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# University of Pretoria Yearbook 2022

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## BScHons (Chemistry) (02240123)

**Department** Chemistry

**Minimum duration of study** 1 year

**Total credits** 135

**NQF level** 08

### Admission requirements

1. Relevant BSc degree
2. A weighted average of at least 60% for chemistry modules at final-year level

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



## Curriculum: Final year

**Minimum credits: 135**

Students must choose any two of the three research modules: CMY 718, CMY 719, CMY 731.

### Core modules

#### Analytical chemistry A 706 (CMY 706)

<b>Module credits</b>	10.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Selected aspects of: Mass spectrometry: ion sources, analysers, detectors, isotope ratios, accurate mass, ion fragmentation, tandem mass spectrometry. Chromatography: theory and instrumentation of gas, liquid and supercritical fluid chromatography, multidimensional systems and coupling to mass spectrometry.

#### Analytical chemistry B 707 (CMY 707)

<b>Module credits</b>	10.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Selected aspects: Electrochemistry: fundamental theory, voltammetry, metal-ligand equilibria, modelling and measurement of solution composition. Statistics: precision and accuracy, random errors, hypothesis testing, method of least squares, curve fitting, multivariate statistics, interpreting patterns of data. Chemical metrology: propagation of errors, quality control of quantitative and qualitative analytical information, international standards, interlaboratory calibration

#### Organic chemistry A 708 (CMY 708)

<b>Module credits</b>	10.00
<b>NQF Level</b>	08



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<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Stereocontrolled organic synthesis: substrate stereocontrol in diastereoselective synthesis. Retrosynthesis: principles and applications. Protecting groups in synthesis. Aromatic and heteroaromatic chemistry.

### Organic chemistry B 709 (CMY 709)

<b>Module credits</b>	10.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Stereocontrolled organic synthesis: chiral auxiliaries in synthesis; reagent controlled synthesis; catalyst controlled synthetic methods. Pericyclic reactions and transition metals in organic synthesis. Aliphatic and heterocyclic amine chemistry.

### Inorganic chemistry A 714 (CMY 714)

<b>Module credits</b>	10.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Inorganic and organometallic chemistry. Classification of ligands and complexes. Synthesis, structure, bonding and reactivity of complexes. Homogeneous catalysis and template effects.

### Inorganic chemistry B 715 (CMY 715)

<b>Module credits</b>	10.00
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<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Main group chemistry. From complexes to clusters to networks. Reaction kinetics and mechanisms. Supramolecular chemistry Bioinorganic and bioorganometallic compounds. Metals in medicine.

### Physical chemistry A 716 (CMY 716)

<b>Module credits</b>	10.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Crystallography: theoretical principles, symmetry elements and operations, point groups, space groups, theory of crystals, X-rays, crystallographic techniques, structure determinations, powder diffraction and crystallographic data bases.

Molecular modelling: molecular structure/energy, methodology, principles and and molecular surfaces.

### Physical chemistry B 717 (CMY 717)

<b>Module credits</b>	10.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 practical per week for 7 weeks, 6 lectures per week for 4 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 or Semester 2

#### Module content

Chemical kinetics: rates of chemical reactions, equilibrium reactions, temperature dependence of reactions, complex reactions, reaction mechanisms and kinetics by thermal analysis. Statistical mechanics: Boltzmann distribution, partition functions, ensembles, thermodynamic functions, equilibria.



### Research: Organic/inorganic project 718 (CMY 718)

<b>Module credits</b>	20.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 seminar, 6 practicals per week for 9 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 and Semester 2

#### Module content

Students work on one project during the year which has a significant component that can be described as instrumental or computational or analysis of data or theoretical. A report and a presentation are required.

### Research: Physical/analytical project 719 (CMY 719)

<b>Module credits</b>	20.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 seminar, 6 practicals per week for 9 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 and Semester 2

#### Module content

Students work on one project during the year which has a significant component that can be described as instrumental or computational or analysis of data or theoretical. A report and a presentation are required.

### Advanced practical techniques 730 (CMY 730)

<b>Module credits</b>	15.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	5 lectures per week for 6 weeks, 5 tutorials per week for 6 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Year

#### Module content

Chemical information literacy; Molecular modelling; NMR spectroscopy; Mass spectrometry; Crystallography and Metrology will be presented from a practical point of view with an emphasis on the interpretation of data and use of instrumentation rather than on underlying theory.



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## Research: Chemistry education 731 (CMY 731)

<b>Module credits</b>	20.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 seminar, 6 other contact sessions per week for 9 weeks
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Chemistry
<b>Period of presentation</b>	Semester 1 and Semester 2

### Module content

Students may select one project per year which can be described as research into the teaching and learning of chemistry at tertiary level.

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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.