University of Pretoria Yearbook 2023

MCom (Statistics) *Advanced Data Analytics* (Coursework) (07250069)

Department	Statistics
Minimum duration of study	1 year
Total credits	180
NQF level	09

Admission requirements

1. BComHons in Mathematical Statistics **or** relevant hounours degree
2. A weighted average of at least 65% at honours level
3. At least 65% for the research component at honours level, but students with a weighted average of at least 70% or more will receive preference
4. An admission examination may be required

Note: Additional modules may be required in order to reach the desired level of competency.

Other programme-specific information

As long as progress is satisfactory, renewal of registration of a master's student will be accepted for a second year of study in the case of a full-time student. Renewal of registration for a third and subsequent years for a full-time student will only take place when Student Administration of the Faculty receives a written motivation (the required form can be obtained from the relevant head of department) that is supported by the relevant head of department and Postgraduate Studies Committee. Refer to General Academic Regulation G32.

General information

University of Pretoria Programme Qualification Mix (PQM) verification project

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

Curriculum: Final year

Fundamental modules

Research orientation 899 (STK 899)

Module credits	0.00
NQF Level	09
Service modules	Faculty of Economic and Management Sciences
Prerequisites	Admission to the relevant programme.
Contact time	Ad Hoc
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Year

Module content

A compulsory bootcamp must be attended as part of this module – usually presented during the last week of January each year. Details regarding the venue and specific dates are made available by the department each year. The bootcamp will cover the basics of research to prepare students for the research component of their degree. Students can be exempt from the bootcamp if it was already attended in a previous year or for a previous degree. Each year of registration for the master's degree will also require the attendance of three departmental seminars. Students should ensure that their attendance is recorded by the postgraduate co-ordinator present at the seminars. The department approves the seminars attended. Students are also required to present their mini-dissertation research proposal within the department or at a conference.

Core modules

Mini-dissertation: Statistics 895 (STK 895)

Module credits	100.00
NQF Level	09
Prerequisites	Admission to relevant programme.
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Year

Elective modules

Statistical and machine learning 880 (MVA 880)

Module credits	20.00
NQF Level	09
Service modules	Faculty of Natural and Agricultural Sciences

Prerequisites	Admission to the relevant programme.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

Unsupervised learning: deterministic clustering, model-based clustering, latent class and behavioural analytics, dimension reduction. Natural language processing and topic modelling; recommender systems. Organisation of data, data wrangling and data structure exploration.

Capita selecta: Statistics 880 (STK 880)

Module credits	20.00
NQF Level	09
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	Admission to the relevant programme.
Contact time	1 lecture per week, 1 other contact session per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

This module covers the most recent literature that discusses current and contemporary research topics in advanced data analytics.

Analysis of time series 880 (TRA 880)

Module credits	20.00
NQF Level	09
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	WST 321 or STK 320
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

Difference equations. Lag operators. Stationary ARMA processes. Maximum likelihood estimation. Spectral analysis. Vector processes. Non-stationary time series. Long-memory processes.

Data science: analytics and visualisation 880 (TRG 880)

Module credits	20.00
NQF Level	09
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	Admission to relevant programme.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

Supervised learning and applications. Multicollinearity, ridge regression, the LASSO and the elastic net. Parametric and nonparametric logistic regression and nonlinear regression. Survival regression. Regression extensions: Random forests MARS and Conjoint analysis. Neural networks.

Cyber analytics 802 (WST 802)

Module credits	20.00
NQF Level	09
Service modules	Faculty of Natural and Agricultural Sciences
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

Reviewing, from a statistical perspective, the cyber-infrastructure ecosystem including distributed computing, multi node and distributed file eco systems, such as Amazon Web Services. Structured and unstructured data sources, including social media data and image data. Setting up of large data structures for analysis. Algorithms and techniques for computing statistics and statistical models on distributed data. Software to be used include, Hadoop, Map reduce, SAS, SAS Data loader for Hadoop.

Regulations and rules

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

The General Academic Regulations (G Regulations) and General Student Rules apply to all faculties and registered students of the University, as well as all prospective students who have accepted an offer of a place at the University of Pretoria. On registering for a programme, the student bears the

responsibility of ensuring that they familiarise themselves with the General Academic Regulations applicable to their registration, as well as the relevant faculty-specific and programme-specific regulations and information as stipulated in the relevant yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations.

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