



# University of Pretoria Yearbook 2021

## BScHons Chemistry (02240123)

**Department** Chemistry

**Minimum duration of study** 1 year

**Total credits** 135

**NQF level** 08

### Programme information

#### Renewal of registration

- i. Subject to exceptions approved by the Dean, on the recommendation of the relevant head of department, a student may not sit for an examination for the honours degree more than twice in the same module.
- ii. A student for an honours degree must complete his or her study, in the case of full-time students, within two years and, in the case of after-hours students, within three years of first registering for the degree. Under special circumstances, the Dean, on the recommendation of the relevant head of department, may give approval for a limited extension of this period.

In calculating marks, General Regulation G.12.2 applies.

Apart from the prescribed coursework, a research project is an integral part of the study.

### 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

### Examinations and pass requirements

A final mark of 50% for each module. To continue to a second semester, a minimum of 40% is required in each module in the first semester. The registration of students who do not meet this requirement will be terminated at the end of the first semester.

### Pass with distinction

The BScHons degree is awarded with distinction to a candidate who obtains a weighted average of at least 75% in all the prescribed modules and a minimum of 65% in any one module.



## Curriculum: Final year

Minimum credits: 135

### 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
<b>Prerequisites</b>	No prerequisites.



**Contact time** 1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks

**Language of tuition** Module is presented in English

**Department** Chemistry

**Period of presentation** 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)

**Module credits** 10.00

**NQF Level** 08

**Prerequisites** No prerequisites.

**Contact time** 1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks

**Language of tuition** Module is presented in English

**Department** Chemistry

**Period of presentation** 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)

**Module credits** 10.00

**NQF Level** 08

**Prerequisites** No prerequisites.

**Contact time** 1 discussion class per week for 4 weeks, 6 lectures per week for 4 weeks

**Language of tuition** Module is presented in English

**Department** Chemistry

**Period of presentation** 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)

**Module credits** 10.00

**NQF Level** 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

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 Part 1 718 (CMY 718)

<b>Module credits</b>	20.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 practical per week for 7 weeks, 1 seminar per week
<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 Part 2 719 (CMY 719)

<b>Module credits</b>	20.00
<b>NQF Level</b>	08
<b>Prerequisites</b>	No prerequisites.
<b>Contact time</b>	1 practical per week for 7 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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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.