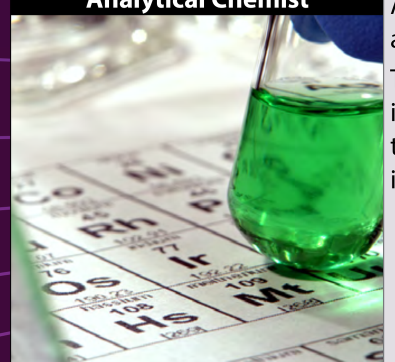
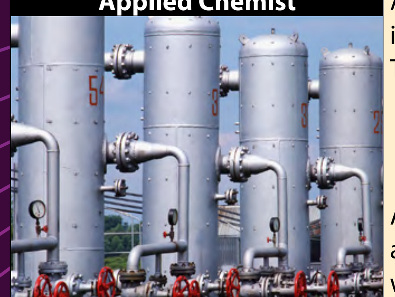
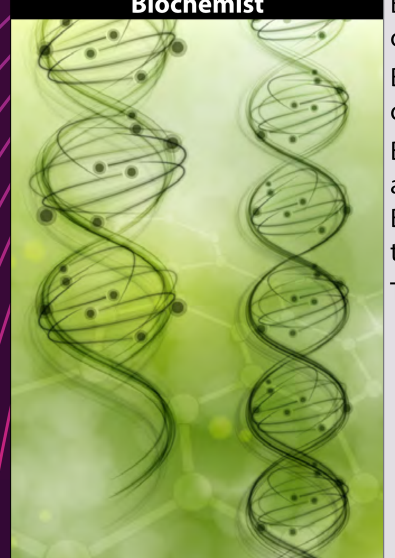
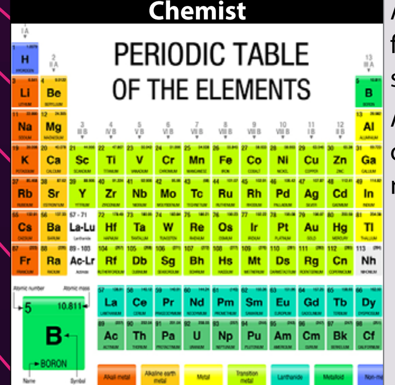
UNIVERSITY OF KWAZULU-NATAL™
INYUVESI YAKWAZULU-NATALI

COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE

Careers with a major in CHEMISTRY

Career	Description – What do they actually do?	Areas of Employment	Degree Name
Analytical Chemist 	Analytical Chemists offer their expertise on how to develop new methods of analysis and investigate which substances are present within an item of study. The Bachelor's degree in Applied Chemistry focuses on the ways that new research into material properties, nanotechnology, renewable energy, and other related technologies use chemical processes, as well as the ways that those processes operate in conjunction with other systems.	• Chemical and other manufacturing industries • Government departments • Non-profit research organisations • Educational institutions • SABS • CSIR • ESKOM • ISCOR • Council for Mineral Technology • Uranium Enrichment Corporation	**BSc Applied Chemistry** **OR** **BSc LES Stream** with possible Majors in Chemistry/ Biochemistry/ Microbiology **OR** **BSc MATH Stream** with a Major in Chemistry
Applied Chemist 	Applied Chemistry covers a variety of chemical fields, working on various materials including metal compounds, inorganic and organic compounds, polymers and proteins. The research is divided into three fields: • Organic and Macromolecular Chemistry • Physical and Inorganic Chemistry • Biotechnology and Chemical Engineering Applied Chemistry is the application of the principles and theories of chemistry to answer a specific question or solve a real-world problem, as opposed to pure chemistry, which is aimed at enhancing knowledge within the field.	• Chemical and other manufacturing industries • Government departments • Non-profit research organisations • Educational institutions • SABS • CSIR • ISCOR • Council for Mineral Technology	**BSc Applied Chemistry**
Biochemist 	Biochemists examine the structure and functions of chemical compounds in all living organisms such as plants, animals, insects, viruses and microbes. Biochemists work only with those chemicals and reactions that occur in living organisms. Biochemists work to produce human insulin, prenatal diagnosis of genetic conditions and DNA testing. Improvements in crop yield are a result of the work of biochemists. Biochemists study the building blocks and components of living organisms, as well as their functioning and physical qualities. The objectives: 1. To identify and describe the chemical components of cells. 2. Secondly, to discover how these components act and interact in processes essential to life.	• Government departments, such as Agriculture and Health • Research organisations like SABS, CSIR, SA Medical Research Council and NECSA • Universities and Universities of Technology (faculties of medicine, science and agriculture) • Industries that manufacture food, beverages, drugs, insecticides and cosmetics • Municipalities • Large hospitals • Pharmaceutical companies • Breweries and wine corporations • Self-employment, as a consultant to industry and government	**BSc LES Steam** with Majors in Biochemistry and Chemistry **OR** **BSc MATH Stream** with a Major in Chemistry
Chemical Technician/ Chemical Technologist 	Chemical Technicians often work in clinical (medical) laboratories conducting routine analyses of medical samples such as blood and urine. Industries which employ chemical technicians include chemical, petrochemical, and pharmaceutical industries. Companies within these industries can be concerned with manufacturing, research and development (R&D), consulting, quality control and a variety of other areas. Chemical Technologists participate in the actual design of experiments, and may be involved in the interpretation of experimental data. They may also be responsible for the operation of chemical processes in large plants, and may even assist Chemical Engineers in the design of the same.	• Research organisations like SABS, CSIR, SA Medical Research Council and NECSA • Universities and Universities of Technology (faculties of medicine, science and agriculture) • Industries that manufacture food, beverages, drugs, insecticides and cosmetics and other products	**BSc Chemistry and Chemical Technology** **OR** **BSc LES Stream** with possible Majors in Chemistry/ Biochemistry/ Microbiology **OR** **BSc MATH Stream** with a Major in Chemistry
Chemist 	A Chemist is a scientist who studies the area of science known as chemistry, which focuses on chemical substances and how they interact with each other. A chemical substance is a form of matter. Matter is anything that takes up space. All Chemists work with simple forms of matter to reach either a greater understanding of the chemical itself, uncover the elements of unfamiliar substances or create entirely new chemical compounds for use in a variety of ways to enhance life.	• Universities and Universities of Technology (faculties of medicine, science and agriculture) • Industries that manufacture food, beverages, drugs, insecticides and cosmetics • Municipalities • Large hospitals • Pharmaceutical companies • Breweries and wine corporations • Self-employment, as a consultant to industry and government	**BSc Applied Chemistry** **OR** **BSc LES Stream** with possible Majors in Chemistry/ Biochemistry/ Microbiology **OR** **BSc MATH Stream** with a Major in Chemistry
Environmental Chemist 	Environmental Chemists are responsible for analysing the effects of chemicals on soil, air and water and they are also responsible for devising solutions to environmental problems. The main function of Environmental Chemists is to locate and neutralise threats of pollution to people, animals and plants, using their knowledge of chemical properties and reactions. They conduct qualitative and quantitative chemical analyses or experiments in laboratories for quality or process control, or to develop new products or knowledge.	• Chemical industry • Private consulting firms • Government agencies • Department of Agriculture • Environmental protection agencies • Waste management companies • Colleges and universities	**BSc LES Steam** with Majors in Chemistry and Geography **OR** **BSc MATH Stream** with a Major in Chemistry

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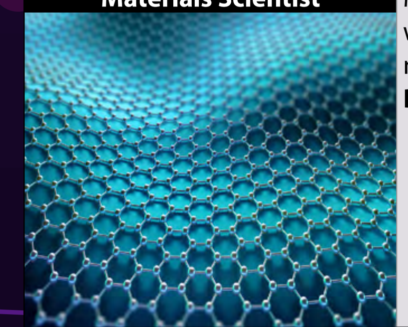
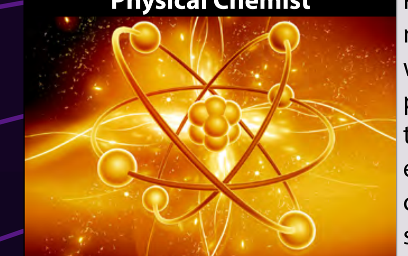
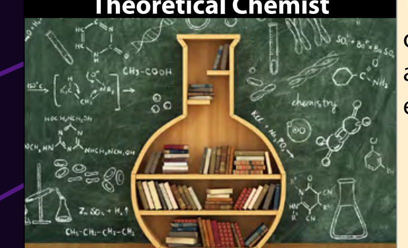
Career	Description – What do they actually do?	Areas of Employment	Degree Name
Forensic Scientist 	Forensic Scientists apply scientific knowledge and skills to investigate crimes. The information they provide may help the police to find or eliminate a suspect in a crime. Forensic Scientists usually specialise in one area of forensics, such as DNA analysis, firearms examination, or toxicology, which is the analysis of body samples for traces of drugs and poisons. The service that forensic analysts provide is invaluable in police and legal work and their expertise is called upon to detect traces or confirm the presence of substances in the human body at post-mortems. This information is then used by the police to assist in solving crimes and by the legal profession to secure convictions or to prove innocence.	• Department of National Health • South African Police • Government laboratories and offices • Private laboratories	**BSc Applied Chemistry** with electives in Biochemistry/ Microbiology/ Genetics **OR** **BSc MATH Stream** with a Major in Chemistry *Specialised further study is required at postgraduate level.*
Green Chemist 	Green Chemists eliminate dangerous substances in the design, manufacture and use of chemical products. Green chemistry has the following benefits: • Prevents pollution at the molecular level. • Results in source reduction because it prevents the generation of pollution. • Reduces the negative impacts of chemical products and processes on human health and the environment. • Lessens and sometimes eliminates hazard from existing products and processes.	• Research organisations like SABS, CSIR, SA Medical Research Council and NECSA • Universities and universities of technology (faculties of medicine, science and agriculture) • Industries that manufacture food, beverages, drugs, insecticides, cosmetics and other products	**BSc Applied Chemistry** **OR** **BSc LES Steam** with possible Majors in Chemistry/ Biochemistry/ Microbiology **OR** **BSc MATH Stream** with a Major in Chemistry
Materials Scientist 	Materials Scientists study substances at the atomic and molecular levels and the ways in which the substances interact with one another. They use their knowledge to develop new and improved products and to test the quality of manufactured goods. **Duties include:** • Plan and carry out complex research projects, such as the development of new products and testing methods. • Instruct scientists and technicians on proper chemical processing and testing procedures, including ingredients, mixing times, and operating temperatures. • Prepare solutions, compounds, and reagents used in laboratory procedures. • Analyse substances to determine their composition and concentration of elements.	• Chemical industry • Private consulting firms • Waste management companies • Colleges and universities	**BSc Applied Chemistry** **OR** **BSc MATH Stream** with possible Majors in Chemistry and Physics
Medicinal Chemist/ Pharmaceutical Researcher (Drug Discovery) 	Drug discovery is the process through which potential new medicines are identified. It involves a wide range of scientific disciplines, including biology, chemistry and pharmacology. Medicinal Chemists apply their chemistry training to the process of synthesising new drugs. They also improve the processes by which existing pharmaceuticals are made. Medicinal Chemists are focused on drug discovery and development and are concerned with the isolation of medicinal agents found in plants and the creation of new synthetic drug compounds.	• Government departments • Pharmaceutical companies • National Health Service • Non-profit research organisations • Educational institutions • Research Institutes	**BSc Applied Chemistry** **OR** **BSc LES Steam** with possible Majors in Chemistry/ Biochemistry/ Microbiology *Further study is required at postgraduate level.*
Physical Chemist 	Physical Chemists are focused on understanding the physical properties of atoms and molecules, the way chemical reactions work, and what these properties reveal. Their work involves analysing materials, developing methods to test and characterise the properties of materials, developing theories about these properties, and discovering the potential use of the materials. Using sophisticated instrumentation and equipment has always been an important aspect of physical chemistry. Most physical chemistry labs are full of analytical instruments, which can include lasers, mass spectrometers, nuclear magnetic resonance, and electron microscopes.	• Chemical industry • Private consulting firms • Space Agencies • Protection agency • Waste management companies • Colleges and universities	**BSc Applied Chemistry** **OR** **BSc LES Steam** with possible Majors in Chemistry/ Biochemistry/ Microbiology **OR** **BSc MATH Stream** with a Major in Chemistry
Theoretical Chemist 	Theoretical Chemists investigate theoretical methods that can predict the outcomes of chemical experiments. Theoretical chemistry includes a variety of specialisations, although most specialisations blend advanced computation and programming. Some examples of Theoretical Chemists are: • Computational Chemists • Mathematical Chemists and • Chemical Informaticians	• Research organisations like SABS, CSIR, SA Medical Research Council and NECSA • Universities and universities of technology (faculties of medicine, science and agriculture)	**BSc Applied Chemistry** **OR** **BSc LES Steam** with possible Majors in Chemistry/ Biochemistry/ Microbiology **OR** **BSc MATH Stream** with a possible Major in Chemistry

DEGREE INFORMATION

Degree Name	Duration	Campus Location	Entry Requirement	Point Range	CAO Code
BSc Applied Chemistry	3 yrs	WST	NSC Deg pass with Maths, Engl and LO level 4 and Agric Sci or Life Sci or Phys Sci level 4.	28-48	KN-W-BSR
BSc Chemistry and Chemical Technology	3 yrs	PMB	NSC Deg pass with Maths, Engl and LO 4 and Agric Sci or Life Sci or Phys Sci 4.	28-48	KN-P-SIK
BSc LES stream	3 yrs	PMB WST	NSC Deg pass with Maths, Engl and LO level 4 and Agric Sci or Life Sci or Phys Sci level 4.	28-48	KN-P-BS2 KN-W-BS2
BSc MATH Stream	3 yrs	PMB WST	NSC Deg pass with Maths level 5, Engl and LO level 4 and Agric Sci or Life Sci or Phys Sci level 4	30-48	KN-P-BS3 KN-W-BS3

POSTGRADUATE STUDY:
The sub-disciplines within Chemistry (e.g. Green Chemistry, Materials Science, Medicinal Chemistry, Physical Chemistry and Theoretical Chemistry) typically require postgraduate study. This starts at an Honours level where one may choose a research project as part of one's course. This project can be in a particular field of interest. Studying for either a Master of Science (MSc) or PhD degree will allow for further specialisation in these fields and many others.

Chemists are Problem Solvers:
With a Major in Chemistry, you will be trained in highly analytical and problem-solving skills. This makes you attractive to employers in unrelated industries. Graduates who major in Chemistry can go on to work in Finance for example.

INSPIRING GREATNESS