



UNIVERSITY OF  
KWAZULU-NATAL™  
INYUVESI  
YAKWAZULU-NATALI

# School of Chemistry and Physics

**College of Agriculture, Engineering  
and Science**

**INSPIRING GREATNESS**



**DON'T ACCEPT WHAT IS,  
ALWAYS ASK WHAT IF.**



UKZN's School of Chemistry and Physics is one of five Schools in the College of Agriculture, Engineering and Science. It is located predominantly on the Pietermaritzburg and Westville campuses, with a small Engineering service presence on Howard College. It has a staff complement of 148 academic and support staff, houses approximately 600 undergraduate students and boasts a postgraduate component of 250, engaged in Honours, Masters, PhD and Postdoctoral research. The School's cutting -edge laboratories and research equipment compare favourably with the best in the world. Caring and enthusiastic lecturers ensure that students emerge highly employable, with a rich university experience and an excellent degree in Chemistry or Physics to their name.



## AREAS OF SPECIALISATION

Chemistry and Physics are considered to be the central sciences and are important subjects in first year for many programmes of study.

Chemistry is the study of atoms and molecules and how they react and interact with one another and with the environment. When a material with new properties is needed, when a drug needs to be found or synthesized, or when a new pest is encountered in agriculture, the chemists are asked to provide the solution. Chemists create new products from atoms and molecules, ranging from paints and water purification chemicals, to medicines and medical implants.

Physicists study the structure and behaviour of individual atoms and their components, the different forces of nature and their relationships, the physical properties of matter, and phenomena such as electricity and magnetism. They study the smallest particles found in nature to the physics of the sun, and provide understanding of how the universe is made up. Physicists are found everywhere and provide high-tech expertise – studying simulated car crashes in industry, investigating the principles of nuclear fusion and fission at the Atomic Energy Corporation, or sharing their enthusiasm for their subject in the classroom.

Areas of specialisation within UKZN's School of Chemistry and Physics include:

- Analytical and Environmental Chemistry
- Applied Chemistry
- Applied Physics
- Astrophysics
- Catalysis
- Drug Discovery
- Experimental High Energy Particle Physics
- Green Chemistry
- Material Science
- Open Quantum Systems
- Physical Chemistry
- Quantum Information Processing and Communication
- Space and Plasma Physics
- Synthetic Chemistry
- Theoretical Physics

## DEGREES OFFERED

### Undergraduate

- **Bachelor of Science**

UKZN's School of Chemistry and Physics offers a three-year undergraduate course leading to the degree of Bachelor of Science (BSc). This may be achieved in two ways:

- Through a general and flexible BSc with possible combinations of Chemistry, Physics, Mathematics, Biology, Biochemistry, Microbiology, Soil Science, Computer Science and Statistics.
- Through a specific focused BSc, which has a more directed outcome:
  - Applied Chemistry
  - Applied Physics
  - Chemistry & Chemical Technology

### Minimum entrance requirements:

- NSC degree pass with Maths, English, Life Orientation and Agricultural Science/ Physical Science/Life Science at level 4 (if you are studying Physics as a degree you will need Maths at level 5).
- Admission points required: 28-48 (highest scoring students taken first).
- The closing date for applications is 30 September.

### Postgraduate

- **Bachelor of Science (Honours)**

A one-year specialist programme leading to an Honours degree. Applicants must have a relevant 3-year or equivalent qualification to be considered for Honours. Spaces are very limited and a careful selection process is followed. The closing date for applications is 30 September.

- **Master of Science**

A Master of Science programme is offered, whereby students engage in research under the supervision of an academic staff member. A minimum of 60% at Honours level or equivalent must be achieved to be considered for this programme. This degree takes a minimum of one year.

- **Doctor of Philosophy**

A Doctor of Philosophy programme is offered where students engage in novel research supervised by academic members of staff. This is typically three years of study and normally follows on from a Master of Science Degree.

- **Postdoctoral study**

Remunerated postdoctoral research positions are available on application.

Visit: <http://caes.ukzn.ac.za>



## CAREER OPPORTUNITIES

Chemistry and Physics teach one to solve problems. To be a Chemist or Physicist one needs an enquiring mind, good powers of observation, mathematical skills, practical ability, the adaptability to learn new skills throughout one's career, and the social skills necessary to share one's ideas with colleagues. These skills all make graduates from UKZN's School of Chemistry and Physics highly employable.

Graduates with a degree in Chemistry or Physics can embark on a wide variety of careers which can be as diverse as petroleum engineering, astronomy and astrophysics, alternate energies, industrial chemistry, environmental science, mining, drug design, medicinal and bio product development, and teaching. Owing to their problem solving abilities, many of our graduates find employment opportunities in a range of industries and professions that do not necessarily relate directly to Chemistry or Physics.

### Chemistry

- **Research Scientist**

A postgraduate degree in Chemistry will enable you to become a research scientist at any leading industry or development institute.

- **Pharmaceutical Industry**

Work in this area involves the testing and synthesizing of commercially-used drugs. A strong background in organic chemistry is advantageous.

- **Forensic Scientist**

Graduates are employed in forensic laboratories around the world, collecting samples at the scene of a crime and analysing them in order to build up evidence, which assists police to find criminals and prosecuting attorneys to bring about a conviction.

- **Laboratory Analyst**

Works in various companies and industries analysing products and materials and making sure they comply with local and international standards.

- **Development Chemist**

Works in this area involves adapting processes and products for use in specific local environments, or further developing a product or process towards commercial implementation.

- **Patent Lawyer**

Coupled with a law degree, a Chemistry graduate can practice patent law, registering patents for new chemical discoveries and preventing copyright infringements of these patents.

- **Educator**

A degree in Chemistry can lead to a teaching career at a university, university of technology or at a school.

- **Management and consultancy**

Where problem solving skills are highly sought after.

- **Marketing and sales**

In all industries involved in Chemistry or Physics.

- **Environmental Chemist**

A wide range of opportunities are available, from air and water quality monitoring to studying the effects of industrial accidents, to land remediation.

### Physics

- **Medical Physics:** radiation therapy, magnetic resonance imaging

- **Geophysics:** oil exploration, underground radar and communications

- **Materials:** micro-electronics, superconductors, diamonds

- **Computational Physics:** software, simulations

- **Environmental Physics:** radiation protection, ozone, satellites

- **Energy:** nuclear power, renewable energy

- **Research Scientist:**

A range of opportunities exist for research, e.g. quantum computing, astrophysics, renewable energy and material science.

- **Space Science**

Scientists are needed for rapidly growing Space and Telescope programmes.

- **Educator**

A degree in Physics can lead to a teaching career at a university, university of technology or at a school.

## CONTACT DETAILS

School of Chemistry and Physics

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### **Westville campus**

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### **Pietermaritzburg campus**

**Tel:** 033 260 6223

**Email:** jordaank@ukzn.ac.za

**Website:** <http://scp.ukzn.ac.za>.

### **Handbook:**

For full course codes and information see the  
College of Agriculture, Engineering and Science handbook at  
<http://caes.ukzn.ac.za>

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