

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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**Department of Chemistry/
Innoventon**

Diploma in Chemical Process Technology

Programme Overview

The three-year diploma course comprises a mixture of disciplinary-based courses in chemistry, physics and mathematics together with integrated disciplinary courses that combine chemistry, engineering, statistics and computer technology. Apart from the formal course and practical work at Nelson Mandela University's modern laboratories and Chemical Pilot Plant. The programme also includes a six-month Work Integrated Learning (WIL) component that must be completed in an industrial setting where skills and knowledge acquired at University are integrated and applied under real life working conditions.

This programme is currently the only one of its kind in South Africa. The curriculum has been designed around a comprehensive competency profile for a chemical process technician that provides for training in and across seven competency fields including personal effectiveness, academic knowledge, professional skills, regulatory knowledge, technical skills, organizational skills and management competencies. Hands-on practical training includes training on the only working pilot chemical production facility at a South African university which provides for seamless integration into a real-life working environment. Much emphasis is placed on communication skills and teamwork in view of the criticality of many of the tasks of the chemical process technician in mega production facilities.

Graduate Attributes

Graduates will develop the following skills during their course of study so as to qualify for entry level positions in supply and service industries.

- Perform start up and shutdown operation procedures.
- Monitoring and sampling of product streams and interpret results coming from the laboratory to ensure that production stays in the correct specifications,
- The graduate will be able to do quantitative statistical process control and discern correctly what action to take in case of sudden pressure or temperature increases or decrease during production.
- The graduate will be able to do critical thinking, problem solving and troubleshooting in the plant to ensure product specifications are met, safety is adhered to at all times and equipment do not suffer any damages.
- Following Good Laboratory Practice (GLP), current Good Manufacturing Practices (cGMP) compliances such as ISO 9001 system and other Quality Management System.

Career Opportunities

The Chemical Process industry, which includes gas and oil production and refining, metal processing and the production of many industrial and household products, is responsible for more than 20% of South Africa's manufacturing gross domestic product. It is experiencing increasing technical sophistication, environmental and health compliance requirements, and economic pressure to optimize processes, and therefore requires personnel with a sound and multi-disciplinary education and training to maintain and operate chemical processes plants on a day-to-day basis. The graduates will be able to find quality employment in a wide variety of industries, nationally and internationally, as this educational foundation is designed with industry participation to meet the needs of the chemical and petroleum industry that includes daily operations such as material handling, product storage, transport and handling, process control and more.

Typical Job Functions

- Play a major part in plant operations, maintenance and control.
- Support and contribute to process quality and improvement of quality processes.
- Function in a team.
- Responsible for plant safety and security.
- Assist in trouble shooting and problem solving during plant operations
- Communicate results and conclusions to line managers and process engineers.

Admission requirements

To study for the Diploma in Chemical Process Technology you will need:

- Minimum National Senior Certificate (NSC) statutory requirements for a diploma must be met.
- An applicant with NSC Grade 12 Mathematics requires a minimum applicant score of 350.
- NSC achievement rating of at least 55% for Mathematics.
- NSC achievement rating of at least 50% for Physical Sciences

Curriculum:

Year 1 (Full time attendance)

Mathematics I
General Chemistry
Introductory Inorganic and Organic Chemistry
Introductory Physics
Electromagnetism and Optics
Essential Computer Skills I
Professional Skills I
Introduction to Process Technology
Basic Process Technology

Year 2 (Full time attendance)

Quality Assurance and Plant Performance
Applied Computing II
Professional Skills II
Physical Process Chemistry
Routes to Chemicals
Process Equipment and Operation
Process Control
Chemical Process Technology II

Year 3

Semester 1 (full attendance)

Chemical Process Technology III
Process Chemistry III
Chemical Process Technology Laboratory III

Semester 2 (6 months: WIL)

Chemical Process Technology Practice

