University of Pretoria Yearbook 2025

BSc in Chemistry 4-year programme (02131004)

Department	Chemistry
Minimum duration of study	4 years
Total credits	510
NQF level	07

Programme information

This is an extended BSc degree programme with a four-year curriculum that is only presented on a full-time basis. It is designed to enable students, who show academic potential, to obtain a BSc degree.

This programme is directed at a general formative education in the natural sciences. It provides the student with a broad academic basis to continue with postgraduate studies and prepares the student for active involvement in a wide variety of career possibilities.

1. Students who are admitted to one of the BSc four-year programmes register for one specific programme.
2. These programmes are followed by students who, as a result of exceptional circumstances, will benefit from an extended programme.
3. Students who do not comply with the normal three-year BSc entrance requirements for study in the Faculty of Natural and Agricultural Sciences, may nevertheless be admitted to the Faculty in one of the BSc four-year programmes. Generally, an extended programme means that the first study year is extended to take two years. The possibility of switching over to other faculties after one or two years in the four-year programmes exists. This depends on selection rules and other conditions stipulated by the other faculties.
4. Applications for admission to the BSc four-year programmes should be submitted in accordance with the UP applications process, with applications considered up to 30 June and in a second round in August/September. Details are obtainable from the Student Administration at the Faculty of Natural and Agricultural Sciences.
5. The rules and regulations applicable to the mainstream study programmes apply mutatis mutandis to the BSc four-year programmes, with exceptions as indicated in the regulations pertaining to the BSc four-year programmes. For instance, students admitted into the BSc four-year programmes must have a National Senior Certificate with admission for degree purposes.

Admission requirements

Important information for all prospective students for 2025

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	Physical Sciences	APS
NSC/IEB	NSC/IEB	NSC/IEB	
58%	58%	58%	**32**

Life Orientation is excluded when calculating the APS.

Applicants currently in Grade 12 must apply with their final Grade 11 (or equivalent) results.

Applicants who have completed Grade 12 must apply with their final NSC or equivalent qualification results.

Please note that meeting the minimum academic requirements does not guarantee admission.

Only students that have completed school in the last two years and have not studied at a tertiary institution will be considered for this programme.

Successful candidates will be notified once admitted or conditionally admitted.

Unsuccessful candidates will also be notified.

Applicants should check their application status regularly on the UP Student Portal at click here.

Applicants with qualifications other than the abovementioned should refer to the International undergraduate prospectus 2025: Applicants with a school leaving certificate not issued by Umalusi (South Africa), available at click here.

International students: Click here.

Examinations and pass requirements

Academic promotion requirements
Students who do not show progress during the first semester of the first year will be referred to the Admissions Committee of the Faculty.
It is expected of students who register for the first year of the BSc four-year programmes to pass all the prescribed modules of the first year.

Progression requirement
The first year is foundational to the mainstream modules that follow; students will be limited to repeating two foundation modules during year 2 of study. Students may apply for internal transfers at the end of year 2. Not all mainstream programmes will be accessible; the Faculty's transfer guide will clearly outline all possibilities and the overarching objective will be that approved transfers will not involve adding an additional year of study.

Curriculum: Year 1

Minimum credits: 100

Fundamental = 20
Core = 80

Fundamental modules

Academic information management 111 (AIM 111) - Credits: 4.00
Academic information management 121 (AIM 121) - Credits: 4.00
Language, life and study skills 133 (LST 133) - Credits: 6.00
Language, life and study skills 143 (LST 143) - Credits: 6.00
Academic orientation 102 (UPO 102) - Credits: 0.00

Core modules

Foundational biology 137 (BIO 137) - Credits: 8.00
Foundational biology 147 (BIO 147) - Credits: 8.00
Foundational chemistry 137 (CMY 137) - Credits: 8.00
Foundational chemistry 147 (CMY 147) - Credits: 8.00
Foundational physics 137 (PHY 137) - Credits: 8.00
Foundational physics 147 (PHY 147) - Credits: 8.00
Foundational statistics 137 (STC 137) - Credits: 8.00
Foundational statistics 147 (STC 147) - Credits: 8.00
Foundational mathematics 137 (WTW 137) - Credits: 8.00
Foundational mathematics 147 (WTW 147) - Credits: 8.00

Curriculum: Year 2

Minimum credits: 128

Core = 96
Elective = 32

Elective Modules
Students must select elective modules with a total number of at least 32 credits. Depending on a student's second major, the following combinations of modules must be registered:

- Second major in biochemistry: MLB 111, GTS 161, and MBY 161 (32 credits)
- Second major in plant science: MLB 111, BOT 161, and MBY 161 (32 credits)
- Second major in geology: GLY 155, GLY 163 (32 credits)
- Second major in physics with an interest in applied mathematics: WTW 115, WTW 152, WTW 162, WTW 123 (32 credits)
- Second major in physics with an interest in statistics: WST 111, WST 121 (32 credits)
- Second major in physics with an interest in biology: MLB 111, BME 120 (32 credits)
- Second major in geography: ENV 101, GGY 156, GGY 166, GMC 110 (34 credits)
- Second major in mathematics: WTW 115, WTW 123, WTW 152, WTW 162 (32 credits)
- Second major in statistics: WST 111, WST 121 (32 credits)

Additional Information:

- Students who intend to take mathematics or mathematical statistics or physics to the 200-level, have to take the combination of WTW 114 and WTW 124, instead of WTW 114, WTW 146 and WTW 148.
- If a student does not intend to take second-year mathematics or mathematical statistics, then WTW 124 be replaced with WTW 146 and WTW 148.

Core modules

General chemistry 117 (CMY 117) - Credits: 16.00
General chemistry 127 (CMY 127) - Credits: 16.00
First course in physics 114 (PHY 114) - Credits: 16.00
First course in physics 124 (PHY 124) - Credits: 16.00
Calculus 114 (WTW 114) - Credits: 16.00
Mathematics 124 (WTW 124) - Credits: 16.00
Linear algebra 146 (WTW 146) - Credits: 8.00
Calculus 148 (WTW 148) - Credits: 8.00

Elective modules

Biometry 120 (BME 120) - Credits: 16.00
Plants and society 161 (BOT 161) - Credits: 8.00
Introduction to environmental sciences 101 (ENV 101) - Credits: 8.00
Aspects of human geography 156 (GGY 156) - Credits: 8.00
Southern African geomorphology 166 (GGY 166) - Credits: 8.00
Introduction to geology 155 (GLY 155) - Credits: 16.00
Earth history 163 (GLY 163) - Credits: 16.00
Cartography 110 (GMC 110) - Credits: 10.00
Introductory genetics 161 (GTS 161) - Credits: 8.00
Introduction to microbiology 161 (MBY 161) - Credits: 8.00

Molecular and cell biology 111 (MLB 111) - 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
Discrete structures 115 (WTW 115) - Credits: 8.00
Numerical analysis 123 (WTW 123) - Credits: 8.00
Mathematical modelling 152 (WTW 152) - Credits: 8.00
Dynamical processes 162 (WTW 162) - Credits: 8.00
Animal diversity 161 (ZEN 161) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 138

Core = 48
Elective = 90

Additional information:
Elective Modules (Credits = at least 90)
Students who do not intend to continue with Mathematics on third year level may replace WTW 220 with WTW 224
Students must select elective modules with a total number of at least 90 credits.
Depending on a student's second major, the following modules must be registered:

- Second major in biochemistry: BCM 251, BCM 252, BCM 257, BCM 261, GTS 251, GTS 261, MBY 251 and MBY 261 (96 credits)
- Second major in plant science: BOT 251, BOT 261, MBY 251, MBY 261, BCM 251, BCM 257, BCM 261 and BCM 252 (96 credits)
- Second major in physics: PHY 255, PHY 263, WTW 211, WTW 218, WTW 220, WTW 248 (96 credits)
- Second major in geology: GLY 253, GLY 263, GLY 266, GGY 252, GKD 250, GIS 221 (GMC is a prerequisite) (90 credits)
- Second major in geography: GGY 252, GGY 283, GGY 201, ENV 201, GKD 250, GIS 220, and GLY 253 (92 credits)
- Second major in mathematics with an interest in physics: WTW 211, WTW 218, WTW 220, WTW 221, PHY 255, PHY 263 (96 credits)
- Second major in mathematics or applied mathematics: WTW 211, WTW 218, WTW 220, WTW 221, WTW 285, WTW 286, WTW 248 (84 credits – select another 12 credits)
- Second major in statistics: WST 211, WST 221, WTW 211, WTW 218, WTW 220 or WTW 224, WTW 221 (96 credits)

Core 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

Elective modules

Introduction to proteins and enzymes 251 (BCM 251) - Credits: 12.00
Carbohydrate metabolism 252 (BCM 252) - Credits: 12.00
Introductory biochemistry 257 (BCM 257) - Credits: 12.00
Lipid and nitrogen metabolism 261 (BCM 261) - Credits: 12.00
South African flora and vegetation 251 (BOT 251) - Credits: 12.00
Plant physiology and biotechnology 261 (BOT 261) - Credits: 12.00
Environmental sciences 201 (ENV 201) - Credits: 14.00
City, structure, environment and society 201 (GGY 201) - Credits: 14.00
Process geomorphology 252 (GGY 252) - Credits: 12.00
Introductory geographic information systems 283 (GGY 283) - Credits: 14.00

Geographic data analysis 220 (GIS 220) - Credits: 14.00
Geographic information systems introduction 221 (GIS 221) - Credits: 12.00
Introductory soil science 250 (GKD 250) - Credits: 12.00
Sedimentology 253 (GLY 253) - Credits: 24.00
Igneous and metamorphic petrology 263 (GLY 263) - Credits: 24.00
Geological field mapping 266 (GLY 266) - Credits: 6.00
Molecular genetics 251 (GTS 251) - Credits: 12.00
Genetic diversity and evolution 261 (GTS 261) - Credits: 12.00
Bacteriology 251 (MBY 251) - Credits: 12.00
Mycology 261 (MBY 261) - Credits: 12.00
Waves, thermodynamics and modern physics 255 (PHY 255) - Credits: 24.00
General physics 263 (PHY 263) - Credits: 24.00
Mathematical statistics 211 (WST 211) - Credits: 24.00
Mathematical statistics 221 (WST 221) - Credits: 24.00
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
Techniques of analysis 224 (WTW 224) - 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

Curriculum: Final year

Minimum credits: 144

Core = 72
Elective = 72

Students must select elective modules with a total number of at least 72 credits.
Depending on a student's second major, the following modules must be registered:

- Second major in biochemistry: BCM 356, BCM 357, BCM 367, BCM 368 (72 credits)
- Second major in plant science: BOT 356, BOT 358, BOT 365 and BOT 366 (72 credits)
- Second major in physics: PHY 356, PHY 364 (72 credits)
- Second major in geology: GLY 370, GLY 367, GLY 368 (78 credits)
- Second major in geography: ENV 301, GGY 301, GGY 361 (54 credits – 18 credits short). Note that in order to qualify for BSc Honours in Geography, students need to change their registration to BSc Geography at the start of the final year to replace compulsory chemistry modules with additional Geography modules
- Second major in mathematics: WTW 310, WTW 320, WTW 381 and WTW 389 (72 credits)
- Second major in applied mathematics: WTW 310, WTW 382, WTW 383, WTW 386 and WTW 387 (90 credits – 18 credits extra)
- Second major in statistics: WST 311, WST 312, WST 321, STK 353 (79 credits)

Core 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

Elective modules

Macromolecules of life: structure-function and bioinformatics 356 (BCM 356) - Credits: 18.00
Biocatalysis and integration of metabolism 357 (BCM 357) - Credits: 18.00
Cell structure and function 367 (BCM 367) - Credits: 18.00
Molecular basis of disease 368 (BCM 368) - Credits: 18.00
Plant ecophysiology 356 (BOT 356) - Credits: 18.00
Plant ecology 358 (BOT 358) - Credits: 18.00
Phytomedicine 365 (BOT 365) - Credits: 18.00
Plant diversity 366 (BOT 366) - Credits: 18.00
Human environmental interactions 301 (ENV 301) - Credits: 18.00
Theories and applications of human geography 301 (GGY 301) - Credits: 18.00
Environmental geomorphology 361 (GGY 361) - Credits: 18.00
Geographic information systems 310 (GIS 310) - Credits: 22.00
Spatial analysis 320 (GIS 320) - Credits: 22.00
Economic geology 367 (GLY 367) - Credits: 36.00
Advanced Geological field mapping 368 (GLY 368) - Credits: 6.00
Structural geology and hydrogeology 370 (GLY 370) - Credits: 36.00
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: 18.00
Multivariate analysis 311 (WST 311) - Credits: 18.00
Stochastic processes 312 (WST 312) - Credits: 18.00
Analysis 310 (WTW 310) - Credits: 18.00
Complex analysis 320 (WTW 320) - Credits: 18.00
Algebra 381 (WTW 381) - 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
Geometry 389 (WTW 389) - Credits: 18.00

General Academic Regulations and Student Rules

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. The G Regulations are updated annually and may be amended after the publication of this information.

Regulations, degree requirements and information

The faculty regulations, information on and requirements for the degrees published here are subject to change and may be amended after the publication of this 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 (HEQSF) 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.