

MAGISTER TECHNOLOGIAE: MATHEMATICAL TECHNOLOGY (Structured)

Qualification code: MTMNST - NQF Level 8

Campus where offered: Arcadia Campus

Important notification to new applicants:

Students who intend to enrol for this qualification should take note that no new applications will be accepted as from 2020. Potential students are advised to consult the University's website for possible new qualifications which are aligned with the newly-implemented Higher Education Qualification Sub-Framework.

REMARKS

a. *Admission requirement(s):*

Any NQF Level 7 bachelor's degree with a subject in Mathematical Sciences at Level IV from a South African university.

In addition, a prospective student should successfully complete Research Methodology in the first year of study if it was not included in a previous qualification.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations.

b. *Selection criteria:*

Selection is based on a personal interview with a departmental selection panel. Registration prior to the approval of a research proposal is provisional and will be made official only when the proposal is approved by the Faculty Committee for Postgraduate Studies. These procedures will be fully explained to all prospective students during their personal interview.

c. *Recommended subjects:*

It is highly recommended that the student should have passed relevant mathematical subjects during undergraduate studies, and/or completed a mathematics-related short learning programme beforehand.

d. *Duration:*

A minimum of one year and a maximum of three years. Students have to re-register annually for this qualification.

e. *Exclusion and readmission:*

See Chapter 2 of Students' Rules and Regulations.

f. *Presentation:*

Block-mode classes and research.

g. *Structure:*

This programme consists of subjects offered on a block basis and a research project in the form of a mini-dissertation (research report). In order to obtain a structured magister technologiae, the student has to pass all the relevant subjects and the mini-dissertation (research report) has to be accepted.

Please note that before the research report will be accepted for assessment, a draft scientific paper, based on the research and approved by the supervisor has to be ready for submission to a peer-reviewed journal (preferably accredited). Research findings should have been presented at a regional symposium or conference.



- h. *Rules on postgraduate studies:*
See Chapter 8 of Students' Rules and Regulations.
- i. *Subject credits:*
Subject credits are shown in brackets after each subject.

CURRICULUM

FIRST YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
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Two of the following subjects:

NAS500T	Numerical Analysis V	(0,040)	
NLA500T	Numerical Linear Algebra V	(0,040)	
ONL500T	Ordinary Nonlinear Differential Equations V	(0,040)	
PDQ500T	Partial Differential Equations V	(0,040)	

Plus:

LABORATORY

MTP50AT	Mathematical Technology: Laboratory Project (A) V	(0,130)	
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TOTAL CREDITS FOR THE FIRST YEAR: **0,210**

SECOND YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
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Two of the following subjects (excluding those taken in the first year):

NAS500T	Numerical Analysis V	(0,040)	
NLA500T	Numerical Linear Algebra V	(0,040)	
ONL500T	Ordinary Nonlinear Differential Equations V	(0,040)	
PDQ500T	Partial Differential Equations V	(0,040)	

Plus:

LABORATORY

MTP50BT	Mathematical Technology: Laboratory Project (B) V	(0,130)	
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TOTAL CREDITS FOR THE SECOND YEAR: **0,210**

THIRD YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
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CQM500T	Colloquium V	(0,040)	Numerical Analysis V Numerical Linear Algebra V Ordinary Nonlinear Differential Equations V Partial Differential Equations V
ILM500T	Industrial Mathematics V	(0,040)	



RESEARCH

MAY501T	Research Report: Mathematical Technology V	(0,500)	Mathematical Technology: Laboratory Project (A) V Mathematical Technology: Laboratory Project (B) V Numerical Analysis V Numerical Linear Algebra V Ordinary Nonlinear Differential Equations V Partial Differential Equations V
MAY501R	Research Report: Mathematical Technology V (re-registration)	(0,000)	
TOTAL CREDITS FOR THE THIRD YEAR:		0,580	
TOTAL CREDITS FOR THE QUALIFICATION:		1,000	

SUBJECT INFORMATION (OVERVIEW OF SYLLABUS)

The syllabus content is subject to change to accommodate industry changes. Please note that a more detailed syllabus is available at the Department or in the study guide that is applicable to a particular subject. On 1 August 2018, the syllabus content was defined as follows:

C

COLLOQUIUM V (CQM500T)

CONTINUOUS ASSESSMENT

(Subject custodian: Department of Mathematics and Statistics)

Students take turns to present lectures on the theory of analysis and its applications with the aid of algebraic manipulators. (Total tuition time: not available)

I

INDUSTRIAL MATHEMATICS V (ILM500T)

CONTINUOUS ASSESSMENT

(Subject custodian: Department of Mathematics and Statistics)

The contents depend on the availability of instructors and demand from regional industry (such as wavelets, futures and derivatives, applied graph theory or calculus of variations, etc.). (Total tuition time: not available)

M

MATHEMATICAL TECHNOLOGY: LABORATORY PROJECT (A) V (MTP50AT)

PROJECT ASSESSMENT

(Subject custodian: Department of Mathematics and Statistics)

This practical subject must be undertaken simultaneously with any two of the theoretical subjects stated above. Experiments employing both numeric and symbolic computation and using software such as Derive, MATLAB, Mathematica, Scientific Workplace, etc. are carried out, which demonstrate investigations of a deeper nature than would be possible in either of the two subjects. A project report is to be submitted for examination. (Total tuition time: not available)

MATHEMATICAL TECHNOLOGY: LABORATORY PROJECT (B) V (MTP50BT)

PROJECT ASSESSMENT

(Subject custodian: Department of Mathematics and Statistics)

This practical subject is to be taken simultaneously with any two of the theoretical subjects not covered in Laboratory Project (A). Experiments employing both numeric and symbolic computation and using software, such as Derive, MATLAB, Mathematica, Scientific Workplace, etc., are carried out, which demonstrate investigations of a deeper nature than would be possible in either of the two subjects. A project report of a deeper nature than that of "Mathematical Technology: Laboratory Project (A) V" is to be submitted for examination. (Total tuition time: not available)



N**NUMERICAL ANALYSIS V (NAS500T)****CONTINUOUS ASSESSMENT***(Subject custodian: Department of Mathematics and Statistics)*

Interpolation polynomials, numerical differentiation and integration, Runge-Kutta type methods, error analysis. (Total tuition time: not available)

NUMERICAL LINEAR ALGEBRA V (NLA500T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Mathematics and Statistics)*

Methods of solving systems of not necessarily linear equations, error analysis, difference equations and finite element methods. (Total tuition time: not available)

O**ORDINARY NONLINEAR DIFFERENTIAL EQUATIONS V (ONL500T)****CONTINUOUS ASSESSMENT***(Subject custodian: Department of Mathematics and Statistics)*

Not necessarily linear ordinary differential equations are studied. (Total tuition time: not available)

P**PARTIAL DIFFERENTIAL EQUATIONS V (PDQ500T)****CONTINUOUS ASSESSMENT***(Subject custodian: Department of Mathematics and Statistics)*

Dirichlet, Neumann, mixed boundary value problems and Sturm-Liouville theory. (Total tuition time: not available)

R**RESEARCH REPORT: MATHEMATICAL TECHNOLOGY V (MAY501T/R)****MINI-DISSERTATION ASSESSMENT***(Subject custodian: Department of Mathematics and Statistics)*

This could, for example, cover work extending results from the respective laboratory projects or it could be a completely new project incorporating the use of available technology, such as Derive, MATLAB, Mathematical and Scientific Workplace. The project must demonstrate the student's ability to produce publishable research articles and/or artefacts in mathematical technology. It may be undertaken only on successful completion of four of the six theoretical subjects and the two laboratory projects listed above. (Total tuition time: not available)

