University of Pretoria Yearbook 2023

BSc (Applied Mathematics) (02133253)

Department	Mathematics and Applied Mathematics
Minimum duration of study	3 years
Total credits	416
NQF level	07

Admission requirements

Important information for all prospective students for 2023

The admission requirements below apply to all who apply for admission to the University of Pretoria with a **National Senior Certificate (NSC) and Independent Examination Board (IEB) qualifications. Click here for this Faculty Brochure.**

Minimum requirements Achievement level		
English Home Language or English First Additional Language	**Mathematics**	**APS**
NSC/IEB	NSC/IEB	
5	6	**34**

Life Orientation is excluded when calculating the APS.

You will be considered for final admission to degree studies if space allows, and if you have a National Senior Certificate (NSC) or equivalent qualification with admission to bachelor's degree studies, and comply with the minimum subject requirements as well as the APS requirements of your chosen programme.

Applicants with qualifications other than the abovementioned should refer to the Brochure: Undergraduate Programme Information 2023: Qualifications other than the NSC and IEB, available at click here.

International students: Click here.

Transferring students

A transferring student is a student who, at the time of applying at the University of Pretoria (UP) is/was a registered student at another tertiary institution. A transferring student will be considered for admission based on NSC or equivalent qualification and previous academic performance. Students who have been dismissed from other institutions due to poor academic performance will not be considered for admission to UP.

Closing dates: Same as above.

Returning students

A returning student is a student who, at the time of application for a degree programme is/was a registered student at UP, and wants to transfer to another degree at UP. A returning student will be considered for admission based on NSC or equivalent qualification and previous academic performance.

Note:

- Students who have been excluded/dismissed from a faculty due to poor academic performance may be considered for admission to another programme at UP, as per faculty-specific requirements.
- Only ONE transfer between UP faculties and TWO transfers within a faculty will be allowed.
- Admission of returning students will always depend on the faculty concerned and the availability of space in the programmes for which they apply.

Closing date for applications from returning students

Unless capacity allows for an extension of the closing date, applications from returning students must be submitted before the end of August via your UP Student Centre.

Candidates who do not comply with the minimum admission requirements for BSc (Applied Mathematics), may be considered for admission to the BSc – Extended programme – Mathematical Sciences, which requires an additional year of study.

Please note: Progression from the BSc – Extended programme – Mathematical Sciences to the mathematics-intensive programmes will be considered only for students who obtained a GPA of 65% in all their first-year modules. Students who pass all first-year modules will be advised on alternative academic pathways.

BSc – Extended Programme – Mathematical Sciences **Minimum requirements** **Achievement level**		
English Home Language or English First Additional Language	**Mathematics**	**APS**
NSC/IEB 4	NSC/IEB 5	**28**

Note:

*The BSc – Extended programmes are not available for students who meet all the requirements for the corresponding mainstream programme.

*Please note that only students who apply in their final NSC or equivalent qualification year will be considered for admission into any of the BSc – Extended programmes. Students who are upgrading or taking a gap year will not be considered.

Other programme-specific information

The Dean may, on the recommendation of the programme manager, approve deviations with regard to the composition of the study programme.

It remains the student's responsibility to acertain, prior to registration, whether they comply with the prerequisites of the modules they want to register for.

The prerequisites are listed in the Alphabetical list of modules.

1.1 Requirements for specific modules

A candidate who:

a. does not qualify for STK 110, must enrol for STK 113 and STK 123;
b. registers for Mathematical Statistics (WST) and Statistics (STK) modules must take note that WST and STK modules, except for STK 281, may not be taken simultaneously in a programme; a student must take one and only one of the following options:

- WST 111, WST 121, WST 212, WST 211, WST 221, WST 311, WST 312, WST 322, WST 321, and STK 353

  or

- WST 111, WST 121, WST 212, WST 211, WST 221, WST 311, WST 312, WST 322, STK 320, STK 353.

  or

- STK 110, STC 122, STK 210, STK 220, WST 212, STK 310, STK 320, STK 353.

c. registers for a module presented by another faculty must take note of the timetable clashes, prerequisites for that module, subminimum required in examination papers, supplementary examinations, etc.

1.2 Fundamental modules

a. It is compulsory for all new first-year students to satisfactorily complete the Academic orientation (UPO 102) and to take Academic information management modules (AIM 111 and AIM 121) and Language and study skills (LST 110). Please see curricula for details.
b. Students who intend to apply for admission to MBChB or BChD in the second semester, when places become available in those programmes, may be permitted to register for up to 80 module credits and 4 core modules in the first semester during the first year provided that they obtained a final mark of no less than 70% for Grade 12 Mathematics and achieved an APS of 34 or more in the NSC.

Promotion to next study year

A student will be promoted to the following year of study if he or she passed 100 credits of the prescribed credits for a year of study, unless the Dean on the recommendation of the relevant head of department decides otherwise. A student who does not comply with the requirements for promotion to the following year of study, retains the credit for the modules already passed and may be admitted by the Dean, on recommendation of the relevant head of department, to modules of the following year of study to a maximum of 48 credits, provided that it will fit in with both the lecture and examination timetable.

General promotion requirements in the faculty
All students whose academic progress is not acceptable can be suspended from further studies.

- A student who is excluded from further studies in terms of the stipulations of the abovementioned regulations, will be notified in writing by the Dean or Admissions Committee at the end of the relevant semester.
- A student who has been excluded from further studies may apply in writing to the Admissions Committee of the Faculty of Natural and Agricultural Sciences for re-admission.
- Should the student be re-admitted by the Admissions Committee, strict conditions will be set which the student must comply with in order to proceed with his/her studies.
- Should the student not be re-admitted to further studies by the Admissions Committee, he/she will be informed in writing.
- Students who are not re-admitted by the Admissions Committee have the right to appeal to the Senate Appeals Committee.
- Any decision taken by the Senate Appeals Committee is final.

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: Year 1

Minimum credits: 140

Fundamental = 14 credits
Core = 64 credits
Elective = 62 credits

Additional information:
Choose electives according to the following combinations with a view to pursuing specialisation in the relevant field:

- **Physics:** PHY 114 & PHY 124 and WST 111 & WST 121 or CMY 117 & CMY 127 (64 credits)
- **Chemistry:** CMY 117 & CMY 127and WST 111 & WST 121 or PHY 114 & PHY 124 (64 credits)
- **Economics:** WST 111, WST 121, EKN 110, EKN 120 and one of FRK 111 or OBS 114 or FBS 112 (62 credits) (Please note: If FRK is selected as an elective, INF 183 has to be taken as well.)
- **Mathemetical Statics:** WST 111 & WST 121, EKN 110, EKN 120 and one of FRK 111 or OBS 114 or FBS 112 (62 credits)
- **Computer Science:** COS 110, COS 132, COS 151, WST 111 and WST 121 (72 credits)

Students who want to take other electives must consult the undergraduate Programme Coordinator in the Department of Mathematics and Applied Mathematics.

Fundamental modules

Academic information management 111 (AIM 111) - Credits: 4.00
Academic information management 121 (AIM 121) - Credits: 4.00
Language and study skills 110 (LST 110) - Credits: 6.00
Academic orientation 102 (UPO 102) - Credits: 0.00

Core modules

Calculus 114 (WTW 114) - Credits: 16.00
Discrete structures 115 (WTW 115) - Credits: 8.00
Numerical analysis 123 (WTW 123) - Credits: 8.00
Mathematics 124 (WTW 124) - Credits: 16.00
Mathematical modelling 152 (WTW 152) - Credits: 8.00
Dynamical processes 162 (WTW 162) - Credits: 8.00

Elective modules

General chemistry 117 (CMY 117) - Credits: 16.00
General chemistry 127 (CMY 127) - Credits: 16.00
Program design: Introduction 110 (COS 110) - Credits: 16.00
Imperative programming 132 (COS 132) - Credits: 16.00
Introduction to computer science 151 (COS 151) - Credits: 8.00
Economics 110 (EKN 110) - Credits: 10.00
Economics 120 (EKN 120) - Credits: 10.00
Financial management 112 (FBS 112) - Credits: 10.00
Financial accounting 111 (FRK 111) - Credits: 10.00
Informatics 183 (INF 183) - Credits: 3.00
Business management 114 (OBS 114) - Credits: 10.00

First course in physics 114 (PHY 114) - Credits: 16.00
First course in physics 124 (PHY 124) - Credits: 16.00
Atmospheric structure and processes 155 (WKD 155) - Credits: 16.00
Mathematical statistics 111 (WST 111) - Credits: 16.00
Mathematical statistics 121 (WST 121) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 132

Core = 84 credits
Elective = 48 credits

Additional information:
Choose electives according to the following combinations with a view to pursuing specialisation in the relevant field:

- **Physics:** PHY 255 & PHY 263 (48 credits)
- **Chemistry:** CMY 282, CMY 283, CMY 284 & CMY 285 (48 credits)
- **Economics:** EKN 214, EKN 224 & EKN 234 (48 credits)
- **Statistics:** WST 211 & WST 221 (48 credits)
- **Mathematical Statistics:** WST 211 & WST 221 (48 credits)
- **Computer Science**: COS 210, COS 212, COS 214 and any one of COS 216, COS 221, COS 284 (56 credits). Consult the Department of Computer Science for guidance on which of the additional modules is appropriate for you. Students wishing to continue with COS 332 in the third year of study should select COS 216. Students wishing to continue with COS 326 in the third year of study should select COS 221.

Students who want to take other electives must consult the undergraduate Programme Coordinator in the Department of Mathematics and Applied Mathematics.

Core modules

Linear algebra 211 (WTW 211) - Credits: 12.00
Calculus 218 (WTW 218) - Credits: 12.00
Analysis 220 (WTW 220) - Credits: 12.00
Linear algebra 221 (WTW 221) - Credits: 12.00
Vector analysis 248 (WTW 248) - Credits: 12.00
Discrete structures 285 (WTW 285) - Credits: 12.00
Differential equations 286 (WTW 286) - Credits: 12.00

Elective modules

Physical chemistry 282 (CMY 282) - Credits: 12.00
Analytical chemistry 283 (CMY 283) - Credits: 12.00
Organic chemistry 284 (CMY 284) - Credits: 12.00
Inorganic chemistry 285 (CMY 285) - Credits: 12.00
Theoretical computer science 210 (COS 210) - Credits: 8.00
Data structures and algorithms 212 (COS 212) - Credits: 16.00
Software modelling 214 (COS 214) - Credits: 16.00
Netcentric computer systems 216 (COS 216) - Credits: 16.00
Introduction to database systems 221 (COS 221) - Credits: 16.00
Computer organisation and architecture 284 (COS 284) - Credits: 16.00
Economics 214 (EKN 214) - Credits: 16.00
Economics 224 (EKN 224) - Credits: 16.00
Economics 234 (EKN 234) - Credits: 16.00
Waves, thermodynamics and modern physics 255 (PHY 255) - Credits: 24.00
General physics 263 (PHY 263) - Credits: 24.00

Physical meteorology 261 (WKD 261) - Credits: 12.00
Introduction to dynamic meteorology 263 (WKD 263) - Credits: 14.00
Satellite meteorology 265 (WKD 265) - Credits: 12.00
Mathematical statistics 211 (WST 211) - Credits: 24.00
Mathematical statistics 221 (WST 221) - Credits: 24.00

Curriculum: Final year

Minimum credits: 144

Core = 90 credits
Elective = 54 credits

Additional information:
Students may choose elective modules from Physics, Chemistry, Economics, Mathematical Statistics, Mathematics and Financial Mathematics.

- **Students who wish to pursue an honours degree in Physics** should take PHY 356 & PHY 364.
- **Students who wish to pursue an honours degree in Chemistry** should take CMY 382, CMY 383 ,CMY 384 & CMY 385, with one of the modules for non-degree purposes.
- **Students who wish to pursue an honours degree in Economics** should take EKN 310, EKN 320 & EKN 325
- **Students who wish to pursue an honours degree in Mathematical Statistics** should take WST 311, WST 312, WST 321, WST 322 & STK 353, with two of the modules for non-degree purposes.
- **Students who wish to pursue an honours degree in Mathematics** should take WTW 381, WTW 320 & WTW 389.
- **Students who wish to pursue an honours degree in Mathematics of Finance or Financial Engineering** should take WTW 354 & WTW 364, and one module from WST 311, WST 312, WST 321 & WST 322.
- **Students who wish to pursue an honours degree in Computer Science** should take COS 301 and any three of COS 314, COS 326, COS 330, COS 332, COS 333, COS 341 and COS 344, with one of the modules for non-degree purposes.

Students who want to take other electives must consult the Undergraduate Programme Coordinator in the Department of Mathematics and Applied Mathematics.

Core modules

Analysis 310 (WTW 310) - Credits: 18.00
Dynamical systems 382 (WTW 382) - Credits: 18.00
Numerical analysis 383 (WTW 383) - Credits: 18.00
Partial differential equations 386 (WTW 386) - Credits: 18.00
Continuum mechanics 387 (WTW 387) - Credits: 18.00

Elective modules

Physical chemistry 382 (CMY 382) - Credits: 18.00
Analytical chemistry 383 (CMY 383) - Credits: 18.00
Organic chemistry 384 (CMY 384) - Credits: 18.00
Inorganic chemistry 385 (CMY 385) - Credits: 18.00
Software engineering 301 (COS 301) - Credits: 27.00
Artificial intelligence 314 (COS 314) - Credits: 18.00
Database systems 326 (COS 326) - Credits: 18.00
Computer security and ethics 330 (COS 330) - Credits: 18.00
Computer networks 332 (COS 332) - Credits: 18.00
Programming languages 333 (COS 333) - Credits: 18.00
Compiler construction 341 (COS 341) - Credits: 18.00

Computer graphics 344 (COS 344) - Credits: 18.00
Economics 310 (EKN 310) - Credits: 20.00
Economics 320 (EKN 320) - Credits: 20.00
Economics 325 (EKN 325) - Credits: 20.00
Electronics, electromagnetism and quantum mechanics 356 (PHY 356) - Credits: 36.00
Statistical mechanics, solid state physics and modelling 364 (PHY 364) - Credits: 36.00
The science of data analytics 353 (STK 353) - Credits: 25.00
Mid-latitude and polar meteorology 315 (WKD 315) - Credits: 18.00
Tropical meteorology 316 (WKD 316) - Credits: 18.00
Synoptic-scale circulation dynamics and vorticity in mid-latitudes 352 (WKD 352) - Credits: 18.00
Quasi-geostrophic analysis 361 (WKD 361) - Credits: 18.00
Multivariate analysis 311 (WST 311) - Credits: 18.00
Stochastic processes 312 (WST 312) - Credits: 18.00
Time-series analysis 321 (WST 321) - Credits: 18.00
Actuarial statistics 322 (WST 322) - Credits: 18.00
Complex analysis 320 (WTW 320) - Credits: 18.00
Financial engineering 354 (WTW 354) - Credits: 18.00
Financial engineering 364 (WTW 364) - Credits: 18.00
Algebra 381 (WTW 381) - Credits: 18.00
Geometry 389 (WTW 389) - Credits: 18.00

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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