b>Contact time</b>	1 practical per week, 1 tutorial per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 2

### Module content

Students can only get credit for one of the following two modules: STK 120 or STK 121.

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: solving and application. Optimisation, linear functions, non-linear functions. Marginal and total functions. Stochastic and deterministic variables in statistical and economic context: producers' and consumers' surplus. Supporting mathematical concepts. Statistical concepts are illustrated using simulation within a data science framework.

This module is also presented as STK 121, an anti-semester module. This is a terminating module.

## Statistics 123 (STK 123)

<b>Module credits</b>	12.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Humanities
<b>Prerequisites</b>	STK 113 GS
<b>Contact time</b>	1 practical per week, 1 tutorial per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 2

### Module content

\*On its own, STK 113 and 123 will not be recognized for degree purposes, but exemption will be granted for STK 110.

Optimisation techniques with economic applications: Data transformations and relationships with economic applications, operations and rules, linear, quadratic, exponential, hyperbolic and logarithmic functions; systems of equations in equilibrium, system of linear inequalities, solving of linear programming problems by means of the graphical and extreme point methods. Applications of differentiation and integration in statistic and economic related problems: the limit of a function, continuity, rate of change, the derivative of a function, differentiation rules, higher order derivatives, optimisation techniques, the area under a curve and applications of definite integrals. Probability and inference: Theoretical probability distributions (revision only). Sampling distributions. Estimation theory and hypothesis testing of sampling averages and proportions (one-sample and two-sample cases). Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques. The weekly one hour practical is presented during the last seven weeks of the semester.



## Mathematical statistics 111 (WST 111)

**Module credits** 16.00

**NQF Level** 05

**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** 1 practical per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** 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

**NQF Level** 05

**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** Module is presented in English

**Department** 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.

## Elective modules

### Marketing management 120 (BEM 120)

**Module credits** 10.00

**NQF Level** 05

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Marketing Management

**Period of presentation** Semester 2

#### Module content

This module provides an overview of the fundamentals of marketing by considering the exchange process, customer value, marketing research and the development of a marketing plan. It also addresses the marketing mix elements with specific focus on the seven service marketing elements namely the service product, physical evidence, people, process, distribution, pricing and integrated marketing communication.

### Informatics 112 (INF 112)

**Module credits** 10.00

**NQF Level** 05

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

**Prerequisites** A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination; or STK 113 60%, STK 123 60% or STK 110

**Contact time** 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Informatics

**Period of presentation** Semester 2

#### Module content

Introduction to information systems, information systems in organisations, hardware: input, processing, output, software: systems and application software, organisation of data and information, telecommunications and networks, the Internet and Intranet. Transaction processing systems, management information systems, decision support systems, information systems in business and society, systems analysis, systems design, implementation, maintenance and revision.

### Commercial law 110 (KRG 110)

**Module credits** 10.00

**NQF Level** 05

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

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** 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

**NQF Level** 05

**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** Module is presented in English

**Department** 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.

**Public administration 112 (PAD 112)**

**Module credits** 10.00

**NQF Level** 05

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

**Prerequisites** No prerequisites.

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** School of Public Management and Administration

**Period of presentation** Semester 1



## Module content

This module in public administration is designed specifically to assist students in understanding the role of public administration in a modern state, the unique characteristics of public administration, the schools and approaches in public administration and introducing the various generic administrative functions. The discipline of public administration has developed rapidly and by implication, has changed and shifted its paradigm over the years. The purpose of this module is to introduce public administration to the student as a field of study that makes a significant contribution to the effective administration and management of government institutions.

### Public administration 122 (PAD 122)

<b>Module credits</b>	10.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities
<b>Prerequisites</b>	PAD 112 GS
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	School of Public Management and Administration
<b>Period of presentation</b>	Semester 2

## Module content

This module in public administration will introduce the constitutional framework pertaining to public administration. The South African system of government, the functions, role and powers of the executive, legislative and judicial branches of government as well as the functioning of the three spheres of government will be discussed. The module will enable the student to understand how and where public administration is practiced.

### Calculus 114 (WTW 114)

<b>Module credits</b>	16.00
<b>NQF Level</b>	05
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities
<b>Prerequisites</b>	60% for Mathematics in Grade 12
<b>Contact time</b>	1 tutorial per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics
<b>Period of presentation</b>	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.

## Mathematics 124 (WTW 124)

**Module credits** 16.00

**NQF Level** 05

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

**Prerequisites** WTW 114

**Contact time** 1 tutorial per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 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  $R^n$ , 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 and quadratic curves.

## Mathematics 134 (WTW 134)

**Module credits** 16.00

**NQF Level** 05

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

**Prerequisites** 50% for Mathematics in Grade 12

**Contact time** 1 tutorial per week, 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 1

## Module content

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

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

## Linear algebra 146 (WTW 146)

**Module credits** 8.00

**NQF Level** 05

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

**Prerequisites** 50% for Mathematics in Grade 12

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**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 and WTW 164. The module WTW 146 is designed for students who require Mathematics at 100 level only and does not lead to admission to Mathematics at 200 level.*

Vector algebra, lines and planes, matrix algebra, solution of systems of equations, determinants. Complex numbers and polynomial equations. All topics are studied in the context of applications.

## Calculus 148 (WTW 148)

**Module credits** 8.00

**NQF Level** 05

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

**Prerequisites** WTW 114 GS or WTW 134 GS

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

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**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 148 and WTW 164. The module WTW 148 is designed for students who require Mathematics at 100 level only and does not lead to admission to Mathematics at 200 level.

Integration techniques. Modelling with differential equations. Functions of several variables, partial derivatives, optimisation. Numerical techniques. All topics are studied in the context of applications.

## Curriculum: Year 2

### Minimum credits: 143

(STK 113,123 or STK 110 & STK 120) and (WST 111 & WST 121) cannot be included in the same curriculum. Choose only one set.

## Fundamental modules

### Introduction to moral and political philosophy 251 (FIL 251)

<b>Module credits</b>	10.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Philosophy
<b>Period of presentation</b>	Quarter 2, 3 and 4

#### Module content

In 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.

## Core modules

### Business law 210 (BER 210)

<b>Module credits</b>	16.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 discussion class per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English



**Department** Mercantile Law

**Period of presentation** Semester 1

**Module content**

Basic principles of law of contract. Law of sales, credit agreements, lease.

**Business law 220 (BER 220)**

**Module credits** 16.00

**NQF Level** 06

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

**Prerequisites** Examination entrance for BER 210

**Contact time** 1 discussion class per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Mercantile Law

**Period of presentation** Semester 2

**Module content**

Labour law. Aspects of security law. Law of insolvency. Entrepreneurial law; company law, law concerning close corporations. Law of partnerships.

**Communication management 281 (KOB 281)**

**Module credits** 5.00

**NQF Level** 07

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Business Management

**Period of presentation** Quarter 1

**Module content**

\*Module content will be adapted in accordance with the appropriate degree programme. Only one of KOB 281-284 may be taken as a module where necessary for a programme.

Applied business communication skills

Acquiring basic business communication skills will enhance the capabilities of employees, managers and leaders in the business environment. An overview of applied skills on the intrapersonal, dyadic, interpersonal, group (team), organisational, public and mass communication contexts is provided. The practical part of the module (for example, the writing of business reports and presentation skills) concentrates on the performance dimensions of these skills as applied to particular professions.

## Elective modules

### Business accounting 200 (BAC 200)

<b>Module credits</b>	32.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Law Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	FRK 111 and FRK 121 or FRK 100/101
<b>Contact time</b>	4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Accounting
<b>Period of presentation</b>	Year

#### Module content

To use a conceptual understanding of intermediate foundational knowledge of International Financial Reporting Standards (IFRS) in order to prepare, present and interpret company and basic group company financial statements in a familiar business context and to propose clear solutions with adequate justification to solve financial problems in an ethical manner.

### Industrial and organisational psychology 214 (BDO 214)

<b>Module credits</b>	16.00
<b>NQF Level</b>	06
<b>Prerequisites</b>	BDO 111 GS, BDO 221 GS
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Human Resource Management
<b>Period of presentation</b>	Semester 1

#### Module content

##### Part 1: Organisational Behaviour I

This section will provide an introduction to the foundations and principles of Organisational Behaviour (OB) as well as the challenges and opportunities for OB. In addition, specific attention will be paid to contemporary theories of motivation, job design, employee involvement and reward programmes. The various leadership theories will be covered. The effect of power and politics in the organisation will be studied, alongside conflict and negotiation skills.

##### Part 2: Organisational behaviour II

The behavioural basis for organisational structuring and organisation design will be addressed. Organisational culture as well as the approaches to organisational change will be covered. Sustainability from an organisational perspective will be discussed as well.



## Industrial and organisational psychology 224 (BDO 224)

<b>Module credits</b>	16.00
<b>NQF Level</b>	06
<b>Prerequisites</b>	BDO 111 GS, BDO 221 GS
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Human Resource Management
<b>Period of presentation</b>	Semester 2

### Module content

#### Part 1: Employee health and ergonomics

This section focuses on actual and important aspects of safety and health management in organisations, as well as the nature and role of ergonomics therein. Specific health, safety and wellness issues such as stress and burnout, substance abuse, diseases, accidents and injuries as well as workplace bullying, violence, trauma and sexual harassment will be addressed. Furthermore employee wellness programmes will be discussed.

#### Part 2: Personality

This section discusses the various personality and social identity theories as they exist within the meta- theory of psychology. The unconscious processes of personality, the trait and social identity theories of personality are examined thoroughly. To close off this module we have a look at diverse social identities within the workplace in a social and cultural context.

## Taxation 200 (BEL 200)

<b>Module credits</b>	32.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	FRK 111 and FRK 121 or FRK 100 or FRK 101. Only available to BCom (Option Taxation, Accounting Sciences, Financial Management Sciences, Financial Sciences, Informatics, Investment Management and Law) students.
<b>Contact time</b>	1 practical per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Taxation
<b>Period of presentation</b>	Year

### Module content

In this module an introduction to taxation as a discipline in the South African tax environment is provided. The income tax concepts covered in this module are gross income, special inclusions, exempt income, general deductions, special deductions, prohibited deductions and allowed assessed losses. The implications of a capital gains tax event, specific sections of the Income Tax Act applicable on individuals as well as fringe benefits and specific allowances for individuals are discussed. Concepts such as the prepaid tax system, tax implications of donations tax events as well as the tax implications of a deceased person will be covered. Finally an introduction to the basic principles of VAT is included.

## Consumer behaviour 212 (BEM 212)

<b>Module credits</b>	16.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	BEM 120 GS
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Marketing Management
<b>Period of presentation</b>	Semester 1

### Module content

Internal and external influencing factors of consumer behaviour, the consumer's decision process and application fields of consumer behaviour, consumerisms and social responsibility, buying behaviour of consumers in both product and service related industries, consumer psychology and the influence thereof on buying behaviour, psychology of pricing, influencing factors in consumer buying behaviour, the impact of various forms of marketing communication on buying behaviour.

## Integrated marketing communications 224 (BEM 224)

<b>Module credits</b>	16.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Humanities Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	BEM 120 GS
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Marketing Management
<b>Period of presentation</b>	Semester 2

### Module content

Integrated brand communications approach, marketing communication planning, objectives and budgets for integrated marketing communications, principles and strategising of marketing communication elements, new media, the brand name communication process, marketing metrics and evaluation for marketing communication effectiveness.

## Economics 214 (EKN 214)

<b>Module credits</b>	16.00
<b>NQF Level</b>	06

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

**Prerequisites** EKN 110 GS & EKN 120 OR EKN 113 GS & EKN 123; & STK 110 GS OR STK 113 & STK 123 & STK 120/121 or concurrently registered for STK 120/121 OR WST 111 & WST121 are prerequisites instead of STK 120/121 or WST 111 and concurrently registered for WST 121.

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Economics

**Period of presentation** Semester 1

### Module content

Macroeconomics

From Wall and Bay Street to Diagonal Street: a thorough understanding of the mechanisms and theories explaining the workings of the economy is essential. Macroeconomic insight is provided on the real market, the money market, two market equilibrium, monetarism, growth theory, cyclical analysis, inflation, Keynesian general equilibrium analysis and fiscal and monetary policy issues.

## Economics 224 (EKN 224)

**Module credits** 16.00

**NQF Level** 06

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

**Prerequisites** EKN 110 GS & EKN 120 OR EKN 113 GS & EKN 123; & STK 110 GS OR STK 113 & STK 123 & STK 120/121 or concurrently registered for STK120/121 OR WST 111 & WST121 are prerequisites instead of STK 120/121 or WST 111 and concurrently registered for WST 121.

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Economics

**Period of presentation** Semester 1

### Module content

Microeconomics

Microeconomic insight is provided into: consumer and producer theory, general microeconomic equilibrium, Pareto-optimality and optimality of the price mechanism, welfare economics, market forms and the production structure of South Africa. Statistic and econometric analysis of microeconomic issues.

## Economics 234 (EKN 234)

**Module credits** 16.00

**NQF Level** 07

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

**Prerequisites** EKN 214 and STK 120/121 or WST 121 OR concurrently registered for STK 120/121 or WST 121.

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Economics

**Period of presentation** Semester 2

### Module content

Macroeconomics

Application of the principles learned in EKN 214 on the world we live in. We look at international markets and dynamic macroeconomic models, and familiarise the students with the current macroeconomic policy debates. We also take a look at the latest macroeconomic research in the world. The course includes topics of the mathematical and econometric analysis of macroeconomic issues.

## Economics 244 (EKN 244)

**Module credits** 16.00

**NQF Level** 06

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

**Prerequisites** EKN 224 and STK 120/121 or WST 121 OR concurrently registered for STK 120/121 or WST 121.

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Economics

**Period of presentation** Semester 2

### Module content

Microeconomics

From general equilibrium and economic welfare to uncertainty and asymmetric information. In this module we apply the principles learned in EKN 224 on the world around us by looking at the microeconomic principles of labour and capital markets, as well as reasons why the free market system could fail. We touch on the government's role in market failures. The course includes topics of the mathematical and econometric analysis of microeconomic issues.

## Financial management 212 (FBS 212)

<b>Module credits</b>	16.00
<b>NQF Level</b>	06
<b>Prerequisites</b>	FRK 111 and 121/122 or FRK 100 or FRK 101
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Financial Management
<b>Period of presentation</b>	Semester 1

### Module content

Role and environment of managerial finance. Financial statement analysis. Time value of money. Risk and return. Working capital management. Interest and valuations (bonds and shares).

## Financial management 222 (FBS 222)

<b>Module credits</b>	16.00
<b>NQF Level</b>	06
<b>Prerequisites</b>	FRK 111 and 122/121 or FRK 100 or FRK 101
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Financial Management
<b>Period of presentation</b>	Semester 2

### Module content

Introduction to management accounting. Cost terms, concepts and classifications. Job-order costing. Cost behaviour. Variable versus absorption costing. Cost-volume profit relationships. Budgeting. Activity based costing. Cash flow and financial planning.

## Informatics 214 (INF 214)

<b>Module credits</b>	14.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	AIM 101 or AIM 111 and AIM 121
<b>Contact time</b>	2 lectures per week, 2 practicals per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Informatics
<b>Period of presentation</b>	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.

## Informatics 225 (INF 225)

**Module credits** 14.00

**NQF Level** 06

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

**Prerequisites** INF 112; AIM 101 or AIM 102 or AIM 111 and AIM 121

**Contact time** 1 lecture per week, 3 practicals per week

**Language of tuition** Module is presented in English

**Department** Informatics

**Period of presentation** Semester 2

### Module content

An overview of systems infrastructure and integration.

## Informatics 261 (INF 261)

**Module credits** 7.00

**NQF Level** 06

**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** Module is presented in English

**Department** 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.

## Business management 210 (OBS 210)

**Module credits** 16.00

**NQF Level** 06

**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

**Language of tuition** Module is presented in English

**Department** 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

**NQF Level** 06

**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. Students from other Faculties are required to have 50% for Mathematics in Grade 12.

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Business Management

**Period of presentation** Semester 2

### Module content

Project management and negotiations:

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.

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.

## Public administration 212 (PAD 212)

**Module credits** 16.00

**NQF Level** 06



<b>Service modules</b>	Faculty of Humanities
<b>Prerequisites</b>	PAD 112 or PAD 122 with a GS in the other
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	School of Public Management and Administration
<b>Period of presentation</b>	Semester 1

#### Module content

This module in public administration constitutes an in-depth analysis of the generic administrative functions, including, policy making, organising, financing, staffing and control. Students will thus be equipped with knowledge and skills related to government strategic planning, policy-making and decision-making, budgeting, public procurement, human resource management functions and employment legislation impacting on human resources within public organisations.

### Public administration 222 (PAD 222)

<b>Module credits</b>	16.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Humanities
<b>Prerequisites</b>	PAD 212 GS
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	School of Public Management and Administration
<b>Period of presentation</b>	Semester 2

#### Module content

This module in public administration introduces the student to the process of planning, executing and evaluating research in the public sector. Students will be enabled to identify, plan, execute and present a research project. This is a service learning module and as such students will be expected to complete approximately 15 hours service learning and submit a portfolio as part of their formal assessment.

### Statistics 210 (STK 210)

<b>Module credits</b>	20.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	STK 110, STC 122 or WST 111, WST 121
<b>Contact time</b>	1 practical per week, 3 lectures per week
<b>Language of tuition</b>	Module is presented in English

<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 1

### Module content

Statistical problem solving. Causality, experimental and observational data. Probability theory. Multivariate random variables. Discrete and continuous probability distributions. Stochastic representations. Measures of association. Expected values and conditional expectation. Simulation techniques. Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

## Statistics 220 (STK 220)

<b>Module credits</b>	20.00
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<b>NQF Level</b>	06
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	STK 210 GS
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<b>Contact time</b>	1 practical per week, 3 lectures per week
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<b>Language of tuition</b>	Module is presented in English
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<b>Department</b>	Statistics
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<b>Period of presentation</b>	Semester 2
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### Module content

Multivariate probability distributions. Sampling distributions and the central limit theorem. Frequentist and Bayesian inference. Statistical learning and decision theory. Simulation techniques enhancing statistical thinking. Supervised learning: linear regression, estimation and inference. Non-parametric modelling. Supporting mathematical concepts. Statistical algorithms. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

## Mathematical statistics 211 (WST 211)

<b>Module credits</b>	24.00
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<b>NQF Level</b>	06
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<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
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<b>Prerequisites</b>	WST 111, WST 121, WTW 114 GS and WTW 124 GS
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<b>Contact time</b>	2 practicals per week, 4 lectures per week
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<b>Language of tuition</b>	Module is presented in English
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<b>Department</b>	Statistics
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<b>Period of presentation</b>	Semester 1
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## 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)

<b>Module credits</b>	24.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	WST 211 GS
<b>Contact time</b>	2 practicals per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	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)

<b>Module credits</b>	12.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
<b>Prerequisites</b>	WTW 124
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics

**Period of presentation** Semester 1

### Module content

This is an introduction to linear algebra on  $\mathbb{R}^n$ . 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

**NQF Level** 06

**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** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 1

### Module content

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

## Analysis 220 (WTW 220)

**Module credits** 12.00

**NQF Level** 06

**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, WTW 211 and WTW 218

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 2

## Module content

\*This module is recommended as an elective only for students who intend to enrol for WTW 310 and/or WTW 320. Students will not be credited for more than one of the following modules for their degree: WTW 220 and WTW 224.

Properties of real numbers. Analysis of sequences and series of real numbers. Power series and theorems of convergence. The Bolzano-Weierstrass theorem. The intermediate value theorem and analysis of real-valued functions on an interval. The Riemann integral: Existence and properties of the interval.

## Linear algebra 221 (WTW 221)

**Module credits** 12.00

**NQF Level** 06

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

**Prerequisites** WTW 211 and WTW 218

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 2

## Module content

Abstract vector spaces, change of basis, matrix representation of linear transformations, orthogonality, diagonalisability of symmetric matrices, some applications.

## Techniques of analysis 224 (WTW 224)

**Module credits** 12.00

**NQF Level** 06

**Prerequisites** WTW 124 and WTW 211 GS and WTW 218 GS

**Contact time** 1 tutorial per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Mathematics and Applied Mathematics

**Period of presentation** Semester 2

## Module content

\*This module does not lead to admission to WTW 310 or WTW 320. Students will not be credited for more than one of the following modules for their degree: WTW 220 and WTW 224.

Sequences of real numbers: convergence and monotone sequences. Series of real numbers: convergence, integral test, comparison tests, alternating series, absolute convergence, ratio and root tests. Power series: representation of functions as power series, Taylor and Maclaurin series. Application to series solutions of differential equations.

## Differential equations 264 (WTW 264)

<b>Module credits</b>	12.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
<b>Prerequisites</b>	WTW 114 and WTW 124
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics
<b>Period of presentation</b>	Semester 2

### Module content

\*Students will not be credited for both WTW 162 and WTW 264 or both WTW 264 and WTW 286 for their degree.

Theory and solution methods for ordinary differential equations and initial value problems: separable and linear first order equations, linear equations of higher order, systems of linear equations. Laplace transform.

## Differential equations 286 (WTW 286)

<b>Module credits</b>	12.00
<b>NQF Level</b>	06
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
<b>Prerequisites</b>	WTW 114, WTW 124 and WTW 162
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics
<b>Period of presentation</b>	Semester 1

### Module content

\*Students will not be credited for more than one of the modules for their degree: WTW 264, WTW 286

Theory and solution methods for ordinary differential equations and initial value problems: separable and linear first-order equations, linear equations of higher order, systems of linear equations. Application to mathematical models. Numerical methods applied to nonlinear systems. Qualitative analysis of linear systems.

## Curriculum: Final year

### Minimum credits: 120

(STK 113,123 or STK 110 & STK 120) and (WST 111 & WST 121) cannot be included in the same curriculum. Choose only one set.

### Elective modules

#### Labour law 311 (ABR 311)

<b>Module credits</b>	20.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Humanities
<b>Prerequisites</b>	Admission to the relevant programme.
<b>Contact time</b>	1 tutorial every 2nd week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mercantile Law
<b>Period of presentation</b>	Semester 1

#### Module content

Basic principles of the employment contract. Collective labour law. Statutory conditions of employment. Individual labour disputes. Collective labour disputes. Settlement procedures.

#### Labour relations 320 (ABV 320)

<b>Module credits</b>	20.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Human Resource Management
<b>Period of presentation</b>	Semester 2

## Module content

The theoretical basis of Labour Relations

In this section the basic concepts, historical context and theoretical approaches to the field of labour relations will be discussed. The institutional framework in which labour relations operates, will be addressed with particular emphasis on the structural mechanisms and institutional processes. The service relationship that forms the basis of labour relations practices, will also be analysed.

Labour Relations practice

In this section students are taught the conceptual and practical skills related to practice aspects such as handling of grievances, disciplining, retrenchments, collective bargaining, industrial action and dispute resolution.

## Business accounting 300 (BAC 300)

**Module credits** 40.00

**NQF Level** 07

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Law  
Faculty of Natural and Agricultural Sciences

**Prerequisites** BAC 200

**Contact time** 4 lectures per week

**Language of tuition** Module is presented in English

**Department** Accounting

**Period of presentation** Year

## Module content

BAC 300 includes both company and complex group company statements and the outcome of BAC 300 is: To use a conceptual understanding of comprehensive and integrated foundational knowledge of International Financial Reporting Standards (IFRS), basic foundational knowledge of IFRS for small and medium-sized enterprises (IFRS for SMEs) and basic foundational knowledge of Generally Recognised Accounting Practice (GRAP), in order to proficiently prepare, present and interpret company and complex group company financial statements in an unfamiliar business context and to propose appropriate solutions with compelling justification to solve financial problems in an ethical manner.

## Industrial and organisational psychology 319 (BDO 319)

**Module credits** 20.00

**NQF Level** 07

**Service modules** Faculty of Health Sciences

**Prerequisites** BDO 110, 120; BDO 219 GS, BDO 229 GS (except for Business Management students).

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Human Resource Management



**Period of presentation** Semester 1

## Module content

### Part 1: The Human Resource Management environment

This section will provide the necessary know-how on the management of a Human Resource (HR) office. This particular section provides an introduction to Human Resource Management (HRM). The environment and foundations of HR will be covered. Various HR system standard and function models including the SA Board for People Practices HR standards model will be explained. The focus will move to emerging HR practices to ensure “competence” such as competency -based HRM. Day-to-day HRM practices are addressed such as HR office administration and technology (HR information systems). This is followed by specific HRM functions such as job design and analysis and the managing of compensation and benefits. Recruitment and selection process to ensure the placing of qualified employees in jobs will be covered.

### Part 2: Human Resources Provision

This section builds on the foundation provided in part 1. This module assists with having the right people in the right jobs at the right time through effective HR planning (HRP). This includes provision of theory which will assist HR managers to address strategy-linked HRP. To be able to ensure return on investment (ROI), organisations must ensure effective assessing and development of qualified employees by implementing performance management (PM) practices. This module will assist the HR professionals with theory related to internal staffing and career management practices. The section closes by discussing the role of HRM in virtual organisations as well as presenting international HRM theory that will assist the HR professional in the managing of international HRM.

## Industrial and organisational psychology 329 (BDO 329)

**Module credits** 20.00

**NQF Level** 07

**Service modules** Faculty of Health Sciences

**Prerequisites** BDO 319 GS

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Human Resource Management

**Period of presentation** Semester 2

## Module content

### Part 1: The theoretical environment of Human Resource Development

This section focuses on the management of Human Resource Development (HRD) practices in organisations. The information will assist students to be able to understand the importance of education, training and development in South Africa and why education, training and development centres are important. Managing training and development will be addressed under the following headings: Managing training and development (T&D) in organisations, including contemporary issues in HRD. The focus moves to the education, training and development (ETD) environment in South Africa. The administration of T&D in organisations and the relevant learning theories and principles that will be applicable to adult learning in the workplace will be discussed. This section closes with a discussion on employee onboarding and orientation.

### Part 2: The practical environment of Human Resource Development

This section will address learning related to determining training and development needs. Emphasis will be on aspects related to needs analysis, curriculum (programme) design and development, training interventions and presentation. The focus moves to learner assessment and programme evaluation.

## Taxation 300 (BEL 300)

<b>Module credits</b>	40.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology
<b>Prerequisites</b>	BEL 200 and FRK 221 or FRK 201
<b>Contact time</b>	1 discussion class per week, 4 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Taxation
<b>Period of presentation</b>	Year

## Module content

The purpose of the module is to enable the learner to calculate the value-added tax liability and to journalise transactions; calculate the normal tax liability (including the determination of taxable capital gains and assessed capital losses) of individuals, companies, estates and trusts, discuss tax principles on value-added tax and normal tax; and calculate and discuss provisional and employees' tax and to object against an assessment.

## Marketing research 314 (BEM 314)

<b>Module credits</b>	20.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Humanities Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	BEM 120 and STK 110 GS
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Marketing Management

**Period of presentation** Semester 1

### Module content

The role of marketing research, the process of marketing research, interpretation of secondary research, qualitative research, survey research, observation, measurement and attitude scaling, questionnaire design, sampling design and sampling procedures, basic data analysis, descriptive statistical analysis, interpretation and reporting of results, research report writing.

## Marketing management 321 (BEM 321)

**Module credits** 20.00

**NQF Level** 07

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

**Prerequisites** BEM 120

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Marketing Management

**Period of presentation** Semester 2

### Module content

Strategic issues in marketing, strategic marketing, strategic analysis (market analysis, customer analysis, competitor analysis and internal analysis), market strategies (competitive strategies, strategies in the product life cycle and relationship building strategies) and strategy implementation and control.

## Economics 310 (EKN 310)

**Module credits** 20.00

**NQF Level** 07

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Education  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

**Prerequisites** EKN 214, EKN 234 or EKN 224, EKN 244

**Contact time** 1 discussion class per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Economics

**Period of presentation** Semester 1

## Module content

Public finance

Role of government in the economy. Welfare economics and theory of optimality. Ways of correcting market failures. Government expenditure theories, models and programmes. Government revenue. Models on taxation, effects of taxation on the economy. Assessment of taxation from an optimality and efficiency point of view. South African perspective on public finance.

## Economics 314 (EKN 314)

<b>Module credits</b>	20.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	EKN 234, EKN 244
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Economics
<b>Period of presentation</b>	Semester 1

## Module content

International trade/finance

International economic insight is provided into international economic relations and history, theory of international trade, international capital movements, international trade politics, economic and customs unions and other forms or regional cooperation and integration, international monetary relations, foreign exchange markets, exchange rate issues and the balance of payments, as well as open economy macroeconomic issues.

## Economics 320 (EKN 320)

<b>Module credits</b>	20.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	EKN 310 GS
<b>Contact time</b>	1 discussion class per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Economics
<b>Period of presentation</b>	Semester 2

## Module content

Economic analyses

Identification, collection and interpretation process of relevant economic data; the national accounts (i.e. income and production accounts, the national financial account, the balance of payments and input-output tables); economic growth; inflation; employment, unemployment, wages, productivity and income distribution; business cycles; financial indicators; fiscal indicators; social indicators; international comparisons; relationships between economic time series - regression analysis; long-term future studies and scenario analysis; overall assessment of the South African economy from 1994 onwards.

## Economics 325 (EKN 325)

**Module credits** 20.00

**NQF Level** 07

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

**Prerequisites** EKN 214, EKN 234

**Contact time** 1 discussion class per week, 2 lectures per week

**Language of tuition** Module is presented in English

**Department** Economics

**Period of presentation** Semester 2

## Module content

Economic policy and development: Capita select

The course provides an introduction to growth economics and also to some topics on development economics. Firstly, historical evidence is covered and then the canonical Solow growth model and some of its empirical applications (human capital and convergence). Secondly, the new growth theory (the AK and the Romer models of endogenous growth) are covered. Some of the development topics to be covered include technology transfer, social infrastructure and natural resources.

## Business management 310 (OBS 310)

**Module credits** 20.00

**NQF Level** 07

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

**Prerequisites** OBS 114 or 124 with admission to the examination in the other

**Contact time** 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Business Management

**Period of presentation** Semester 1

## Module content

Strategy formulation: the deliberate strategy process of formulating a vision and mission statement, conducting internal and external environmental analyses and selecting appropriate strategies. It will enhance an understanding of the level of strategy formulation, gaining competitive advantage in your market place and thinking strategically.

### Public administration 312 (PAD 312)

<b>Module credits</b>	20.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Humanities
<b>Prerequisites</b>	PAD 112, PAD 122, PAD 212 or PAD 222 with a GS in the other
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	School of Public Management and Administration
<b>Period of presentation</b>	Semester 1

## Module content

This module in public administration is designed specifically to assist students to have a better understanding regarding the depth, origin and development of ethics in public service and administration. The emphasis here is on building responsive public servants whose duties and responsibilities do not only encourage the effective and efficient functioning of public organisations in an aim to facilitate better service delivery to all, but also apply ethical personal and organisational codes and standards in their daily operational activities. The purpose of this module is to enable the student to apply, synthesise and abstract theory into practice for a better public service of the future.

### Public administration 322 (PAD 322)

<b>Module credits</b>	20.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Humanities
<b>Prerequisites</b>	PAD 312 GS
<b>Contact time</b>	3 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	School of Public Management and Administration
<b>Period of presentation</b>	Semester 2

## Module content

This module on public administration is designed to broaden the view of students on the understanding of the origin and development of administrative systems. The emphasis is on the practical application of knowledge to problems of developing societies. Increasing global interdependence require scholarly interest in comparative public administration. A motivating force for comparative Public administration is the search for discovering regularities in administrative processes and behaviours throughout the human experience, irrespective of place and time.

### Statistics 310 (STK 310)

**Module credits** 25.00

**NQF Level** 07

**Service modules** Faculty of Engineering, Built Environment and Information Technology  
Faculty of Humanities  
Faculty of Natural and Agricultural Sciences

**Prerequisites** STK 210, STK 220

**Contact time** 1 practical per week, 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Statistics

**Period of presentation** Semester 1

## Module content

Supervised learning. Linear and non-linear regression. Ordinary least squares and maximum likelihood estimation. Violations of the assumptions, residual analysis. Cross validation. Statistical inference. Bootstrap inference. Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

### Statistics 320 (STK 320)

**Module credits** 25.00

**NQF Level** 07

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

**Prerequisites** STK 210, STK 220 or WST 211, WST 221

**Contact time** 1 practical per week, 3 lectures per week

**Language of tuition** Module is presented in English

**Department** Statistics

**Period of presentation** Semester 2

## Module content

Stationary and non-stationary univariate time series. Properties of ARIMA processes. Identification, estimation and diagnostic testing of a time series models. Forecasting. Multivariate time series. Supervised learning: introduction to generalised linear models. Modelling of binary response variables, logistic regression. Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

## Multivariate analysis 311 (WST 311)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	WST 211, WST 221, WTW 211 GS and WTW 218 GS
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 1

## Module content

Multivariate statistical distributions: Moments of a distribution, moment generating functions, independence. Multivariate normal distribution: Conditional distributions, partial and multiple correlations. Distribution of quadratic forms in normal variables. Multivariate normal samples: Estimation of the mean vector and covariance matrix, estimation of correlation coefficients, distribution of the sample mean, sample covariance matrix. Principal component analysis. The linear model: Models of full rank, least squares estimators, test of hypotheses. The generalised linear model: Exponential family mean and variance, link functions, deviance and residual analysis, test statistics, log- linear and logit models. Practical applications: Practical statistical modelling and analysis using statistical computer packages and interpretation of the output.

## Stochastic processes 312 (WST 312)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	WST 211, WST 221, WTW 211 GS and WTW 218 GS
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 1



### Module content

Definition of a stochastic process. Stationarity. Covariance stationary. Markov property. Random walk. Brownian motion. Markov chains. Chapman-Kolmogorov equations. Recurrent and transient states. First passage time. Occupation times. Markov jump processes. Poisson process. Birth and death processes. Structures of processes. Structure of the time-homogeneous Markov jump process. Applications in insurance. Practical statistical modelling, analysis and simulation using statistical computer packages and the interpretation of the output.

## Time-series analysis 321 (WST 321)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	WST 211, WST 221, WTW 211 GS and WTW 218 GS
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 2

### Module content

**Note: Only one of the modules WST 321 or STK 320 may be included in any study programme.**

Stationary and non-stationary univariate time-series. Properties of autoregressive moving average (ARMA) and autoregressive integrated moving average (ARIMA) processes. Identification, estimation and diagnostic testing of a time-series model. Forecasting. Multivariate time-series. Practical statistical modelling and analysis using statistical computer packages, including that of social responsibility phenomena.

## Actuarial statistics 322 (WST 322)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
<b>Prerequisites</b>	WST 211, WST 221, WTW 211 GS and WTW 218 GS
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Statistics
<b>Period of presentation</b>	Semester 2

### Module content

Bayes estimation. Loss distributions. Reinsurance. Risk models. Ruin theory. Credibility theory. Extreme value theory. Copulas. Practical statistical modelling and analysis using statistical computer packages.

## Analysis 310 (WTW 310)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities
<b>Prerequisites</b>	WTW 220
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics
<b>Period of presentation</b>	Semester 1

### Module content

Topology of finite dimensional spaces: Open and closed sets, compactness, connectedness and completeness. Theorems of Bolzano-Weierstrass and Heine-Borel. Properties of continuous functions and applications. Integration theory for functions of one real variable. Sequences of functions.

## Financial engineering 354 (WTW 354)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
<b>Prerequisites</b>	WST 211, WTW 211 and WTW 218
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics
<b>Period of presentation</b>	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

## Algebra 381 (WTW 381)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities

<b>Prerequisites</b>	WTW 114 and WTW 211
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics
<b>Period of presentation</b>	Semester 1

#### Module content

Group theory: Definition, examples, elementary properties, subgroups, permutation groups, isomorphism, order, cyclic groups, homomorphisms, factor groups. Ring theory: Definition, examples, elementary properties, ideals, homomorphisms, factor rings, polynomial rings, factorisation of polynomials. Field extensions, applications to straight-edge and compass constructions.

### Dynamical systems 382 (WTW 382)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
<b>Prerequisites</b>	WTW 218 and WTW 286/264
<b>Contact time</b>	1 tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics
<b>Period of presentation</b>	Semester 1

#### Module content

Matrix exponential function: homogeneous and non-homogeneous linear systems of differential equations. Qualitative analysis of systems: phase portraits, stability, linearisation, energy method and Liapunov's method. Introduction to chaotic systems. Application to real life problems.

### Numerical analysis 383 (WTW 383)

<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Service modules</b>	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Humanities
<b>Prerequisites</b>	WTW 114, WTW 123 WTW 124 and WTW 211
<b>Contact time</b>	1 practical per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Mathematics and Applied Mathematics



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**Period of presentation** Semester 2

**Module content**

Direct methods for the numerical solution of systems of linear equations, pivoting strategies. Iterative methods for solving systems of linear equations and eigenvalue problems. Iterative methods for solving systems of nonlinear equations. Introduction to optimization. Algorithms for the considered numerical methods are derived and implemented in computer programmes. Complexity of computation is investigated. Error estimates and convergence results are proved.

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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.