

Programmes offered in the Department of Chemistry

- Diploma in Analytical Chemistry
- Advanced Diploma in Analytical Chemistry
- Diploma in Polymer Technology
- Diploma in Chemical Process Technology
- BSc Chemistry (Major) and BSc Honours (Chemistry)
- Honours in Formulation Science
- MSc (Chemistry)
- MSc (Nanoscience)
- PhD (Chemistry)

Institutes linked to the Department of Chemistry InnoVenton

Institute for Chemical Technology is a formally registered Research Institute at the Nelson Mandela University whose principal research focus is in Product and Process Development. The Institute strives to be self-sustaining through income generated from services to industry, income from technology transfer projects and royalties from patents. The Institute incorporate the Downstream Chemicals Technology Station, a Government funded initiative to make available high level research, technological services and training to technology based Small and Medium Enterprises, and South African industry as a whole.

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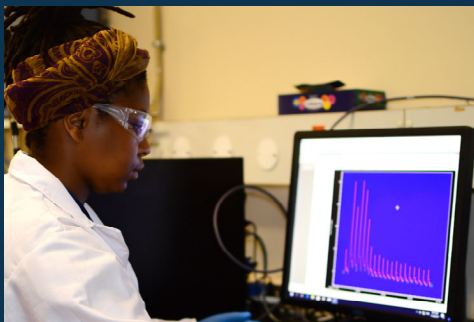
Centre for Rubber Science and Technology

The Centre for Rubber Science and Technology (CRST) draws on Nelson Mandela University's historic experience in chemical rubber science and technology. Its activities include the advancement of rubber related research and development programmes across various disciplines such as Chemistry, Environmental Science and Computer Science; training for the needs of the rubber and tyre manufacturing industries within South Africa; and providing analytical and technical services to the South African rubber and tyre manufacturing and recycling industry.

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Faculty of Science

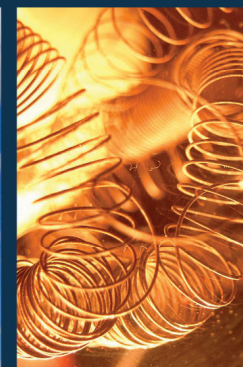
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Department of Chemistry

BSc Chemistry (Major), BSc Honours (Chemistry), Masters and Doctorate

Programme Overview

Chemistry is the study of the composition, properties and reactions of matter. Studies in chemistry range from the bulk behavior of matter, down to the interactions of its atoms and molecules. Chemistry, is a central discipline whose interfaces range from physics to computers to biology. Consequently, almost every facet of life is dependent on chemical processes of one form or another. Chemical reactions have thus been harnessed by man to produce a wide variety of products that improve the quality of life, for example, synthetic materials, pharmaceuticals, plastics, paints, dyes, metals and alloys, some of which display the most remarkable properties.

The Bachelor of Science degree in Chemistry (major) provides a rigorous scientific foundation in all the major areas of chemistry, namely, Organic Chemistry, Inorganic Chemistry, Physical Chemistry and Analytical Chemistry. Popular combinations with Chemistry are Biochemistry, Botany, Geology, Mathematics, Microbiology, Physics and Zoology. Other BSc majors can be selected from Applied Mathematics, Computer Science and Mathematical Statistics. This degree prepares the graduate for a career in a wide variety of chemically related areas including, the chemical, petroleum, environmental and pharmaceutical sectors. This fundamental stream also prepares one for a career in academia through studies up to a PhD level.

Students who have successfully completed the Bachelor of Science degree in Chemistry as a major, with an average pass of 60% may proceed to the Bachelor of Science Honours degree programme. This degree programme comprises of core Chemistry modules followed by elective modules in any of the three main fields, namely, Physical/Polymer, Organic or Analytical/Inorganic Chemistry and conduct a research project in any of the active research areas.

Graduate Attributes

Graduates will develop and exhibit the following intellectual, practical and transferrable skills during their course of study so as to be competitive and employable.

- Apply one's knowledge and understanding of fundamental concepts, principles and theories to provide solutions to problems in the scientific field, that are both of a qualitative and quantitative nature.
- Recognize, analyze problems of a scientific nature and plan strategies for their solutions.
- Access, evaluate, interpret and synthesize scientific information and data.
- Communicate scientific understanding in writing, orally and using computer software and models.
- Work effectively as a member of a team or group in scientific projects and investigations.
- Apply scientific knowledge and ways of thinking to societal issues, taking into account ethical and cultural considerations.
- Information retrieval skills, in relation to primary and secondary information sources, including information retrieval through online computer searches.

Career Opportunities

BSc Chemistry degree will allow you to work as a:

- Production Chemist
- Industrial Chemist
- Teacher or Lecturer
- Laboratory Analyst
- Research Chemist
- Environmental Scientist
- Forensic Scientist
- Quality Controller
- Sales Representative



Admission requirements

To study for the BSc Chemistry degree you will need:

- Minimum National Senior Certificate (NSC) statutory requirements for a degree entry must be met.
- An applicant with NSC grade 12 Mathematics requires a minimum applicant score of 410
- NSC achievement rating of at least 60% for Mathematics.

Curriculum for BSc Chemistry (Major):

First year modules:

General Chemistry 1
Inorganic Chemistry 1
Organic Chemistry

Second year modules:

Analytical Chemistry 2
Inorganic Chemistry 2
Organic Chemistry 2
Physical Chemistry 2

Third year modules:

Inorganic Chemistry 3
Organic Chemistry 3
Physical Chemistry 3

Curriculum for BSc Honours (Chemistry):

Analytical Science
General Chemistry A and B
Organic Chemistry Theory and Practical or,
Physical/Polymer Chemistry Theory and Practical or,
Inorganic/Analytical



Research activities

The Chemistry Department offers postgraduate programmes at Masters (MSc) and Doctorate (PhD) levels in Chemistry. Research in the Department is focused on the following areas.

Battery chemistry	Polymer Chemistry
Solid state transitions	Metal ion separation
Nanomaterials	Analytical chemistry
Microalgae technologies	Catalysis
Natural products chemistry	Fuel Chemistry
Supramolecular chemistry	Bioinorganic chemistry

Masters Programmes:

MSc (Chemistry),
MSc (Nanoscience)

Admission requirements

A BSc Honours degree or an equivalent qualification as determined by committee.

Doctoral Programme:

PhD (Chemistry)

Admission requirements

MSc (Chemistry) or MSc (Nanoscience)

Research Chair: Professor Paul Watts Microfluidic Biochemical Processing

Professor Paul Watts' research aim is to develop a continuous flow methodology to investigate how small production platforms can enhance chemical manufacture within the South African economy. In addition, research will be undertaken to investigate the integration of synthesis and purification within continuous flow systems.

Research interests include:

- Micro reactor and continuous flow synthesis
- Green chemistry
- Process intensification and process analytical technology
- Pharmaceutical manufacture
- Catalysis (and biocatalysis) in continuous flow reactors
- Drug formulation
- Nanochemistry

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