*Which competencies will best support you when starting the Chemical Sciences programme?*

*Numerical competency*:

You should be able to

- manipulate simple mathematical (algebraic and trigonometric) functions; and
- draw and interpret data tables and two-dimensional graphs.

*Communicative competency*:

You should be able to

- read and understand English text at introductory university level; and
- express yourself in clear spoken and written English.

*Academic competency*:

You should be able to

- plan and manage your academic, social and personal interests and activities in a balanced way;
- work independently and take responsibility for your own learning; and
- solicit support from university staff and structures for any academic problem you may encounter.

*Technical competency*:

You should be able to use the following:

- entry level scientific calculator; and
- computer software for the purpose of sending and receiving electronic mail.

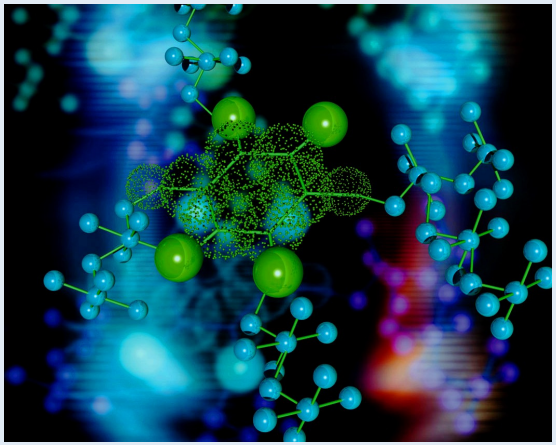
## *What do chemists do?*

The world we live in would be hard to imagine without the contributions of chemists.

Chemical research has given us materials (textiles, plastics, construction materials, steels and alloys, composites and many more), medicines, foodstuffs, fuels and cosmetics. It has given us techniques for purifying water, and detecting and mopping up environmental pollution.

Chemists are interested to know which elements occur in materials, how these elements are put together to form a particular material, how materials can be transformed into other materials, and how much energy is contained in materials.

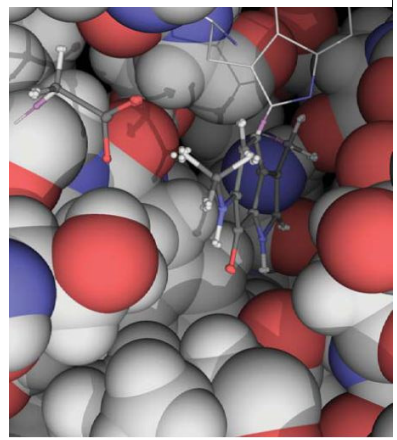
The answers to these questions enable chemists to apply their knowledge to the synthesis and characterisation of new materials which may further enhance the quality of our lives.



UNIVERSITY *of the* WESTERN CAPE

# CHEMISTRY DEPARTMENT

## *UNDERGRADUATE INFORMATION*



**Chemistry** is often described as the central science because it touches all the other sciences. Chemistry can be defined as the study of matter and its transformations. Since all the natural sciences involve working with or studying matter in some form or another, chemistry plays an central supporting role in fields such as biochemistry, biotechnology, geology, food science, agriculture, pharmaceutics, polymer science, electronics and forensic science.

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# The Chemical Sciences degree program

Your study in the Chemical Sciences will include at least some of the sub-disciplines listed below. In reality these sub-disciplines integrate to support and enhance each other, and there are no clear boundaries delineating them. As you progress through the programme, you may choose to specialise in those that interest you most.

*Organic Chemistry* is the study of the reactions of carbon-based compounds, their structure, reactions and synthesis. We study organic chemistry because just about all of the molecules that make life possible—proteins, enzymes, vitamins, lipids, carbohydrates and nucleic acids—contain carbon; thus, the chemical reactions that take place in living systems are organic reactions.

*Inorganic Chemistry* is the branch of chemistry concerned with compounds of elements other than carbon; their structure, properties, reactions and synthesis. Inorganic materials have mainly non-biological origins and find application in every aspect of the chemical industry–including catalysis, materials science, pigments, surfactants, coatings, medicine, fuel, and agriculture. Inorganic and organic chemistry overlap significantly in the sub-discipline of organometallic chemistry.

*Analytical chemistry* is the study of the separation, identification, and quantification of the chemical components of natural and artificial materials. Analytical chemistry is also focused on improvements in experimental design, chemometrics, and the creation of new measurement tools to provide better chemical information. Analytical chemistry has applications in forensics, bioanalysis, clinical analysis, environmental analysis, and materials analysis.

*Physical chemistry* is the study of macroscopic, atomic, subatomic, and particulate phenomena in chemical systems in terms of laws and concepts of physics. It applies the principles, practices and concepts of physics such as motion, energy, force, time, thermodynamics, quantum chemistry, statistical mechanics and dynamics.

*Environmental chemistry* is the scientific study of the chemical and biochemical phenomena that occur in natural places. It can be defined as the study of the sources, reactions, transport, effects, and fates of chemical species in the air, soil, and water environments; and the effect of human activity on these. Environmental chemistry is an interdisciplinary science that includes atmospheric, aquatic and soil chemistry, as well as heavily relying on analytical chemistry and being related to environmental and other areas of science.

*Applied Chemistry* is the application of chemistry knowledge to new and existing challenges related to the production and transformation of matter and energy.

## *What additional resources are available to students enrolled in the Chemical Sciences program?*

*eLearning:*

Most courses in the program have fully integrated eLearning components that can be accessed by registered students from any on or off-site computer. Here students can find relevant information and downloadable resources related to their courses.

*The 'Hot Seat" for first year students:*

In addition to the formal supplemental instruction activities, students have access to a free tutor service that is available every weekday afternoon from 14:00 to 16:00.

## *How is the Chemical Sciences programme taught?*

The Chemistry Department is fully invested in providing the best possible learning environment for our students.

Upon completion of the program you should be able to:

- Apply chemical concepts and principles to engage with real-world phenomena or examples;
- Conduct scientific investigations, including the collection, handling and interpretation of experimental data;
- Conduct research using the library, the web and other sources of information;
- Use the internet and computer-based word-processing, spreadsheet, and presentation software to complete tasks;
- Recognise the relationship of chemistry to society, technology and the environment;
- See chemistry as discipline in a wider context;
- Present a clear, well-structured oral presentation and well-structured practical reports; and
- Work productively in co-operative learning groups.

Peer assisted learning in which students are facilitated by senior (mostly post-graduate) students feature strongly in the department, and serves a dual purpose: using learning peer facilitators ensures greater personal attention for undergraduate students, whilst at the same time developing the professional potential of the senior student, in terms of teaching and other marketable skills.