University of Pretoria Yearbook 2016

MSc Mathematical Statistics (02250191)

Duration of study	1 year
Total credits	180

Programme information

Details of compilation of curriculum are available from the Head of the Department of Statistics as well as from the departmental postgraduate brochure.

A candidate must compile his/her curriculum in consultation with the head of department or his representative. Refer to the Departmental website for further information.

The MSc degree is conferred on the grounds of a dissertation and such additional postgraduate coursework as may be prescribed.

Renewal of registration
As long as progress is satisfactory, renewal of the registration of a master's student will be accepted for the second year of the study. Registration for a third and subsequent years will only take place when the Student Administration of the Faculty receives a written motivation that is supported by the head of department and Postgraduate Studies Committee.

General
Candidates are required to familiarise themselves with the General Regulations regarding the maximum period of registration and the requirements on the submission of a draft article for publication.

Admission requirements

- A relevant honours degree in Mathematical Statistics is required.

- For MSc (Mathematical Statistics) an average mark of 65% or more in the BScHons in Mathematical Statistics.

- Students from other accredited institutions must comply with the same requirements based on equivalent models at their institutions. In addition, students from other accredited institutions must also pass an entrance evaluation.

- Student numbers are limited to a maximum of 20, collectively over all master?s programmes in the Department of Statistics.

- Admission is also subject to the availability of a suitable supervisor for the study.

- Historical performance during prior studies will also be considered in selecting students. Specific attention will be given to modules repeated and duration of study.

- The research proposal of applicants should be in line with the research focus of the department.

- Any further additional entrance requirements as specified by the head of department in consultation with the departmental postgraduate selection committee.

- The head of department, in consultation with the departmental postgraduate selection committee reserves the right to prescribe additional modules.

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 Head of Department) that is supported by the Head of Department and Postgraduate Studies Committee. (Also see the General Regulations.)

Details of compilation of curriculum are available from the Head of the Department of Statistics as well as from the departmental postgraduate brochure.

A candidate must compile his/her curriculum in consultation with the head of department or his representative. Refer to the Departmental website for further information.

Promotion to next study year

The progress of all master's candidates is monitored biannually by the supervisor and the postgraduate coordinator. A candidate's study may be terminated if the progress is unsatisfactory or if the candidate is unable to finish his/her studies during the prescribed period.

Subject to exceptions approved by the dean, on recommendation of the head of department, and where applicable, a student may not enter for the master's examination in the same module more than twice.

Pass with distinction

The MSc degree is conferred with distinction to candidates who obtain a final average mark of at least 75% and a mark of at least 75% for the dissertation/mini-dissertation from each of the members of the examination panel. Where a member of the examination panel awards a mark of less than 75% for the dissertation/mini-dissertation, that member of the examination panel must offer, in writing, support for his/her decision, or indicate in writing that he/she supports the examination committee's decision to confer the degree with distinction.

Curriculum: Year 1

Minimum credits: 180

Core modules

Statistical learning 880 (MVA 880)

Module credits	20.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	English
Academic organisation	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

Supervised and unsupervised methods, including computational methods, within the broader context of data mining. Supervised learning. Linear methods for Regression, Classification and Prediction. Basis Expansions, Regularisation, Smoothing, Additive models and Support Vector Machines.
Unsupervised learning: Clustering, principal components, dimensional reduction. Data methods: Organisation of data and exploratory data analysis.

Capita selecta: Statistics 880 (STK 880)

Module credits	20.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 other contact session per week
Language of tuition	English
Academic organisation	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

The module is primarily an article based on and covers the most recent literature that discusses the developments and research in, for example, Shewhart charts, Exponentially Weighted Moving Average (EWMA) charts, Cumulative Sum (CUSUM) charts, Q-charts, Parametric and Nonparametric charts, Univariate and Multivariate charts, Phase I and Phase II control charts, profile monitoring and other research topics.

Analysis of time series 880 (TRA 880)

Module credits	20.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	WST 321 or TRA 720

Contact time	1 lecture per week
Language of tuition	English
Academic organisation	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 analytics and visualisation 880 (TRG 880)

Module credits	20.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	English
Academic organisation	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

Regression introduction: Simple and multiple regression. Multicollinearity, Heteroscedasticity, Ridge regression. Logistic regression: Estimation, inference and applications. Non Linear regression: Estimation, inference and applications. Text mining: Topic modelling with applications. Survival regression: Survival models applied in regression. Regression extensions: CART, MARS and Conjoint analysis.

Mini-dissertation: Mathematical statistics 895 (WST 895)

Module credits	100.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Language of tuition	English
Academic organisation	Statistics
Period of presentation	Year

Curriculum: Final year

Minimum credits: 180

Core modules

Statistical learning 880 (MVA 880)

Module credits	20.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	English
Academic organisation	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

Supervised and unsupervised methods, including computational methods, within the broader context of data mining. Supervised learning. Linear methods for Regression, Classification and Prediction. Basis Expansions, Regularisation, Smoothing, Additive models and Support Vector Machines.
Unsupervised learning: Clustering, principal components, dimensional reduction. Data methods: Organisation of data and exploratory data analysis.

Capita selecta: Statistics 880 (STK 880)

Module credits	20.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 other contact session per week
Language of tuition	English
Academic organisation	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

The module is primarily an article based on and covers the most recent literature that discusses the developments and research in, for example, Shewhart charts, Exponentially Weighted Moving Average (EWMA) charts, Cumulative Sum (CUSUM) charts, Q-charts, Parametric and Nonparametric charts, Univariate and Multivariate charts, Phase I and Phase II control charts, profile monitoring and other research topics.

Analysis of time series 880 (TRA 880)

Module credits	20.00
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Prerequisites	WST 321 or TRA 720

Contact time	1 lecture per week
Language of tuition	English
Academic organisation	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 analytics and visualisation 880 (TRG 880)

Module credits	20.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	English
Academic organisation	Statistics
Period of presentation	Semester 1 or Semester 2

Module content

Regression introduction: Simple and multiple regression. Multicollinearity, Heteroscedasticity, Ridge regression. Logistic regression: Estimation, inference and applications. Non Linear regression: Estimation, inference and applications. Text mining: Topic modelling with applications. Survival regression: Survival models applied in regression. Regression extensions: CART, MARS and Conjoint analysis.

Mini-dissertation: Mathematical statistics 895 (WST 895)

Module credits	100.00
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Language of tuition	English
Academic organisation	Statistics
Period of presentation	Year

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.