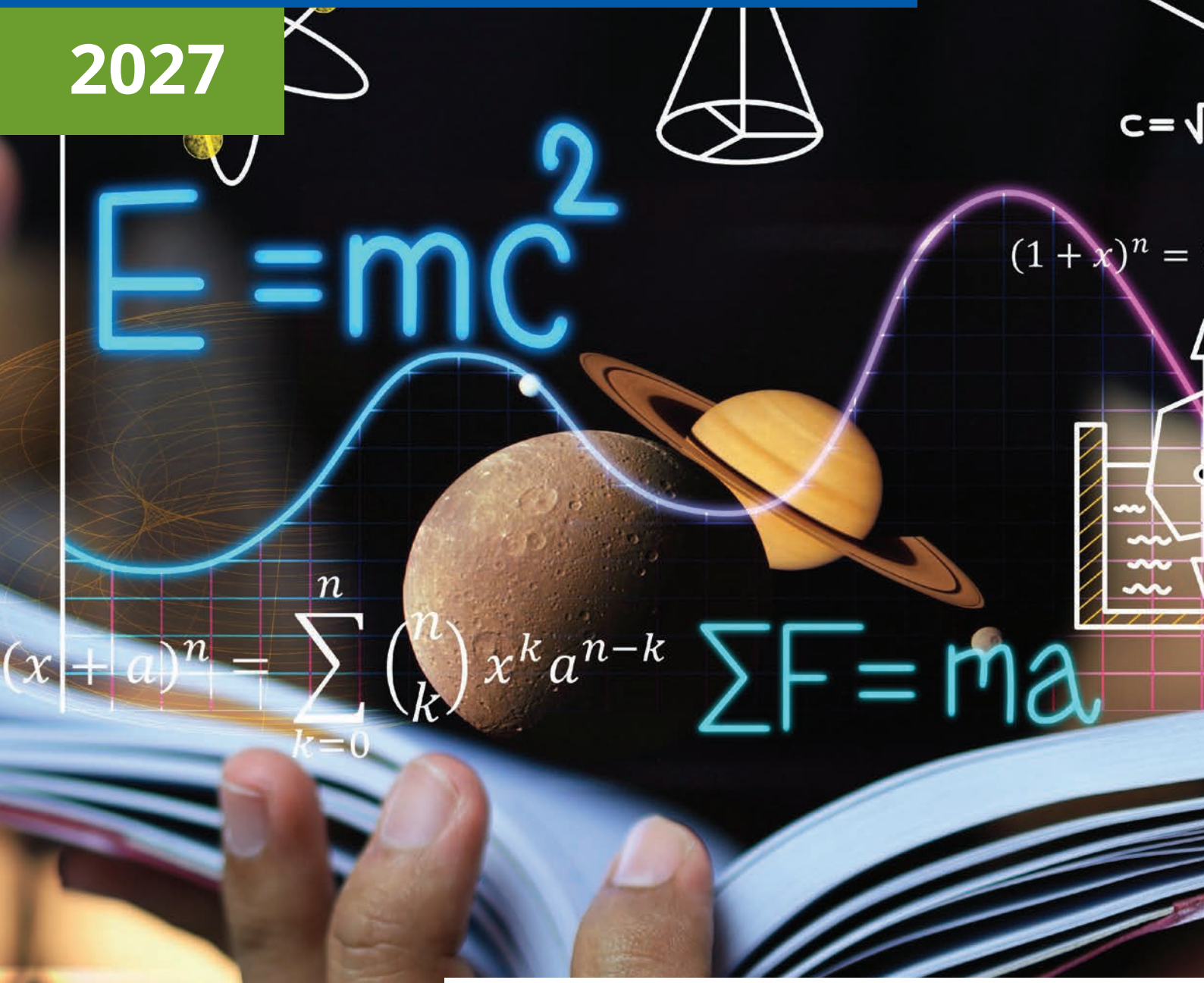
Undergraduate Faculty Brochure

2027



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Natural and Agricultural Sciences

Fakulteit Natuur- en Landbouwetenskappe
Lefapha la Disaense tša Tlhago le Temo

Make today matter

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MESSAGE FROM THE DEAN

Welcome to the University of Pretoria's Faculty of Natural and Agricultural Sciences

Prof Vinesh Maharaj, Acting Dean: Faculty of Natural and Agricultural Sciences, University of Pretoria

At the University of Pretoria's Faculty of Natural and Agricultural Sciences (NAS), curiosity sparks purpose and every breakthrough brings us closer to a brighter, more innovative future. We believe that within every moment of every day lies the potential to change the world and the good we do today can positively impact our futures. It is a single idea that holds everything together.

We take this challenge very seriously: we continuously assess, reflect and improve how we teach, to ensure that our graduates get the skills to thrive and lead in these uncertain times. We value quality education, campus safety, employability, international competitiveness and research impact. For many decades, the Faculty of NAS has stood at the heart of South Africa's scientific and agricultural progress. From pioneering breakthroughs in soil science and crop genetics, to driving world-class research in mathematics, biological sciences, chemistry and environmental resilience. We are known for our deep expertise in forestry and agriculture, the life sciences and mathematical and statistical sciences, all grounded in a tradition of academic excellence and genuine scholarship. Our programmes span unique degrees such as Meteorology and Nutrition, alongside exciting double majors and South Africa's only triple major in Human Physiology, Genetics and Psychology designed to meet the needs of a changing world.

Our high-quality, purposefully designed on-campus activities provide opportunities for our students and graduates to develop into well-rounded, locally rooted and internationally relevant citizens. At the Faculty of NAS, you'll be part of a vibrant academic journey enriched by cutting-edge research, supported by our collaborations with industry partners and purpose-driven community projects. Every experience is designed to equip you with the skills, confidence and vision to shape a better future and give you a unique edge for employment. A qualification from NAS doesn't just open doors—it launches you into a world of opportunity where your impact truly matters.

As a student in NAS, you will be mentored by leading scientists and trained in the use of state-of-the-art equipment. Here you will be at the forefront of scientific research and you will be inspired to think innovatively. You will join a pipeline of generations of NAS-produced leaders who have shaped not just academic thought, but society itself.

We are excited to help shape your journey—from the lecture hall to the lab, from research to real-world impact. Join us and become part of a proud legacy of innovation and discovery that continues to transform South Africa and the world.

I would like to welcome you to the Faculty of NAS at UP and we look forward to joining you on an exciting journey.

Email nas.undergradhelp@up.ac.za

SCAN QR CODE TO VISIT OUR WEBSITE

CONTENT

** Possible degree name change with Culinary Science as specialisation.*
*** Possible degree name change with Nutritional Science as specialisation.*
**** The programme name is currently under review and may be subject to change.*

Produced by the Department of Enrolment and Student Administration in December 2025.
Comments and queries may be directed to ssc@up.ac.za or tel: +27 (0)12 420 3111.

FACULTY WEBSITE:

POSTGRADUATE WEBSITE:

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES AT A GLANCE

The Faculty of Natural and Agricultural Sciences is the most diverse faculty of its kind in Africa.

All degree programmes are designed to develop problem-solving individuals who can easily adapt to changing circumstances and take the lead in their chosen fields of specialisation. Our world-class qualifications provide access to numerous career opportunities for dynamic and creative people. Some of the Faculty's degree programmes are unique to the University of Pretoria, while others are also offered at other institutions.

STUDENT PROFILE

3 623 Undergraduate students

1 590 Postgraduate students

542 Students from countries other than South Africa*

ACADEMIC OFFERINGS

42 Undergraduate degree programmes

118 Postgraduate degree programmes

9 Research centres and institutes

Mathematical Sciences	Physical Sciences	Biological Sciences	Agricultural & Food Sciences
▪ Bachelor of Science in Actuarial and Financial Mathematics ▪ Bachelor of Science in Applied Mathematics[2] ▪ Bachelor of Science in Mathematical Statistics[2] ▪ Bachelor of Science in Mathematics[1,2]	▪ Bachelor of Science in Chemistry[1,2] ▪ Bachelor of Science in Environmental and Engineering Geology ▪ Bachelor of Science in Geography Option: Geography and Environmental Science[2] ▪ Bachelor of Science in Geoinformatics[1] ▪ Bachelor of Science in Geology[1,2] ▪ Bachelor of Science in Meteorology[1,2] ▪ Bachelor of Science in Physics[2]	▪ Bachelor of Science in Biochemistry[2] ▪ Bachelor of Science in Biotechnology ▪ Bachelor of Science in Ecology[2] ▪ Bachelor of Science in Entomology[2] ▪ Bachelor of Science in Genetics[2] ▪ Bachelor of Science in Human Genetics[2] ▪ Bachelor of Science in Human Physiology, Genetics and Psychology ▪ Bachelor of Science in Human Physiology[1,2] ▪ Bachelor of Science in Medical Sciences[2] ▪ Bachelor of Science in Microbiology[2] ▪ Bachelor of Science in Plant Science[2] ▪ Bachelor of Science in Zoology[2]	▪ Bachelor of Consumer Science specialising in Clothing Retail Management ▪ Bachelor of Consumer Science specialising in Food Management ▪ Bachelor of Science in Agriculture in Agricultural Economics ▪ Bachelor of Science in Agriculture in Animal Science ▪ Bachelor of Science in Agriculture in Applied Plant and Soil Sciences[1] ▪ Bachelor of Science in Agriculture in Plant Pathology[1] ▪ Bachelor of Science in Food Management specialising in Culinary Science, or in Nutrition ▪ Bachelor of Science in Food Science

1. Foundation programmes
2. Double majors

Top 1% Globally

Agricultural Sciences, Biology and Biochemistry, Molecular Biology and Genetics, Environment/Ecology, Microbiology and Plant and Animal Science

UNIQUE DEGREES

Bachelor of Science in Meteorology is the only degree of its kind offered in sub-Saharan Africa.

Bachelor of Science in Food Management Option: Culinary Science*** is the only degree of its kind in Africa.

#1 in SA

TOP 301-350 globally in Mathematics**

**2025 QS Subject Rankings

UP *AT A GLANCE*

UP has achieved top subject rankings in South Africa: for example, in the 2025 Times Higher Education Subject Rankings it is No. 1 in SA in Accounting & Finance; Architecture; Electrical & Electronic Engineering; Law; Sport Science; and Veterinary Science. UP is globally competitive: in the 2025 Quacquarelli Symonds (QS) Subject Rankings, it ranks in the top 50 for several subjects (e.g., Agriculture & Forestry, Biological Sciences, Engineering & Technology).

UP is the only university in South Africa with a **Faculty of Veterinary Science**—and that faculty is ranked best in Africa.

UP secured a **100% pass rate in the SAICA** first professional exam (now called IAC) for the third year in a row.

The University of Pretoria is ranked **number one in South Africa for Law** in the 2025 Times Higher Education Subject Rankings.

Life beyond academics matters at UP: the university highlights its culture of 'more than study'—arts, culture, sports, student societies.

Faculty of Economic and Management Sciences

#1	in SA and Top 201-250 globally in Accounting & Finance
#1	in SA and Top 101-150 globally in Economics
8	academic departments, and School of Public Management and Administration
64%	of academic staff hold doctoral degrees

Faculty of Education

82%	academic staff hold doctoral degrees
20	NRF-rated researchers
5	academic departments
Top 351-400	Ranked among Top 351-400 Education faculties globally
Top 5	Ranked among Top 5 Education faculties in South Africa

Faculty of Engineering, Built Environment and Information Technology

72%	of academic staff hold doctoral degrees
100	NRF-rated researchers
12	research centres, units and institutes
6	QS-rated subjects
16	externally funded research chairs

Faculty of Health Sciences

68%	of academic staff hold doctoral degrees
52	NRF-rated researchers
6	research chairs
43	specialised academic departments
Top 312	globally for Life Sciences and Medicine

Faculty of Humanities

71%	of academic staff hold doctoral degrees
67	NRF-rated researchers
25	international partnerships and agreements
23	specialised undergraduate degree programmes
12	academic programmes

Faculty of Law

72%	of academic staff hold doctoral degrees
23	NRF-rated researchers
Largest	Law of Africa collection in the world
10	advanced Human Rights courses
#1	Law faculty in Africa since 2017, and #125 globally

Faculty of Theology and Religion

#1	in SA and #76 globally for Theology, Divinity and Religion
92%	placement rate for graduates
100%	academic staff hold doctoral degrees
23	NRF-rated researchers
11	international partnerships and agreements

Faculty of Veterinary Science

98%	undergraduate pass rate
Top 51-100	in QS world University Subject Rankings for 2025
51%	of academic staff hold doctoral degrees
35	NRF-rated researchers
100%	Responsible for 100% of all South African veterinary science degrees

ADMISSION REGULATIONS

General admission regulations that apply to all prospective students

1. The admission requirements and general information provided in this Faculty brochure are applicable to students who apply for admission to the University of Pretoria with a National Senior Certificate (NSC) or an Independent Examination Board (IEB) qualification.
2. The following persons will be considered for admission to a first bachelor's degree at the University of Pretoria:
   - Candidates who have a certificate that is deemed by the University to be equivalent to the required National Senior Certificate (NSC) with bachelor's degree endorsement;
   - Candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and
   - Candidates who are graduates of another faculty at the University of Pretoria.
3. Grade 11 results are used for the conditional admission of prospective students, but final admission will depend on the NSC (or equivalent) qualification and results.
4. Candidates must also comply with the specific subject and achievement level requirements and the minimum Admission Point Score (APS) for their chosen degree programmes.
5. The APS calculation is done by using the NSC 1 to 7 scale of achievement. It is based on a candidate's achievement in six recognised 20-credit subjects. The highest APS that can be achieved is 42. Life Orientation is a 10-credit subject and is excluded from the calculation when determining the APS. The following subject rating scores are used for calculating the APS for NSC/IEB:

Admission Point Score (APS) Conversion

Rating code	Rating	Marks %
7	Outstanding achievement	80–100%
6	Meritorious achievement	70–79%
5	Substantial achievement	60–69%
4	Adequate achievement	50–59%
3	Moderate achievement	40–49%
2	Elementary achievement	30–39%
1	Not achieved	0–29%

NSC – National Senior Certificate (completed Grade 12 in or after 2008)
IEB – Independent Examination Board

6. Except in cases where modules or programmes require the use of a language other than English, all modules will be presented in English, which is the University's official language of tuition, communication and correspondence.
7. Minimum requirements for admission to the relevant programmes are set out in the application requirements table in this brochure.
8. Meeting the application requirements does not guarantee admission into a programme.
9. Applicants with qualifications other than NSC and IEB should refer to the following publication:
   - *International Undergraduate Prospectus 2027: Applicants with a school leaving certificate not issued by Umalusi* (South Africa)*, available at www.up.ac.za/programmes > Undergraduate > Admission information.
10. **School of Tomorrow** (SOT), **Accelerated Christian Education** (ACE) and **General Education Development** (GED): These qualifications are not accepted at the University of Pretoria.
11. **National Certificate (Vocational)** (NCV) Level 4: The University of Pretoria may consider NCV candidates, provided they meet the exemption for bachelor's status criteria and the programme requirements.

* **Umalusi** accredits South African private providers of education and training as well as private assessment bodies to offer tuition and/or assessment for qualification(s) on the General and Further Education and Training Qualifications Sub-Framework (GFETQSF). Contact Umalusi at info@umalusi.org.za or +27 (0)12 349 1510.

Note: Refer to the General Academic Regulations and Student Rules at www.up.ac.za/yearbooks/home, click on 'General Rules and Regulations'.

APPLICATION AND CLOSING DATES:
- Applications open on 1 April. All study programmes at the University of Pretoria are number-limited. You are encouraged to submit your application as soon as possible after 1 April.
- The closing date for applications for all UP study programmes is 30 June. This excludes the programmes in the Faculty of Veterinary Science which close on 31 May.

APPLICATION STATUS:
- Apply with your final Grade 11 (or equivalent) results.
- Applicants can expect feedback by September at the latest.
- Please check your application status and communication regularly on the UP Student Portal at www1.up.ac.za.
- Final admission will be based on the applicant's final school-year NSC or equivalent results.

ADMISSION REGULATIONS

Faculty-specific admission regulations

Physical Sciences: Students in the Cambridge system must have completed both **Physics** and **Chemistry** with an achievement level equal to that of NSC Physical Sciences as specified in the table on pages 5 to 8.

Key information for foundation programmes

1. In the placement of candidates for the 4-year Bachelor of Science and 5-year Bachelor of Science in Agriculture programmes, preference will be given to students from quintiles 1-4 schools.
2. The maximum number of students per 4-year Bachelor of Science and 5-year Bachelor of Science in Agriculture programme is 30.
3. Students starting in the 4-year Bachelor of Science and 5-year Bachelor of Science in Agriculture programmes will be allowed to apply for internal transfers, however, applications will be based on academic merit and the impact on N+1 funding will be considered.
4. Transfer options will only include similar specialisations to these programmes, so as not to add an additional year of study.
5. Students who applied for the main stream Bachelor of Science programmes and did not meet the cut-off average during the ranking process, will be allowed to change their choice of study to one of the 4-year Bachelor of Science or 5-year Bachelor of Science in Agriculture programmes, if space permits.
6. Only students that have completed school in the last two years and have not studied at a tertiary institution will be considered for the 4-year Bachelor of Science and 5-year Bachelor of Science in Agriculture programmes.
7. Students who applied for main stream programmes and have been conditionally admitted, but forfeited their admission by not meeting the minimum admission requirements on grounds of the Grade 12 final results (or equivalent), will be given the opportunity to apply for a 4-year Bachelor of Science or 5-year Bachelor of Science in Agriculture programme, if such a student meets the minimum admission requirements for the above-mentioned programmes, and if space permits.

The link between Natural and Agricultural Sciences and Health Sciences:
Students with an interest in the Health Sciences should refer to the Health Sciences Faculty brochure, available at www.up.ac.za/programmes under Undergraduate > Faculty Brochures.

Student may also consider biomedical science options in NAS such as Bachelor of Science in Biochemistry, Bachelor of Science in Chemistry, Bachelor of Science in Food Management, Bachelor of Science in Food Science, Bachelor of Science in Human Genetics, Bachelor of Science in Human Physiology, Bachelor of Science in Human Physiology, Genetics and Psychology, Bachelor of Science in Medical Sciences, Bachelor of Science in Physics and Bachelor of Science in Plant Science.

University of Pretoria website: www.up.ac.za/nas

Application requirements

- The closing date for applications for programmes in this faculty is 30 June.
- Meeting the application requirements does not guarantee admission into a programme.

University of Pretoria programme qualification verification

The higher education sector has undergone an extensive alignment to the Higher Education Qualification Sub-Framework (HEQSF) across all institutions in South Africa. In order to comply with the HEQSF, all institutions are legally required to participate in a national initiative led by regulatory bodies such as the Department of Higher Education and Training (DHET), the Council on Higher Education (CHE) and the South African Qualifications Authority (SAQA). The University of Pretoria is presently engaged in an ongoing effort to align its qualifications and programmes with the HEQSF criteria. Current and prospective students should take note that changes to UP qualification and programme names may occur as a result of the HEQSF initiative. Students are advised to contact their faculties if they have any questions.

UNDERGRADUATE PROGRAMMES

Programmes	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
AGRICULTURAL AND FOOD SCIENCES	**English Home Language or English First Additional Language**	**Mathematics**	**Physical Sciences**	
Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management [4 years]	5	5	5	**32**

Careers: The Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management degree is ideal for students who are passionate about and have competencies in both science and business subjects. The degree programme cultivates problem solvers with unique skill sets to help feed and clothe the world. Agricultural economists are involved in many different areas of the economy.

Their roles in the economy include: analysing and understanding consumer behaviour in terms of people's wants, needs and willingness to pay for food and clothing; conducting research in environmental economics to assist governments and businesses in ensuring the sustainable use of scarce resources such as water; training of smallholder farmers by providing extension services; trading of financial instruments and agricultural commodities on global and local stock markets; advising clients in the agricultural sector on how to manage their finances and risks; advising government on how to ensure that there will be enough food for all South Africans; and conducting research to ensure the sustainable and profitable supply of food and clothing across the various supply chains.

Employment opportunities for agricultural economists include employment in the government, commercial banks, multinational agribusiness companies, farmer cooperatives, commodity trading houses, food processors and manufacturers and research councils.

Bachelor of Science in Agriculture in Animal Science [4 years]	5	5	5	**32**

Careers: Animal science is focused on the application of the scientific aspects of animal production and the quality control of products to ensure consumer satisfaction. Careers in this field make an essential contribution to food (protein) production in South Africa. Based on the most recent research and the needs of both animals and humans, animal science focuses on the entire livestock production value chain, from conception to consumption.

There are numerous career opportunities for animal scientists in research, commercial farming, the public sector and the livestock and feed industries. Animal scientists can work on different levels in these sectors, such as researchers or consultants on animal nutrition or breeding, technical representatives, managers of intensive and extensive animal production systems and policymakers.

The Bachelor of Science in Agriculture in Animal Science degree is acknowledged as a professional qualification by the South African Council for Natural Scientific Professions (SACNASP) in terms of Act 106 of 1993. It is internationally recognised, which means that graduates can register as professional animal scientists.

Bachelor of Science in Agriculture in Applied Plant and Soil Sciences [4 years]	5	5	5	**32**

Careers: Graduates could be employed as teachers and lecturers at schools and academic institutions, as well as researchers and managers at various public and private institutions:

- **Public sector:** The Agricultural Research Council (ARC), the Department of Water and Sanitation (DWS), the Department of Forestry, Fisheries and the Environment (DFFE), the Department of Tourism (DT), the Department of Agriculture, Land Reform and Rural Development (DALRRD), the Council for Scientific and Industrial Research (CSIR), provincial agriculture and nature conservation departments, municipalities, SANParks, national farming and food production agencies
- **Private sector:** Companies involved in seed, fertiliser and plant protection research and development, environmental planning and management, nurseries, vegetable, fruit and ornamental cut-flower production and irrigation
- **Extension services involving knowledge transfer:** Nature conservation, national and provincial departments of agriculture and the environment, environmental management and rehabilitation, nurseries, crop, turfgrass and weed management, private companies servicing field crops, vegetables, medicinal and aromatic plants, fruit, ornamental and cut-flower production
- **Entrepreneurial:** Consultants in crop, pasture, vegetable, medicinal and aromatic plants, ornamental and cut-flower production systems and landscaping enterprises, managing own farms and nurseries for extensive (field) or intensive (tunnel/greenhouse) production systems involving various crops and managing companies specialising in irrigation, reclamation and soil conservation

Bachelor of Science in Agriculture in Plant Pathology [4 years]	5	5	5	**32**

Careers: Graduates could be employed in:

- **Education and training:** Graduates can work at universities, colleges and schools
- **Plant pathologists:** Graduates are in demand in various industries, with careers ranging from researchers to practitioners working in laboratories, on commercial farms (including fieldwork), or in the food trade industry
- **Research and management:** Graduates are also hired at research institutes, government departments, seed, fertiliser and agrochemical companies, municipalities and in the mining industry
- **Extension services for technology transfer:** Employers of graduates include grower associations, national and provincial Departments of Agriculture, Land Reform and Rural Development (DALRRD), Forestry, Fisheries and the Environment (DFFE), Tourism (DT), Mineral Resources and Energy (DMRE) and Water and Sanitation (DWS)
- **Entrepreneurial:** Graduates can work as consultants or in production

Bachelor of Science in Food Management Option: Culinary Science [4 years]	5	5	5	**32**

Careers: Graduates can be employed as culinary scientists, culinologists, sensory analysts, food researchers, food product developers, food safety and quality assurance managers and food service managers.

Bachelor of Science in Food Management Option: Nutritional Science [4 years]	5	5	5	**32**

Careers: Career opportunities exist in food or related industries such as pharmaceutical and food manufacturing companies, government departments, international organisations such as the United Nations Food and Agricultural Organisation (FAO) and the World Health Organisation (WHO), NGOs, research organisations and as project managers and advisors in the food, health and consumer sectors.

Bachelor of Science in Food Management Option: Nutritional Science is an interfaculty degree programme, presented jointly by Consumer and Food Sciences (Faculty of Natural and Agricultural Sciences) and Human Nutrition (Faculty of Health Sciences).

Bachelor of Science in Food Science [3 years]	5	5	5	**32**

Careers: Food scientists with highly marketable training and professional skills work as food risk investigators, quality and safety assurance managers, food chemists, food microbiologists and biotechnologists, packaging and shelf-life specialists, safety auditors, product and process development managers, technical sales and marketing advisors, sensory scientists or food bio-scientists (for example, brewers or flavourists) in the food, agro-processing and related industries.

The work environments of food scientists include laboratories, food production sites, business premises (retail and wholesale), training areas, government institutions and research organisations. Food scientists also work in industries and companies that manufacture and supply materials (for example, packaging and food additives such as colourants and flavourants) to the food industry, or have secondary involvement in food production and sales.

UNDERGRADUATE PROGRAMMES

Programmes	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
BIOLOGICAL SCIENCES	**English Home Language or English First Additional Language**	**Mathematics**	**Physical Sciences**	
Bachelor of Science in Biochemistry [3 years]	5	5	5	**32**
Careers: Biochemistry offers many opportunities for exciting and challenging careers in the food and pharmaceutical, fine chemicals and waste-processing industries. Careers at research councils, such as the South African Medical Research Council (SAMRC), the Agricultural Research Council (ARC), the Cancer Association of South Africa (CANSA) and the Water Research Commission (WRC) are possibilities, as are academic institutions, such as the Council for Scientific and Industrial Research (CSIR) and forensic as well as pathology laboratories. Possible careers include that of researcher, teacher, lecturer and medical representative. Graduates are comfortable in work environments such as universities, research institutes, pharmaceutical companies, biotechnology companies and related industries.				
Bachelor of Science in Biotechnology [3 years]	5	5	5	**32**
Careers: Graduates mostly find work as laboratory-based researchers or bio-entrepreneurs using medical, animal, plant or microbe-based technologies to develop products and services. If students combine biotechnology with additional qualifications such as law, they will be equipped for success in careers such as patent law, pharmaceutical sales and marketing, project management, computer programming (natural computation) and science journalism. Please note that the level of training and qualification plays a vital role in determining the type of work a qualified biotechnologist can pursue.				
Bachelor of Science in Ecology [3 years]	5	5	5	**32**
Careers: Graduates will be at the forefront of conserving natural ecosystems in a changing world. They find work in local and international environmentally based government and private conservation organisations (eg, the World Wide Fund for Nature [WWF], the International Union for Conservation of Nature [IUCN]), companies involved in the direct or indirect use of natural resources (eg, agriculture, mining), environmental consultancies, environmental education initiatives, academic and training institutions and research.				
Bachelor of Science in Entomology [3 years]	5	5	5	**32**
Careers: Graduates with expertise in entomology are highly sought after in the agricultural sector as insect management specialists or researchers. They are also employed at nature reserves, environmental consultancies and conservation planning agencies. Other opportunities include positions at medical and veterinary research institutions, educational institutions and museums. Graduates also work for organisations involved in the management of invasive species and pests, quarantine and inspection services and in the biochemical and biotechnology industries. Additionally, there are roles in IT-related fields and the corporate sector. There are also opportunities to start your own business farming insects that benefit humans, such as biological control agents or pollinators like bees and flies, or those that can be used as feed for animals and food for humans.				
Bachelor of Science in Genetics **Bachelor of Science in Human Genetics** [3 years]	5	5	5	**32**
Careers: Graduates generally choose to work as molecular biologists, medical or clinical geneticists, cytogeneticists, biotechnologists, agricultural scientists, molecular ecologists, forensic scientists, genetic counsellors, bioinformaticists and computational analysts, veterinary scientists, teachers or lecturers at various institutions and in bioscience-related industries. If students combine genetics with additional qualifications such as law, they will be equipped for successful careers in, for example, patent law, pharmaceutical sales and marketing, project management, computer programming (natural computation) and science journalism. Note that the level of training and qualification plays an important role in determining the type of work in which a qualified geneticist can become involved.				
Bachelor of Science in Human Physiology **Bachelor of Science in Human Physiology, Genetics and Psychology** [3 years]	5	5	5	**32**
Careers: Many of the career options for graduates are research-orientated. Research is performed in cooperation with medical teams in private and government research laboratories, pharmaceutical firms, universities, veterinary and industrial institutions. Graduates of these degrees also contribute to education (teachers, lecturers and instructors), sport physiology, biostatistics, bioengineering, biotechnology, microbiology, virology, industrial hygiene, scientific journalism, medical technology and sales representatives of pharmaceutical firms. Further studying also opens the opportunity to become genetic counsellors and psychologists.				
Bachelor of Science in Medical Sciences [3 years]	5	5	5	**32**
Careers: Career opportunities include research in any of the subdisciplines of anatomy, in academia, in forensic science and in the health science industry. Other potential careers include those in sports sciences, virology, chemical pathology, immunology, health administration and ergonomics. Technical careers are also possible, such as in the anatomy or physiology departments at universities. Postgraduate studies are highly recommended. Honours, master's and doctoral degrees can be obtained in any of the subdisciplines of anatomy: neuro-anatomy, clinical anatomy, cell biology, physical and forensic anthropology, histology and embryology. Students who obtain this degree can also continue with their studies to obtain postgraduate degrees in physiology, genetics and pharmacology.				
Bachelor of Science in Microbiology [3 years]	5	5	5	**32**
Careers: Microbiologists can pursue a variety of careers involving activities ranging from practical application to basic research. Career opportunities are available in the food, dairy, beer, wine, baker's yeast and fermentation industries and at mines where they will be involved in corrosion control. Graduates can also pursue careers in medical or veterinary microbiology, microbial genomics and ecology, or work as researchers at organisations such as the CSIR, MRC or ARC, or as lecturers and researchers at academic institutions.				
Bachelor of Science in Plant Science [3 years]	5	5	5	**32**
Careers: Careers range from working in a laboratory to studying plants in their natural environments. Graduates could be employed at biotechnology and pharmaceutical firms, SANParks, private ecological companies and research institutions such as the CSIR, ARC and the South African National Biodiversity Institute (SANBI).				
Bachelor of Science in Zoology [3 years]	5	5	5	**32**
Careers: Graduates play pivotal roles in managing the conflict between a growing human population and the conservation of Africa's unique biodiversity. They may be employed by public and private nature conservancies, environmental consultancies, conservation agencies, medical and veterinary research institutions, biochemical and biotechnology industries, educational institutions, scientific data management and the corporate sector. These careers typically involve a stimulating mix of problem-solving, analytical work and fieldwork.				

UNDERGRADUATE PROGRAMMES

Programmes	Application requirements for NSC/IEB for 2027		
	Achievement level		
CONSUMER SCIENCE	**English Home Language or English First Additional Language**	**Mathematics**	**APS**
Bachelor of Consumer Science specialising in Clothing Retail Management [4 years]	5	4	**28**
Careers: Graduates find employment with major clothing retailers, suppliers and small businesses in various roles, including brand managers, buyers, planners, designers, marketers, social media content creators, product developers, quality controllers, assurance managers, store managers, visual merchandisers, image consultants, textile technologists and pattern technologists. Many graduates also choose to become entrepreneurs by starting their own businesses.			
Bachelor of Consumer Science specialising in Food Management [4 years]	5	4	**28**
Careers: Key retailers and industry stakeholders such as in2food, RCL Foods, UCOOK, DotActiv, research companies, top hotels, culinary businesses and educational institutions employ graduates from our programme. Some of the career paths include being employed as brand managers, sales people, store managers, food stylists and quality assurance officers, consumer insight specialists and entrepreneurs.			

Programmes	Application requirements for NSC/IEB for 2027		
	Achievement level		
MATHEMATICAL SCIENCES	**English Home Language or English First Additional Language**	**Mathematics**	**APS**
Bachelor of Science in Actuarial and Financial Mathematics [3 years]	5	7	**36**

Careers: Actuarial and financial mathematics is a popular field, with career opportunities in the business market and at investment institutions such as banks and insurance companies. Mathematical skills are essential in portfolio management and the modelling of financial risk.

This programme prepares students for professional careers as actuaries or financial engineers. The activities of actuaries or actuarial technicians include long-term capital projects and designing the benefits of medical schemes. They are also involved in pension fund management, determining contributions and ensuring sound long-term financial management. Additional responsibilities include evaluating investments in shares, property and other transactions, as well as determining premiums and reserves for insurers' outstanding claims.

Financial engineers can be employed by banks and financial institutions, brokerage firms and investment institutions. The mathematical skills of financial engineers are essential in portfolio and risk management. Activities include asset management (trading in bonds, futures and derivative instruments as options), designing new financial products and devising strategies to control credit risk.

Bachelor of Science in Mathematics **Bachelor of Science in Applied Mathematics** [3 years]	5	6	**34**

Careers: Graduates in mathematics and applied mathematics are employed by research institutions, educational bodies (universities and schools), the public sector (government and medical institutions) and the private sector (engineering companies, financial institutions and the computer industry). These graduates' training in abstract, analytical and computational thinking provides them with the background required to easily adjust to changing circumstances in the professional environment and to construct mathematical models of natural, technological and financial phenomena. Mathematicians and applied mathematicians apply, evaluate and adapt existing problem-solving techniques, or develop new techniques to solve problems.

Bachelor of Science in Mathematical Statistics [3 years]	5	6	**34**

Careers: By completing this programme you will therefore be positioned at the forefront of analytical thinking and application in the statistical, computational and interdisciplinary environments of the future. What career opportunities exist for you as a graduate? Many professions amongst others: Data scientist, data analyst, financial risk analyst, financial analyst, geospatial information analyst, biostatistician, statistical software engineer.

Some examples of career opportunities are:

- Google Analytics uses statistics to track internet users so as to generate leads for their recommended engines.
- Movement information captured by cell phones is used in statistical predictive models to predict traffic congestion and suggest faster routes.
- Statisticians make use of statistical methodologies to detect fraud, assist with credit-related portfolios and forecast financial-economic trends.
- Retail companies study customer satisfaction and customer experience by using statistical models.
- Statisticians are prominent in the modelling of climate change, crime hotspots, rhino-poaching, diseases, etc.
- Statisticians advise animal scientists on factors affecting animal nutrition and genetic breeding plans.
- The government employs statisticians to understand population demographics, health risks and other factors that influence sustainable development programmes.

UNDERGRADUATE PROGRAMMES

Programmes	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
PHYSICAL SCIENCES	**English Home Language or English First Additional Language**	**Mathematics**	**Physical Sciences**	
Bachelor of Science in Chemistry [3 years]	5	5	5	**34**

Careers: Graduates are employed in most technology-based institutions and work in laboratory environments that form part of industrial, research or academic institutions. A chemist must be able to participate in teamwork in a multidisciplinary environment and a wide variety of enterprises in both the private and public sectors. It is important to note that the type of work available to a graduate in chemistry depends on the level of the qualification obtained. Advanced qualifications will eventually lead to positions in research and/or production management and require management and financial planning skills.

Many career opportunities exist in the fields of education, research, journalism, environmental protection, food and beverages, energy, water, health, sports, pharmaceutics and cosmetics, geology, mining and law enforcement. These include the well-known professions of synthetic chemist, materials scientist, chemical pathologist, forensic chemist, analytical chemist, drug analyst, patent lawyer, environmental chemist, geochemist, food chemist, polymer chemist and soil chemist.

Bachelor of Science in Environmental and Engineering Geology [3 years]	5	5	5	**34**

Careers: Engineering and environmental geologists study the interaction between human activities and the geological environment, such as the pollution of soil and groundwater. They investigate geological structures as well as soil and rock properties at construction sites, for example, dams, tunnels and mines, to provide valuable information before construction. They also locate and evaluate suitable construction materials. The task of the hydrogeologist is to search for groundwater and monitor the responsible exploitation of that water.

Bachelor of Science in Geography Option: Geography and Environmental Science [3 years]	5	5	5	**34**

Careers: Geographers and environmental scientists typically pursue careers in teaching, research or practical application. They often specialise in areas like environmental management, urban planning, rural development, or ecological issues such as pollution and ecosystem degradation. Employment opportunities exist across the private sector (e.g., planning, engineering, tourism, environmental and industrial firms), government departments (e.g., environment, agriculture, education, tourism, human settlement) and many also work as self-employed consultants in fields like marketing, planning and policy development.

Bachelor of Science in Geoinformatics [3 years]	5	5	5	**34**

Careers: In South Africa, graduates with a geospatial background are highly employable across a diverse range of sectors. Opportunities exist in traditional geospatial companies, including GIS software vendors (e.g., Esri, Intergraph), companies focusing on satellite imagery processing and analysis, specialised consulting firms (AfriGIS, Geoterra Image, Kartoza), as well as within various government bodies like our national mapping agency (NGI), research councils and government agencies (ARC, CSIR, SANBI, Stats SA) and departments (DFFE, DALRRD, DTSI, DWS, National Department of Agriculture), in addition to local municipalities.

Beyond these conventional roles, geospatial professionals are increasingly finding significant demand in the broader private sector, spanning areas like civil engineering, tourism, environmental conservation, mining, agriculture, retail and utilities. Their unique skills in managing and analysing geographic data are also creating new avenues in less obvious fields such as the banking sector and the food industry. Furthermore, many leverage their expertise to become self-employed consultants, offering specialised spatial insights for marketing, planning, development and policy formulation.

The South African Geomatics Council endorses the Bachelor of Science in Geoinformatics programme. Upon completing the Bachelor of Science in Geoinformatics, you can register as a Candidate Geomatics Practitioner (CGP) - GISc Technologist and Bachelor of Science Honours in Geoinformatics graduates can register as CGP - GISc Professional Practitioners (GPr. GISc).

Bachelor of Science in Geology [3 years]	5	5	5	**34**

Careers: Large international mining companies are significant employers of geologists and other geoscientists in research, exploration and mining projects. However, employment is increasingly found in smaller, start-up entrepreneurial firms. Exciting careers are available in Geosciences, the CSIR, the Council for Mineral Technology (MINTEK), DWS, as well as at museums, engineering firms and consulting companies. Graduates may even operate as self-employed consultants in their own firms. Laboratory specialists, for example, mineralogists, identify and examine minerals using sophisticated instruments and analytical equipment. Environmental and engineering geologists study the interaction between human activities and the geological environment, such as the pollution of soil and groundwater. They investigate geological structures and soil and rock properties at construction sites, for example, dams, tunnels and mines, to provide valuable information before construction. They also locate and evaluate suitable construction materials. The task of the hydrogeologist is to look for groundwater and monitor the responsible exploitation of that water.

Bachelor of Science in Meteorology [3 years]	5	5	5	**34**

Careers: Key employers in South Africa include the South African Weather Service (SAWS), the Council for Scientific and Industrial Research (CSIR), various universities, agricultural institutions, municipalities and industries, where they often serve as specialists. Graduates from this programme can pursue roles as researchers, investigating atmospheric phenomena, developing complex atmospheric models using supercomputers, monitoring air quality and assessing climate change impacts. Many become weather forecasters, analysing data and utilising supercomputer models to issue forecasts across various timescales, from short-range to seasonal, with opportunities in both public and growing private forecasting sectors, including television presentation.

Climatologists manage extensive climate datasets from SAWS and other organisations. Additionally, meteorologists work as consultants in the private sector and universities, providing specialised research services. Academic positions are also available at South African universities for those with master's or doctoral degrees in Meteorology, ensuring the maintenance of international standards in meteorologist training. The Bachelor of Science Honours in Meteorology degree, which is required to become a professional meteorologist, also meets all the requirements set by the World Meteorological Organisation (WMO) Technical Regulations.

Bachelor of Science in Physics [3 years]	5	5	5	**34**

Careers: Graduates can be employed as university academics, with duties that include lecturing, conducting research and supervising postgraduate students. They may also work as researchers in national laboratories such as the Nuclear Energy Corporation of South Africa (NECSA), the South African Astronomical Observatory, or iThemba LABS (Laboratory for accelerator-based Sciences). Other opportunities include roles in industry, such as at the CSIR or Element Six, or as science advisors for non-governmental organisations, industry or government. Graduates may pursue careers as radiation scientists, medical scientists, biophysicists, atmospheric scientists, climatologists, developers of renewable energy sources, geophysicists, innovators, entrepreneurs and computational scientists. International collaboration with experts from abroad is also common.

UNDERGRADUATE PROGRAMMES

Bachelor of Science four-year programmes
Bachelor of Science in Agriculture five-year programmes

The four-year Bachelor of Science and five-year Bachelor of Science in Agriculture programmes have slightly lower application requirements. These foundation programmes are designed for students who, due to exceptional circumstances, may benefit from additional academic support.

What do the programmes entail?

The programmes provide students the opportunity to pursue a career in several specialisations. For programme and career information, consult the corresponding three-year Bachelor of Science and four-year Bachelor of Science in Agriculture information. Applications are considered up to 30 June and in a potential second round in August/September.

What makes these programmes unique?

The programmes are designed to accommodate students who did not initially meet the application requirements to pursue a Bachelor of Science or Bachelor of Science in Agriculture degree. Students are provided with more academic support and a stronger foundation in their first year to support the successful transition to higher education. The first year of study comprises foundational modules in biology, chemistry, mathematics, physics and statistics, in addition to fundamental modules in academic information management, language and study skills. From the second year of study, students complete mainstream modules as prescribed in the respective curricula. Student progress is closely monitored and guided throughout all the years of study.

Application requirements

Programmes	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Mathematics	58%	65%	N/A	**32**
Bachelor of Science in: ▪ Chemistry ▪ Geoinformatics ▪ Geology ▪ Meteorology ▪ Physics	58%	58%	58%	**32**
Bachelor of Science in: ▪ Agriculture in Applied Plant and Soil Sciences ▪ Agriculture in Plant Pathology ▪ Ecology ▪ Human Physiology	58%	58%	58%	**30**

Single, double and triple major degree programmes

Although programmes are more generic during the first year to provide sound foundations, students who progress to the second year are advised to carefully consider the combinations that may be possible in their second and third years, which strongly relate to each other concerning prerequisites. Explanatory infographics are available on the NAS Faculty webpage and detailed information is provided in the yearbook at www.up.ac.za/yearbooks/home.

The Bachelor of Consumer Science and Bachelor of Science in Agriculture degrees have fixed curricula, but most of these programmes are multidisciplinary. The other NAS programmes offer a variety of combinations. There are 12 biological sciences programmes, which represent more than 50 possibilities for single or double majors and even one triple major degree programme. Single major degrees can be obtained in most disciplines, but they all offer double major combinations to make it possible for graduates to choose either one of their majors for postgraduate study. In the physical sciences, there are six programmes, but several combinations.

There are several single major degrees (such as Environmental and Engineering Geology), but chemistry, geology and physics offer double majors. The mathematical sciences offer similar possibilities, with two streams in the professional programme in Actuarial and Financial Mathematics and double major options in the Applied Mathematics, Mathematics and Mathematical Statistics programmes.

AGRICULTURAL AND FOOD SCIENCES

Agricultural Economics, Extension and Rural Development

Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management

The Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management programme provides students with an overview of the global food and agricultural sector and teaches them vital skills in business economics and agricultural science. These skills enable them to build careers in food and agricultural value chains, from seed to plate and everything in between.

Who is the ideal candidate?

The programme is ideal for students who enjoy science and business subjects and are passionate about value addition in agriculture.

Which institutions and companies employ our graduates?

Our alumni are employed across various sectors:

Financial Services
Commercial banks (ABSA, FNB, Land Bank, Nedbank and Standard Bank) and insurance companies (Santam and Bryte)

Agricultural Input and Service Providers
Input providers (Syngenta, Omnia and John Deere) and service providers (AFGRI, NWK Limited, TWK Agri and VKB Group)

Industry Organisations
Producer organisations (AgriSA, Agri Western Cape, GrainSA, Milk Producers' Organisation, Potatoes SA, South African Pork Producers' Organisation and Vinpro) and associations (Agbiz)

Trading & Manufacturing
Grain traders (Majesty Oil Mills, Louis Dreyfus Company and BVG Commodities), investment groups (Russell Stone Group) and food manufacturers (Tiger Brands)

Public & International Sectors
Government departments, research institutes (Agricultural Research Council and Bureau for Food and Agricultural Policy) and international bodies (Food and Agriculture Organisation and World Bank)

What makes this programme unique?

The programme develops problem solvers with unique skill sets who contribute to feeding and clothing the world. This programme is also the foundation to honours, masters and PhD programmes within the discipline.

'This degree has equipped me with a solid base of knowledge about the agricultural economics environment to enter the world of work. The range of job opportunities that this degree provides is endless since you gain financial and scientific understanding of how an agribusiness and the agricultural sector functions. I am grateful to have been exposed to various practical experiences such as milking cows, planting maize, performing experiments and much more. In addition, the business side of this degree lays a good foundation on agricultural finance. The agricultural sector is of great importance globally and this field of study is a fantastic contributor to it.'

Jenna Beukes – Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management

'The Bachelor of Science in Agricultural Economics and Agribusiness Management is a highly comprehensive degree that offers a broad understanding of the agricultural supply chain, from farm production to retail distribution. The programme provides foundational knowledge in subjects such as chemistry, biology, plant and animal production, soil science, accounting and economics. If you are looking for an all-in-one agricultural degree, this programme is an excellent choice. It gave me valuable insight into the business side of agriculture, including risk management, financial planning and strategies for running farm or agribusiness operations efficiently. Upon completion, graduates can pursue careers as agricultural economists in a variety of sectors, including banks, insurance companies, consulting firms, agricultural enterprises and finance institutions.'

Katlego Ledwaba – Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management

AGRICULTURAL AND FOOD SCIENCES

Agricultural Economics, Extension and Rural Development

Career opportunities

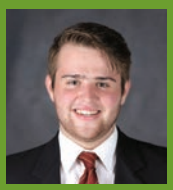
Employment opportunities for agricultural economists exist in, for example, the government, commercial banks (private and multinational), multinational agribusiness companies, commodity trading houses, food processors and manufacturers and research councils.

THE WORK DONE BY AGRICULTURAL ECONOMISTS INCLUDES:

- Advising clients in the agricultural sector on how to manage their finances and risks
- Advising the government on how to ensure that there will be enough food for all South Africans
- Analysing and understanding consumer behaviour in terms of people's wants, needs and willingness to pay for food and clothing
- Conducting research in environmental economics to assist the efforts of governments and businesses to ensure the sustainable use of scarce resources such as water
- Conducting research to ensure the sustainable and profitable supply of food and clothing across the various supply chains
- Managing various aspects of agribusinesses, food companies and food supply chains
- Trading of financial instruments and agricultural commodities on global and local stock markets
- Training of smallholder farmers by providing extension services

'As a foodie, my degree has made me more appreciative of food and where it comes from. We have a wide variety of food on this continent and thanks to global food supply chains, we all have unlimited opportunities for experiencing the world of food. It gives me joy and a sense of fulfilment to know that through my studies, I am part of solving the problem of feeding the world.'

Chikomborero Chiobvu – Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management



'Not only does our degree focus on theory, but teaches you so many skills that are necessary in life ranging from time management to critical thinking to analysis of markets and the greater agribusiness environment. Workplace opportunities are diverse, thanks to the flexibility of this degree. If you prefer a traditional 9-to-5 office job, that's an option. Alternatively, you could travel from farm to farm, providing advice on farming techniques and more. This degree is perfect for someone who doesn't necessarily know where they want to end up. It provides you with various tools to be able to work in various occupations and grow and learn as you go.'

Hanco Marias – Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Agriculture in Agricultural Economics in Agribusiness Management [4 years]	5	5	5	**32**

AGRICULTURAL AND FOOD SCIENCES

Animal Science

Bachelor of Science in Agriculture in Animal Science

Livestock, pig and poultry production is one of the major sectors in South African agriculture and contributes substantially to the economy of the country. Animal Science is the science of livestock production, with a focus on animal breeding and genetics, animal nutrition and the growth and reproduction physiology of production animals.

Animal science covers all aspects of animal production and animal welfare in intensive and extensive production systems. This includes the husbandry, nutrition and breeding and genetics of several livestock species (cattle, sheep, goats, pigs and poultry) and the products derived from them (such as meat, milk and dairy products, wool, mohair and eggs).

Who is the ideal candidate?

The ideal candidate is someone who has a passion for science, animal welfare and production. They have a wilingness to learn and have a capacity for analytical thinking, attention to detail and communication skils, while acknowledging their unique role in a primary field responsible for providing the country with sustainable animal products.

What makes this programme unique?

The Bachelor of Science in Agriculture in Animal Science is a professional degree that alows graduates to register with the South African Council for Natural Scientific Professions (SACNASP).

Graduates can make a meaningful contribution to improve animal husbandry practices and sustainable food production for profit.

Career opportunities

Depending on the level of specialisation in animal science, career opportunities may be found in the following fields:

- The animal husbandry industry (including feedlots or abattoirs)
- The animal feed industry (e.g., feed formulation, sales and production)
- Animal breeding organisations (e.g., breeders' societies, SA Stud Book)
- Private consultancy and advisory services
- The animal reproduction industry (e.g., semen and embryo collection and artificial insemination companies)
- Educational institutions (e.g., universities, technical colleges)
- Legislative/regulative institutions (e.g., The National Department of Agriculture)
- Research institutions (e.g., the Agricultural Research Council)

'In my matric year, my mother encouraged me to apply for an agriculture bursary, even though my dream was to study medicine and become a neurosurgeon. I took her advice and applied for Animal Science at the University of Pretoria. Over the course of my four-year degree, I discovered that agriculture, like medicine, is ultimately about helping people. Animal Science showed me how science can be applied in the practical production and management of livestock. Studying in UP's Department of Animal Science has given me a deep appreciation of the vital role agriculture plays in sustaining livelihoods.'

Lesedi Diphofa – Class of 2024 *cum laude* Graduate and MSc Animal Breeding and Genetics Student

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Agriculture in Animal Science [4 years]	5	5	5	**32**

AGRICULTURAL AND FOOD SCIENCES

Plant and Soil Sciences

Bachelor of Science in Agriculture in Applied Plant and Soil Sciences

Bachelor of Science in Agriculture in Applied Plant and Soil Sciences is a four-year, full-time degree programme. It teaches the principles of plant-based agriculture within the disciplines of agronomy, horticultural science, pasture science and soil science. Graduates can embark on a diverse range of careers in the agricultural and environmental fields.

Who is the ideal candidate?

The ideal candidate for this degree is someone with a keen interest in plants and soil, a desire to deepen their understanding of the environment and a passion for making a positive impact in the world. Graduates make a direct contribution to sustainable food production, while simultaneously protecting our natural resources.

What makes this programme unique?

This programme is unique in terms of the combination of disciplines taught within the degree. Students are exposed to various fields within plant production and soil sciences. This ensures that graduates are well-rounded and equipped for a wide range of career opportunities. They are also able to make informed decisions about specialisation if they wish to pursue postgraduate studies.

Our graduates are highly sought after and often have to choose between several offers of employment. The degree is accredited by the South African Council for Natural Scientific Professions (SACNASP) and graduates can be registered as professional natural scientists.

Career opportunities

Public sector

The Agricultural Research Council (ARC); government departments that address issues related to agriculture and rural development, water supply, conservation and the environment; the Council for Scientific and Industrial Research (CSIR); provincial departments of agriculture and nature conservation; the South African National Biodiversity Institute (SANBI); municipalities; South African National Parks; and national farming and food production agencies.

Private sector

Companies involved in seed, fertiliser and plant protection research, development and marketing; environmental planning and management; nurseries; vegetable, fruit, ornamental and cut flower production; and irrigation.

Entrepreneurial

Consultants to producers of crops, pastures, vegetables, medicinal and aromatic plants and ornamental and cut-flowers; landscaping enterprises; managing own farms and nurseries for extensive (field) or intensive (tunnel/greenhouse) production systems involving various crops; and managing companies specialising in irrigation, reclamation and soil conservation.

Extension services involving knowledge transfer

Nature conservation; national and provincial departments of agriculture and the environment; environmental management and rehabilitation, including mine lands; nurseries; crop, turf grass and weed management; private companies servicing field crops, vegetables, medicinal and aromatic plants, fruit, ornamental and cut-flower production.

AGRICULTURAL AND FOOD SCIENCES

Plant and Soil Sciences

Bachelor of Science in Agriculture in Applied Plant and Soil Sciences (continued)

Which companies employ our graduates?

- Agro-chemical companies
- Drone companies
- Environmental consulting firms
- Export companies
- Farming co-operatives
- Farming operations (extensive and intensive)
- Fertiliser companies
- Government departments
- Insurance companies
- Irrigation companies
- Nurseries
- Patent attorneys
- Research institutions
- Seed companies

'What I enjoyed most about this degree is that it exposed students to the diverse range of disciplines that form the basis of crop production and that each discipline is unique yet connected to the others. Crop production is the perfect field for anyone who enjoys working on solving complex problems to have a meaningful impact on people's quality of life. My dream job is to continue with the work I am doing for my postgraduate studies, which is to find ways of making agricultural science accessible to smallholder farmers and the public in order to build a more equitable food system.'

Richard Hay – Master of Science in Agronomy and Crop Science Student

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Agriculture in Applied Plant and Soil Sciences [4 years]	5	5	5	**32**

AGRICULTURAL AND FOOD SCIENCES

Plant and Soil Sciences

Bachelor of Science in Agriculture in Plant Pathology

The Bachelor of Science in Agriculture in Plant Pathology programme entails the study and control of plant diseases.

Agricultural scientists often work in the field or in plant nurseries, farms, pack houses, processing plants, markets or retail. They may also be involved in the local or international food trade. They are multifaceted thinkers who enjoy solving problems, are curious about nature and want to provide food for the table by ensuring healthy plants, crop protection, high yields and reduced waste and losses.

Who is the ideal candidate?

The ideal candidate is a creative thinker who enjoys exploring and understanding problems. They seek to uncover the causes of issues and find solutions. Identifying the culprit (e.g., the pathogen) behind a plant's disease or death is much like being a detective solving a crime. Like veterinary scientists and medical doctors, plant pathologists work with patients—except they cannot communicate with plants. Instead, they rely on observation, experience and intuition to diagnose and resolve issues. Successful students in this programme are curious, creative, passionate, driven and ambitious, eager to take on new challenges.

What makes this programme unique?

The programme covers both basic and applied research and ensures safe food and food security for all.

Career opportunities

- Consultant plant pathologists often collaborate with economists, soil scientists, horticulturists, entomologists and farmers, big corporates, pesticide companies or retailers. They not only advise, but also influence governments, industry and the general public regarding critical matters such as trade, phytosanitary and sanitary matters and the right to food.
- Lecturers and researchers at universities and technical colleges provide quality creative education and share their skills and experiences with students to prepare them for careers in the flower industry, turf grass or horticultural sectors, crop production, viticulture, agronomy, soil sciences and entomology, as well as agricultural economics. They are classical transdisciplinary thinkers who can solve problems and are innovative in finding practical solutions for farmers and others in the agricultural sector.
- Agricultural scientists and researchers at various companies and academic institutions research many different aspects of plant health, crop protection, food security and food safety.

Which companies employ our graduates?

Our graduates are employed at:

- The National Department of Agriculture
- The Agricultural Research Council
- Agrochemical companies
- Seed and plant production companies
- Undercover crop production endeavours, eg vertical farming, greenhouses and hydroponics
- Tissue culture laboratories
- Diagnostic laboratories
- Biological control companies
- Nurseries and garden centres
- Lawn and landscape maintenance firms
- Agricultural co-operatives
- Private agricultural estates, farms and big corporate estates
- The SA Bureau of Standards (SABS) and The Council for Scientific and Industrial Research (CSIR)
- Exporting or importing companies
- Fresh produce markets and retailers
- National and international certification bodies such as auditors, assessors or technical experts in good agricultural practices or food safety
- United Nations, Food and Agricultural Organisation, World Health Organisation, World Trade Organisation or International Standards Organisations
- Researchers and lecturers at technical colleges or universities

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Agriculture in Plant Pathology [4 years]	5	5	5	**32**

AGRICULTURAL AND FOOD SCIENCES

Consumer and Food Sciences

Bachelor of Science in Food Management
Option: Culinary Science*

Culinary Science is a broad-based discipline that combines food chemistry, microbiology, culinary art and food product development and lends itself to innovation and entrepreneurship. The practical training includes the characterisation of various food ingredients and their utilisation in recipe development. The research component focuses on understanding the functional properties of various food types and their application in the food service industry.

This degree is for those who are not only interested in creating food that tastes and looks great, but also want to understand why food tastes and looks the way it does.

Any candidate wishing to pursue a career in the Culinary Science stream requires not only technical ability, but also has to be an analytical problem solver who pays attention to detail.

What makes this programme unique?

This degree offers a seamless integration of culinary art and science to equip future graduates with a degree embedded in science and technology and tailored to changing culinary trends.

Career opportunities

Culinary scientists, culinologists, sensory analysts, food researchers, food product developers, food service managers, safety and quality assurers, food production managers, entrepreneurs and food legislation experts.

Which companies employ our graduates?

Graduates are employed by:
- Research institutions
- Food processing companies (e.g., McCain, Enterprise Foods, BRM Foods, Mondelez)
- Flavour houses (e.g., McCormick, Firmenich)
- The food service industry (e.g., Famous Brands)
- Leading retailers (e.g., Woolworths, Pick n Pay, Checkers)
- Government institutions
- Various institutions of higher learning

'I was very excited when I heard about the Bachelor of Science in Food Management Option: Culinary Science* programme. I enrolled because it offers a perfect mix between food and science, which are two of my major passions. I really enjoy my study programme because it includes cooking and recipe development, but does not neglect the science behind what happens to the food on the molecular level. This degree opens the door to many careers in the food industry, but my dream job is to be a flavour scientist.'

Danae Bezuidenhout – Bachelor of Science in Food Management

'This degree combines the creativity of culinary arts with the rationality of food science and through my studies I have obtained a unique scientific view of food service management. Over the past four years I have realised the importance of consumer satisfaction to both food service managers and food technologists. I believe that my degree will open many doors for me in the future, notably in my main field of interest, which is recipe development. I enjoy applying my specific scientific knowledge while experimenting with food.'

Christine Janik – Bachelor of Science in Food Management

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Food Management Option: Culinary Science* [4 years]	5	5	5	**32**

**Possible degree name change with Culinary Science as specialisation.*

AGRICULTURAL AND FOOD SCIENCES

Consumer and Food Sciences

Bachelor of Science in Food Management
Option: Nutritional Science*

The Bachelor of Science in Food Management Option: Nutritional Science* programme involves the study of concepts from various disciplines, including food chemistry and food composition, biochemistry, physiology and human nutrition. An ideal candidate is someone who has analytical skills and a keen interest in the science of food and nutrition.

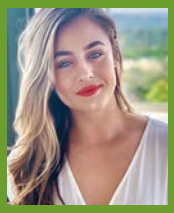
What makes this programme unique?

This is an interfaculty programme presented jointly by the Departments of Consumer and Food Sciences (Natural and Agricultural Sciences) and Human Nutrition (Health Sciences).

Bachelor of Science in Food Management graduates will become nutritional scientists eligible for registration as natural scientists with the South African Council for Natural Scientific Professions and the Nutrition Society of South Africa.

Which companies employ our graduates?

A varied field with numerous career opportunities, which include:
- Food product and supplement development to meet specific nutritional needs of the consumer
- Project management and implementation of food programmes and legislation for government departments, international organisations and NGOs
- Entrepreneurship and small business development
- Nutrition research in the food industry or research institutes



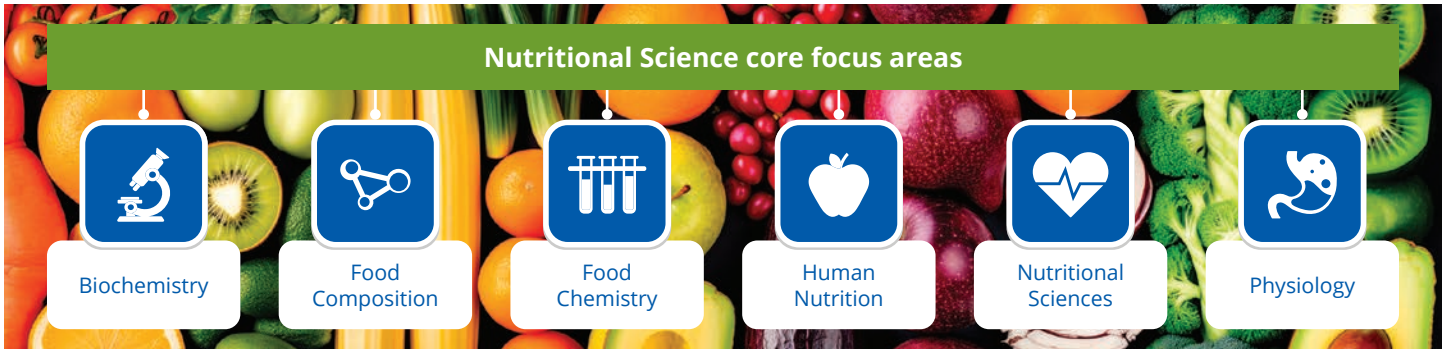
'I have found the four-year Bachelor of Science in Food Management Option: Nutritional Science* degree programme to be very interesting as it consists of a variety of modules that cover topics ranging from human physiology to food sciences. Being taught by the experts in the department has really made studying very enjoyable. This degree caters perfectly for my two passions, which are science and helping others. I dream of becoming a policy developer and making a contribution towards ending hunger.'

Natasha Howes – Bachelor of Science in Food Management

'My journey as a Bachelor of Science in Food Management Option: Nutritional Science* student has exceeded all my expectations. The workload is intense, which forced me to grow personally and perform academically. Our exposure to different science disciplines broadens our understanding of the world of science and helps us to incorporate the role of a nutritional scientist with the roles of scientists in other disciplines. My dream is to partner with major organisations to help reduce nutrition-related diseases and teach people how to maintain good health affordably.'

Ntŝepase Princess Matete – Bachelor of Science in Food Management

www.up.ac.za/department-of-consumer-and-food-sciences



Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Food Management Option: Nutritional Science* [4 years]	5	5	5	32
Bachelor of Science in Food Management Option: Nutritional Science* is an interfaculty degree programme, presented jointly by Consumer and Food Sciences (Faculty of Natural and Agricultural Sciences) and Human Nutrition (Faculty of Health Sciences).				

** Possible degree name change with Nutritional Science as specialisation.*

AGRICULTURAL AND FOOD SCIENCES

Consumer and Food Sciences

Bachelor of Science in Food Science

This programme focuses on the chemical composition, structure and nutritional value of food. The interaction of food components during processing, preservation and storage is studied by making use of chemistry, physics, biological and mathematical principles. Candidates who are likely to excel are those who enjoy science and are keen on understanding food production from farm to fork.

What makes this programme unique?

Students of this programme focus on a product essential to daily life—food—preparing themselves to play a vital role in feeding the nation. A graduate with a Bachelor of Science in Food Science degree is eligible for registration as a natural scientist with the South African Council of Natural Scientific Professions (SACNASP).

Which companies employ our graduates?

Graduates are employed by major food production companies such as Nestlé, RCL Foods, in2foods, Unilever and Rhodes Food Group. They also work with leading food retailers like Shoprite, Checkers, Woolworths and Pick n Pay, as well as flavour and additive producers such as the South African Association of the Flavour & Fragrance Industry (SAAFFI) and Cell-Chem. Additionally, they find opportunities in laboratories specialising in food analysis, both in South Africa and internationally.

Career opportunities

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Food Science [3 years]	5	5	5	**32**

AGRICULTURAL AND FOOD SCIENCES

Consumer and Food Sciences

Bachelor of Consumer Science specialising in Clothing Retail Management

Clothing Retail Management integrates clothing construction, design, fashion, textiles, consumer behaviour and retail merchandising with marketing and business modules. This combination prepares students for the dynamic and fast-paced textile and clothing industry. Successful candidates are creative, analytical and thrive under pressure in team-oriented environments.

What makes this programme unique?

This is a vocational programme that balances theory, practical application and experiential training in the industry. Through the programme, students are exposed to the entire clothing supply chain and can specialise in a particular area of interest once they graduate. Graduates are well-trained and ready to venture into the many different areas offered in the textile and clothing industry.

Career opportunities

Graduates are typically employed as clothing buyers and planners, allocation planners, brand managers, product developers, fashion designers, fashion marketers, social media content managers, quality assurance managers, sourcing coordinators, textile technologists, visual merchandisers and pattern technologists.

Which companies employ our graduates?

Graduates are employed by all major clothing retailers in South Africa, including Mr Price, Truworths, TFG Group, PEP, Woolworths and Cape Union Mart, as well as various brands such as Lacoste and Guess.

They also secure roles as merchandisers, account managers or production coordinators at suppliers, production companies and licensing firms like Blue Horizon (for Mattel), Character Group and Cosmic Options.

'I thoroughly enjoyed this degree programme as it combines my two passions, namely fashion and business and develops the students' creative and analytical abilities to achieve all-round excellence. I appreciated the focus on sustainability, especially in the final year, which provides the tools needed to have a positive environmental impact in the clothing and textile industry. I dream of becoming a sustainable fashion planner/buyer.'

Shanna Howarth – Bachelor of Consumer Science specialising in Clothing Retail Management

'I have always dreamed of working in the fashion industry, specifically as a buyer. This degree opens the doors to all sections of this industry. Unlike many other degrees, it has the ability to develop and test both the creative and business sides of the brain and prepare students of all personality types for any aspect of the fashion industry.'

Tannah Metzler – Bachelor of Consumer Science specialising in Clothing Retail Management

Application requirements

Programme	Application requirements for NSC/IEB for 2027		
	Achievement level		APS
	English Home Language or English First Additional Language	Mathematics	
Bachelor of Consumer Science specialising in Clothing Retail Management [4 years]	5	4	**28**

AGRICULTURAL AND FOOD SCIENCES

Consumer and Food Sciences

Bachelor of Consumer Science specialising in Food Management

The Bachelor of Consumer Science specialising in Food Management degree allows students to enrol for a four-year degree in food management, which equips them with the interdisciplinary knowledge needed to excel in the dynamic world of food.

During the first three years, the programme covers the fundamentals of food preparation, food service management, nutrition, food safety and hygiene, recipe development and standardisation, culinary skills and other essential core business modules. On completion of the third year, students will have to select a field of specialisation in either food retail or hospitality management. Respective modules for these specialisations, such as sustainable retail logistics or event management, must be completed in the fourth year.

Specialisation field: Food Retail Management

Food retail management covers the entire food supply chain in one programme—from farm to fork. The food retail programme incorporates the fundamentals of food preparation, food service management, nutrition, food safety and hygiene, recipe development and standardisation, consumer aspects of foods and sustainable food retail logistics. Emphasis is placed on future retail trends, such as omnichannel retailing, blockchain and creating immersive customer experiences. The programme also includes various marketing and business modules. To fit into the dynamic world of retailing, candidates need to be curious, confident team players with good numerical and organisational skills and a degree of commercial awareness.

What makes specialisation in this field unique?

Students are exposed to every aspect of the food retail industry through on-site visits and exposure to guest speakers from local and international sectors. Students are also required to complete experiential training/internships.

Which companies employ our graduates?

All key South African retailers (Woolworths, Shoprite, Checkers, Spar, Pick n Pay, Dischem), related subsidiary companies and other supply chain stakeholders (such as Freshmark, RCL Foods, in2food, SABMiller, DotActiv, RSA Market Agents). Various consumer research companies, such as Consulta and Ask Afrika, have also employed graduates.

Specialisation field: Hospitality Management

Hospitality management aims to prepare students for employment with leading food companies, renowned master chefs and other experts in the food and hospitality industry. Graduates will not only master the creation of exceptional dishes but also develop skills in culinary arts and food product development. They will gain expertise in recipe creation, food styling and large-scale food production, as well as restaurant and event management. Various marketing and business modules are also included in the programme. To fit into the vibrant, innovative and creative hospitality world, candidates must be team players who are curious by nature, service-oriented and have a passion for food and the hospitality industry. This degree is perfect if you have boundless patience, perseverance and creativity.

What makes specialisation in this field unique?

Students gain comprehensive exposure to the hospitality and tourism industries through hands-on training, site visits and guest lectures by local and international sectors. They are also required to complete experiential training or internships, enabling them to familiarise themselves with the workplace and gain practical, real-world experience in the hospitality industry.

This degree stands out for its unique combination of science, creativity, art and business management, offering students a practical and immersive learning experience. It also provides diverse career opportunities after graduation. In South Africa, it is one of the few hospitality degrees still available in a traditional university setting.

Which companies employ our graduates?

This degree offers a wide range of career opportunities in the culinary world. Graduates can pursue roles such as chef, food stylist, food photographer, sommelier, menu engineer, recipe and product developer, product marketer, food safety consultant, improvement specialist, culinary concept developer or entrepreneur. Many also choose careers in academia or teaching.

Graduates have found employment in various fields, including hotel and tourism management, small business ventures, recipe and product development, consumer research, food journalism and education.

Application requirements

Programme	Application requirements for NSC/IEB for 2027		
	Achievement level		APS
	English Home Language or English First Additional Language	Mathematics	
Bachelor of Consumer Science specialising in Food Management [4 years]	5	4	**28**

BIOLOGICAL SCIENCES

Biochemistry, Genetics and Microbiology

Bachelor of Science in Biochemistry

Life at the cellular and molecular levels depends on the specific interaction and cooperation of many individual biomolecules. To understand life at a fundamental level, biochemists study the role of individual biomolecules and relate this function to its unique structure and its interactions with other molecules.

Challenges of global relevance, such as COVID-19, HIV/AIDS, malaria, tuberculosis, antimicrobial drug resistance and other human or animal diseases are addressed by using flow cytometry, biophysical analysis, protein crystallography, genome analysis, selective gene expression and metabolic profiles.

Biochemists can work in medicine, veterinary science, the food and pharmaceutical industries, agricultural research and many other fields.

First-year students are exposed to a range of biological, physical and mathematical science subjects to provide them with a firm scientific basis. In the second and third years, they delve deeper into biochemistry, combining theoretical lectures with appropriate practical studies to learn the principles and methodology of best biochemical practice. In the third year, the genome, transcriptome, proteome and metabolome of a living cell is studied and proteome analysis, crystallography, cell structure and function, enzymology and immunology are applied to understand the molecular basis of disease.

Ideally, biochemistry is combined with chemistry, genetics, human physiology, microbiology, plant science and zoology, which all include both theoretical and practical aspects. Students may choose elective modules related to their studies.

Who is the ideal candidate?

A candidate for the Bachelor of Science in Biochemistry programme should be motivated, innovative, persistent, meticulous and curious about life.

What makes this programme unique?

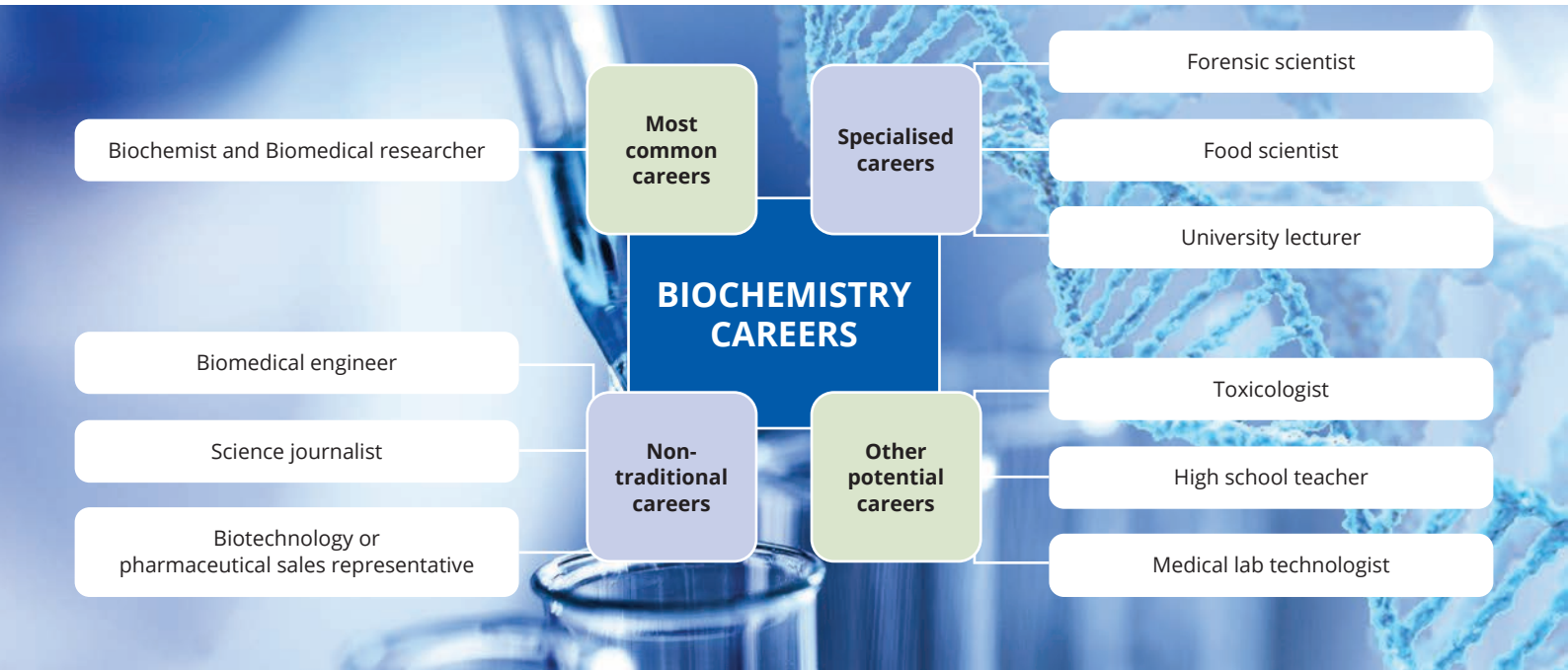
This degree falls under the Department of Biochemistry, Genetics and Microbiology and provides a firm basis for a career in the life sciences.

Ideally, biochemistry is combined with chemistry, microbiology, genetics, human physiology, plant science, zoology and/or food science. Transferable skills gained while studying biochemistry include critical observation and analysis, project planning, report writing, time management, problem solving, logical thinking and computer literacy.

Career opportunities

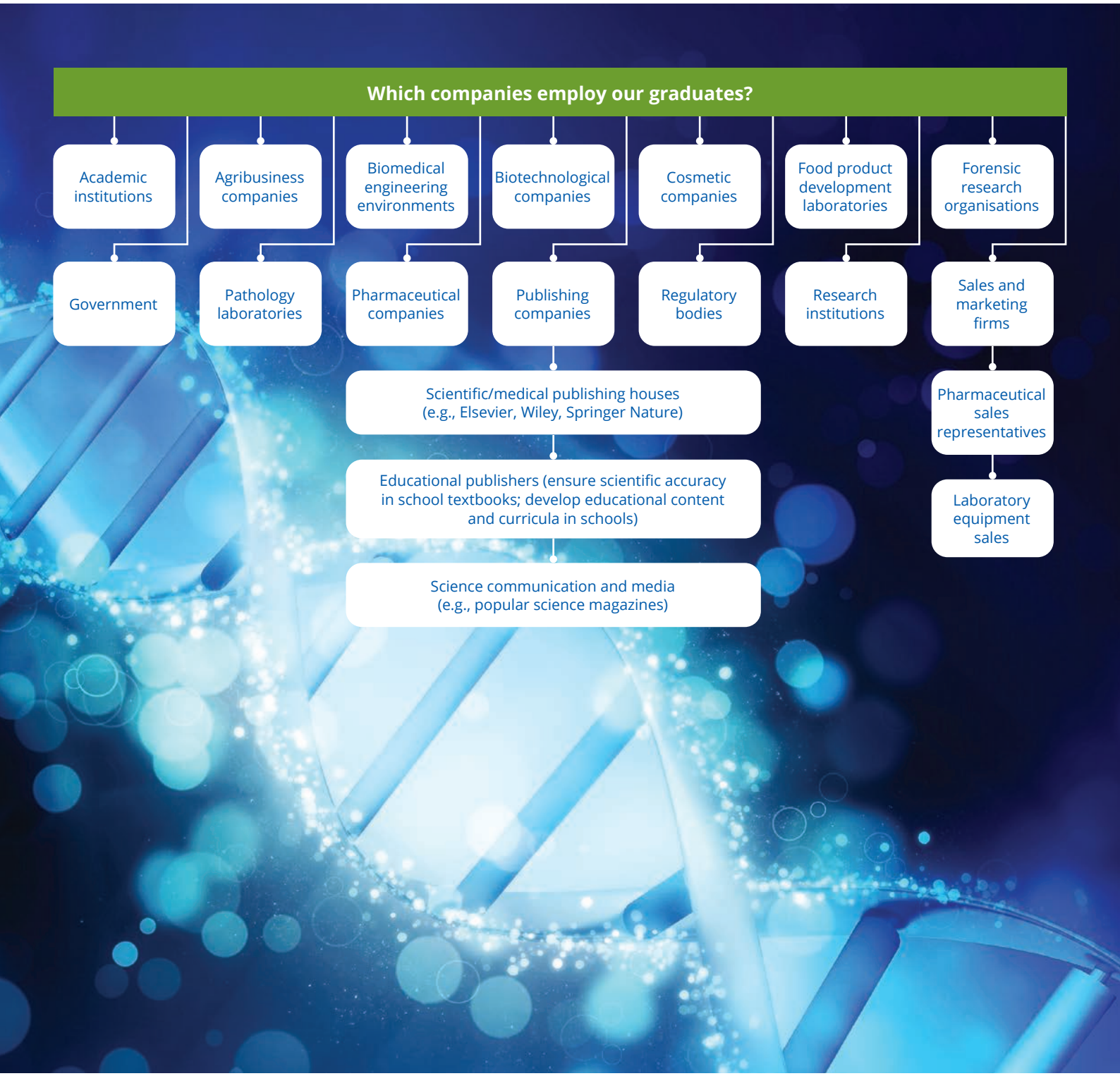
Biochemistry offers many opportunities for exciting and challenging careers in medical research and in the food and pharmaceutical, fine chemicals and waste processing industries. Possible employers are academic institutions, research councils such as the Medical Research Council (MRC), the Agricultural Research Council (ARC), the Cancer Association of South Africa (CANSA) and the Water Research Commission (WRC) and applied research agencies such as the Council for Scientific and Industrial Research (CSIR) and forensic and pathology laboratories.

Career opportunities include those of researcher, lecturer, teacher and medical representative. Graduates are comfortable in work environments such as universities, research institutions, pharmaceutical and biotechnology companies and related industries.



BIOLOGICAL SCIENCES

Biochemistry, Genetics and Microbiology



Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Biochemistry [3 years]	5	5	5	**32**

BIOLOGICAL SCIENCES

Zoology and Entomology

Bachelor of Science in Ecology

The Bachelor of Science in Ecology programme explores how animals and plants interact with each other and the natural environment. It provides an opportunity to contribute to their conservation and address the challenges threatening life on Earth. This programme is ideal for those pursuing a career in biodiversity conservation, environmental consultancy, land rehabilitation, or wildlife management.

What makes this programme unique?

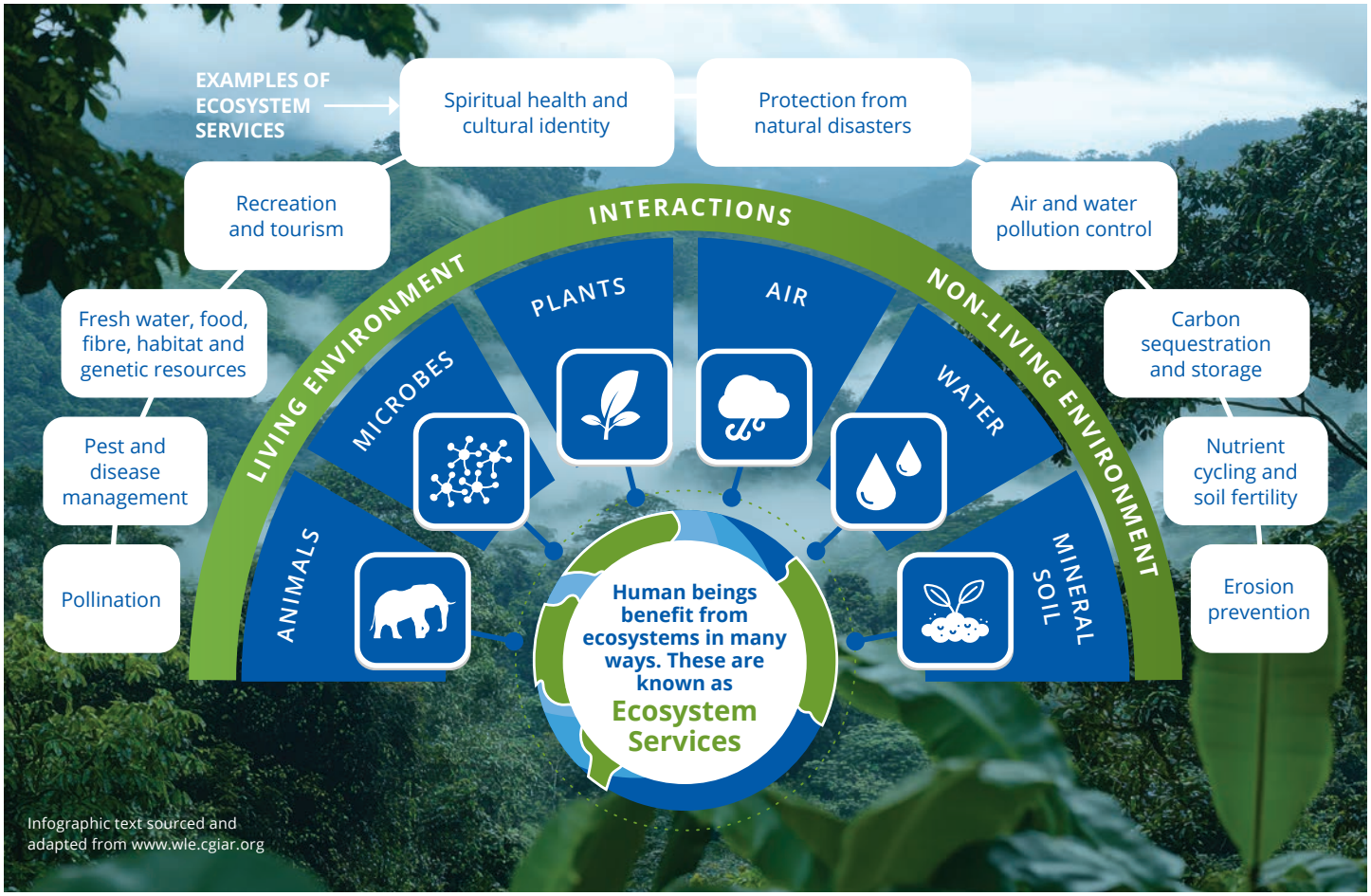
Bachelor of Science in Ecology is the only programme of its kind offered in South Africa and teaching is focused on animals and plants, ecology, geographic information systems and quantitative statistics.

Career opportunities

As a graduate you can find employment as a conservation officer or manager, environmental consultant or manager, game ranger, research scientist, data manager and more.

Which companies employ our graduates?

Graduates can find employment at government agencies focused on the environment, conservation organisations, state or private game reserves, environmental consultancies, education initiatives, academic and training institutions.



Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Ecology [3 years]	5	5	5	**32**

BIOLOGICAL SCIENCES

Zoology and Entomology

Bachelor of Science in Entomology

The Bachelor of Science in Entomology programme provides exciting insights into insect diversity, conservation, ecology and physiology. Graduates can contribute to the protection of crops, livestock, human health and the environment. This programme is ideal for those interested in a career in forensics, environmental affairs, or plant, animal or public health.

Which companies employ our graduates?

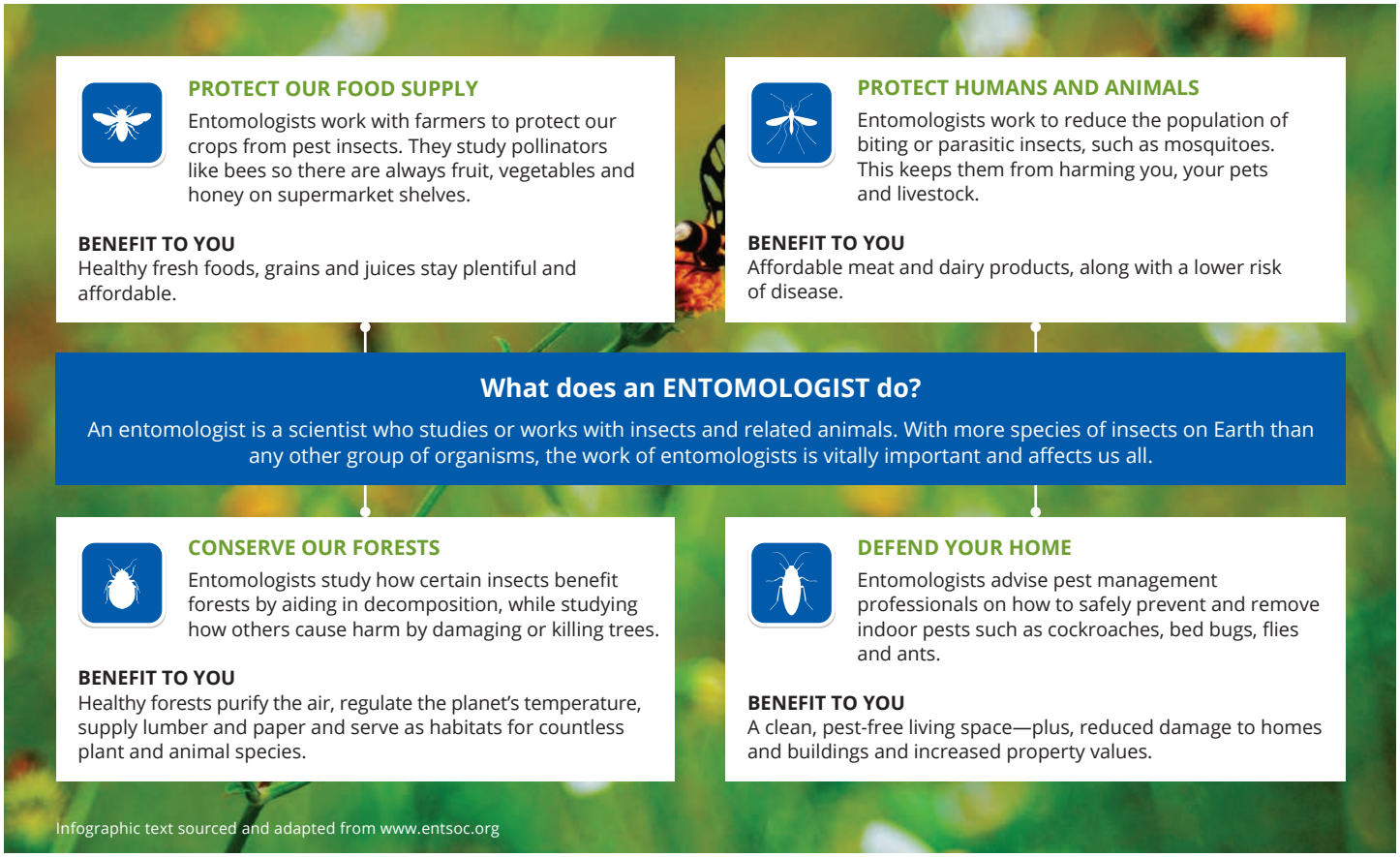
Graduates are employed by various government and international agencies, agricultural industries and research institutes, environmental consultancies, nature conservation agencies, museums, the South African Police Service and public health research and policy institutes. Graduates can also establish their own businesses in the growing industries of insect production for biological control, animal feed or human food.

What makes this programme unique?

All of our lecturers are leaders in their fields. They have strong ties to governments, local and international organisations and industries. This unlocks employment, networking and postgraduate opportunities.

Career opportunities

Graduates find employment as researchers in biological control, curators for entomological collections, environmental consultants and managers, forensic entomologists, specialists in insect pest management, insect-rearing and laboratory technicians, quarantine officers, public health practitioners and many more.



PROTECT OUR FOOD SUPPLY

Entomologists work with farmers to protect our crops from pest insects. They study pollinators like bees so there are always fruit, vegetables and honey on supermarket shelves.

BENEFIT TO YOU
Healthy fresh foods, grains and juices stay plentiful and affordable.

PROTECT HUMANS AND ANIMALS

Entomologists work to reduce the population of biting or parasitic insects, such as mosquitoes. This keeps them from harming you, your pets and livestock.

BENEFIT TO YOU
Affordable meat and dairy products, along with a lower risk of disease.

What does an ENTOMOLOGIST do?

An entomologist is a scientist who studies or works with insects and related animals. With more species of insects on Earth than any other group of organisms, the work of entomologists is vitally important and affects us all.

CONSERVE OUR FORESTS

Entomologists study how certain insects benefit forests by aiding in decomposition, while studying how others cause harm by damaging or killing trees.

BENEFIT TO YOU
Healthy forests purify the air, regulate the planet's temperature, supply lumber and paper and serve as habitats for countless plant and animal species.

DEFEND YOUR HOME

Entomologists advise pest management professionals on how to safely prevent and remove indoor pests such as cockroaches, bed bugs, flies and ants.

BENEFIT TO YOU
A clean, pest-free living space—plus, reduced damage to homes and buildings and increased property values.

Infographic text sourced and adapted from www.entsoc.org

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Entomology [3 years]	5	5	5	**32**

BIOLOGICAL SCIENCES

Biochemistry, Genetics and Microbiology

Bachelor of Science in Genetics, Bachelor of Science in Human Genetics and Bachelor of Science in Biotechnology

Genetics is at the core of the biological, agricultural, veterinary and medical sciences and has become essential in fields as diverse as virology and epidemiology, biodiversity conservation and sustainable agriculture. Our graduates are so versatile that they can be found in a variety of careers, both locally and abroad. Some of our top students continue their studies internationally.

Both the Bachelor of Science in Genetics and the Bachelor of Science in Human Genetics qualifications offer single- and double-major options. Students can choose to specialise in genetics as a single major or combine genetics with a second major. Options include biochemistry, microbiology, plant science or zoology in the Genetics qualification and human physiology in the Human Genetics qualification.

The interdepartmental Bachelor of Science in Biotechnology qualification places particular emphasis on molecular biology and is aimed at empowering students to pursue their interest in biotechnology. Undergraduate training includes exposure to aspects of biochemistry, genetics and microbiology, in addition to other subjects chosen by the student.

Career opportunities

Employment opportunities are available in various fields and graduates may be employed as:

- Biomedical scientists
- Biotechnologists
- Clinical research associates
- Computational biologists
- Molecular biologists
- Plant breeders
- Science communicators
- Teachers
- Bioinformaticians
- Cell biologists
- Field application specialists
- Genetic counsellors
- Researchers and lecturers
- Sales representatives
- Virologists

What makes this programme unique?

While we begin by providing students with a thorough grounding in the principles of genetics, we apply those principles in fields as diverse as genomics; plant and animal biotechnology; diagnostics, bioethics; conservation ecology; population, behavioural and evolutionary studies. This approach places a strong emphasis on understanding underlying concepts and principles and requires a problem-solving mindset and analytical skills that will challenge you. As graduates develop strong analytical and critical thinking abilities, along with creativity in problem solving and data handling, they are well equipped for success in both scientific and non-scientific careers.

Which companies employ our graduates?

Genetics graduates are employed by institutes such as the Council for Scientific and Industrial Research (CSIR), National Health Laboratory Service (NHLS), Agricultural Research Council (ARC), National Research Foundation (NRF), South African National Biodiversity Institute (SANBI) and National Institute for Communicable Diseases (NICD). They have found positions in a wide range of fields, including academia, plant and crop breeding, animal health, microbiology, virology, agriculture and wildlife, the medical and pharmaceutical industries, computational biology and bioinformatics, biomedical science communication, corporate business and sales and human and medical genetics. Employment prospects in the private sector improve significantly for those who pursue postgraduate studies.

Who is the ideal candidate?

Effective science is increasingly transdisciplinary and relies on diverse research teams and areas of expertise. Ideal candidates for qualifications such as Genetics are innovative and creative thinkers with curious minds, a persistent drive to ask questions and seek understanding and a passion for life-science-related topics. A fair grasp of mathematics is also important.

If you are still uncertain about which specific direction to pursue, Genetics offers an excellent opportunity to explore and connect with a range of fields across the life sciences—helping you discover where your true interests lie.

Application requirements

Programmes	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Genetics **Bachelor of Science in Human Genetics** [3 years]	5	5	5	**32**
Bachelor of Science in Biotechnology [3 years]	5	5	5	**32**

BIOLOGICAL SCIENCES

Bachelor of Science in Biochemistry, Genetics and Microbiology: Student Testimonials

'I had originally planned to study medicine, but was encouraged to do a Bachelor of Science instead—and it turned out to be one of the best decisions I've ever made. The degree was challenging, but also incredibly rewarding. I was surprised by how interesting the content was and how much I grew, both academically and personally. The triple major offered great variety and the lecturers were passionate and supportive. I made lifelong friends and found a love for science. Now that I'm doing my Honours in Genetics, I can see how strongly this degree prepared me. If you're unsure—give it a try. It might just ignite a passion you didn't expect.'

Rabia Omar – Bachelor of Science in Physiology, Genetics and Psychology

'The Bachelor of Science in Human Physiology, Genetics and Psychology gave me a broad understanding of how humans function—from the molecular to the psychological level and most importantly, the reasons why. If you're curious about how humans function but not yet sure which field of study to pursue, this degree gives you a strong foundation and opens many doors for the future. For me, it sparked a passion for genetics and a desire to understand life on a molecular level. I was able to combine that passion with my love for nature and today I work in animal conservation. This degree can truly shape your path in biology.'

Aidan Boyle – Bachelor of Science Honours in Genetics

'Studying at the University of Pretoria was a truly transformative experience. My undergraduate degree in Human Physiology, Genetics and Psychology gave me a holistic understanding of how the human body and mind work. The interdisciplinary nature of this qualification challenged me to think critically and gave me the opportunity to explore complex biological systems from different angles. The supportive academic environment, engaging lectures and practical sessions made my learning journey incredibly enriching. This degree not only helped me develop strong scientific and analytical skills but also gave me the confidence and foundation I needed to pursue postgraduate studies. I am grateful for the well-rounded, enriching experience that prepared me for my future.'

Tshiamo Lesedi – Bachelor of Science Honours in Genetics

'The Bachelor of Science in Human Genetics gave me the opportunity to explore the intricate connection between our genetic makeup and human disease. Although the degree mainly focused on human disease and physiology, the genetics modules' interdisciplinary nature highlighted the broad impact of genetics on the world. Now, I am enrolled in a Master's degree focusing on malarial disease. My Bachelor of Science laid the foundation for a future in the scientific industry, with the ultimate goal of contributing to targeted drug design and development.'

Alessandra de Gouveia – Bachelor of Science Honours in Biotechnology

'When I left school, my idea of genetics was a vague picture of a white lab coat and DNA samples. I soon realised how much more there was to discover! Genetics is a broad and dynamic field that introduces you to everything from the chemistry of life to microbiology, molecular inheritance and even computational biology. One of the most exciting things about this degree is how it pulls from multiple scientific disciplines—chemistry, biochemistry, physiology, bioinformatics and zoology, giving you a solid foundation while allowing you to discover where your real interests lie. The lecturers made a lasting impression on me. They brought science to life with their contagious passion and made me feel like I was part of something meaningful. Today, I'm a postgraduate student working on a computational project developing a multi-peptide vaccine for parasites in dogs—a field I didn't even know existed when I applied. My undergraduate journey taught me that the world of science is vast and that with a Genetics degree, you can go anywhere you choose—whether it's human health, animal research, plant biology or bioinformatics. It showed me that if you stay curious, the possibilities are endless.'

Mahmooda Milanzie – Bachelor of Science Honours in Genetics

'The Bachelor of Science in Genetics and Microbiology was the perfect choice to help me discover my passion and direction at university. The degree covered a wide range of topics, from microbial interactions to bacterial genetics and virology, which kept me inspired throughout. The material was both challenging and exciting and I always felt supported by knowledgeable and approachable lecturers. During my undergraduate years, I had the privilege of working with some of these lecturers in my postgraduate studies, learning a great deal from them. This exposure motivated me and shaped my path and I now integrate these concepts into my research. After completing my Honours degree in Genetics with a focus on virology, I am currently pursuing my Master's.'

Nipho Mtambo – Bachelor of Science Honours in Genetics

BIOLOGICAL SCIENCES

Human Physiology

Bachelor of Science in Human Physiology

During the first year of study for this degree, students are exposed to a generic range of subjects from the biological and agricultural sciences. In the second year they study physiological systems, (which include the neurophysiological, haematological, cardiovascular, pulmonary, renal, nutritional and digestive, endocrinological and reproductive systems), with biochemistry as a compulsory subject.

The study programme for the third and final year includes a selection of integrated physiology modules, such as exercise and nutrition physiology, cellular and developmental physiology, applied pathophysiology, higher neurological function and industrial physiology. At the third-year level, students have an opportunity to select elective modules in the programme. The Bachelor of Science in Human Physiology programme will appeal to scientifically minded students who are inquisitive by nature.

'I have thoroughly enjoyed earning my Bachelor of Science in Physiology, Genetics and Psychology degree, taking every opportunity that came my way. The field is captivating because it offers a comprehensive and interconnected view of how the human body and mind work, making it especially appealing to curious students exploring various career options. The broad scope of the programme has deepened my interest in scientific research and strengthened my passion for discovery. This degree has given me a strong foundation to pursue my goal of making meaningful contributions to science. I am now pursuing my Honours in Physiology, with the aim of applying my knowledge to help others and building a career in academia.'

Shané Joubert – Bachelor of Science in Physiology, Genetics and Psychology graduate

What makes this programme unique?

Physiologists study how the body functions, starting at the molecular and cellular levels and progressing through tissues, organs and systems to the integrated control of body functions. This foundational knowledge is applied in research to explore both normal and abnormal life processes.

Career opportunities

A Bachelor of Science in Human Physiology is ideally suited for students planning to pursue postgraduate studies. Most professional and research-oriented careers in physiology require further specialisation through honours, master's or doctoral studies. This degree prepares students to remain in the academic environment as researchers, lecturers or scientists.

Graduates may also pursue careers in research or applied settings with additional training. These include working in cooperation with medical and research teams in public and private sectors—such as at the Council for Scientific and Industrial Research (CSIR), the Medical Research Council (MRC), pharmaceutical companies or pathology laboratories.

This degree therefore serves both as a launchpad into advanced academic study and as a foundation for diverse professional pathways, depending on the graduate's chosen direction and further qualifications.

Which companies employ our graduates?

Our graduates are employed by:

- Academia
- State departments (eg the Department of Health)
- Medical and pharmaceutical companies
- Private and government research laboratories—such as the Council for Scientific and Industrial Research (CSIR), the South African Medical Research Council (SAMRC), the National Health Laboratory Service (NHLS), the Agricultural Research Council (ARC), the National Research Foundation (NRF), the South African National Biodiversity Institute (SANBI) and the National Institute for Communicable Diseases (NICD)
- Computational biology and bioinformatics companies
- Biomedical science communication companies
- Corporate and sales businesses
- Wellness companies

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Human Physiology [3 years]	5	5	5	**32**

BIOLOGICAL SCIENCES

Human Physiology

Bachelor of Science in Human Physiology, Genetics and Psychology

During the first two years of study, students are exposed to fundamental core scientific and biology-related modules. Final-year studies include modules from all three disciplines (Physiology, Genetics and Psychology), creating opportunities to continue with postgraduate studies in any of the three disciplines.

The Bachelor of Science in Human Physiology, Genetics and Psychology programme is recommended for individuals with a passion for biological and related sciences who wish to gain core knowledge in these fields.

What makes this programme unique?

The structure of this programme allows students to choose any one of the three majors for postgraduate studies. It provides multiple pathways into specific fields that align with a student's particular interests. Another notable feature is the transdisciplinary inclusion of Psychology as a humanities module, which offers additional opportunities.

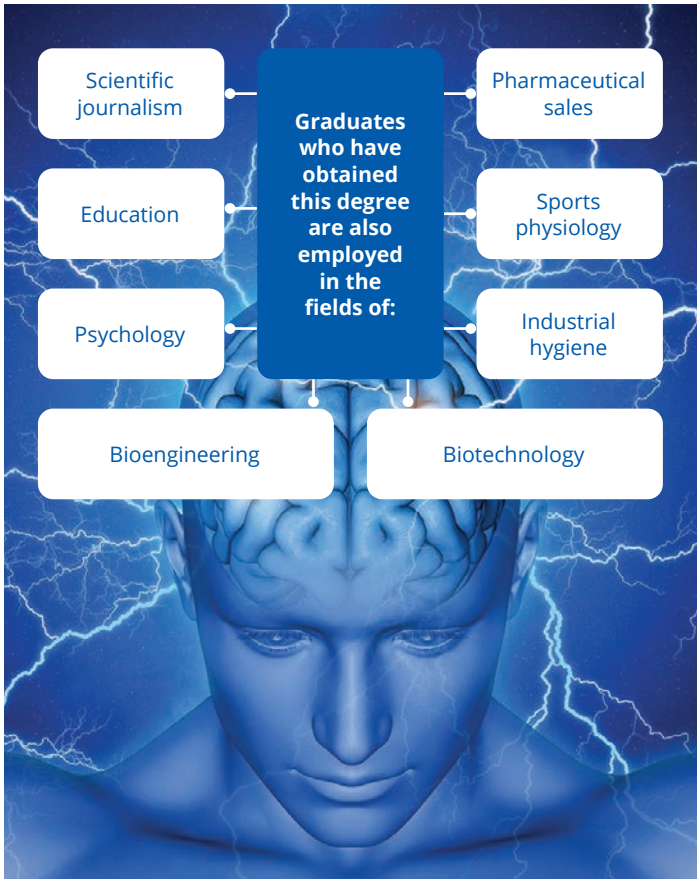
Which companies employ our graduates?

Our graduates are employed by:

- Academia
- State departments (such as the Department of Health)
- Medical and pharmaceutical companies
- Private and government research laboratories—such as the Council for Scientific and Industrial Research (CSIR), the South African Medical Research Council (SAMRC), the National Health Laboratory Service (NHLS), the Agricultural Research Council (ARC), the National Research Foundation (NRF), the South African National Biodiversity Institute (SANBI) and the National Institute for Communicable Diseases (NICD)
- Veterinary and industrial institutions
- Computational biology and bioinformatics companies
- Biomedical science communication companies
- Corporate and sales businesses
- Wellness companies
- Human and medical genetics laboratories

Career opportunities

Many of the career options are research oriented. Research is conducted in cooperation with medical teams at private and government research laboratories, pharmaceutical firms, universities, veterinary and industrial institutions. Further study can lead to careers in genetic counselling and psychology.



Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Human Physiology, Genetics and Psychology [3 years]	5	5	5	**32**

BIOLOGICAL SCIENCES

Anatomy

Bachelor of Science in Medical Sciences*

The Department of Anatomy is part of the School of Medicine in the Faculty of Health Sciences and hosts a Bachelor of Science in Medical Sciences degree in the Faculty of Natural and Agricultural Sciences.

Students are trained in the basic biomedical sciences, which include clinical anatomy, physical and forensic anthropology, histology, cell biology and embryology. These subjects can be combined with elective modules from physiology, pharmacology and genetics. Ideally, students who register for this degree should have a keen interest in research related to anatomy and the basic biomedical sciences.

What makes this programme unique?

Students are trained in the basic biomedical sciences, including clinical anatomy, physical anthropology and cell biology. During the course of their studies they work with human material, including human skeletal material and do cadaver dissection.

Bachelor of Science in Medical Sciences students make use of the Forensic Anthropology Research Centre (FARC) on the Prinshof Campus. Established in 2008, the FARC is leading research and innovation in micro-CT and 3D printing of human skeletal material in southern Africa. The Centre, as part of its internship programme for postgraduate students, analyses approximately 60 cases per year for the South African Police Service's Victim Identification Centre, giving postgraduate students exposure to real-world forensic work.

References:
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Career opportunities

Career opportunities exist in the field of research in any of the subdisciplines of anatomy, in academia, in forensic science and in the health science industry, including medical device companies, pharmaceutical research, clinical trials coordination and biotechnology firms.

Other careers that may be considered are in sports science, virology, chemical pathology, immunology, health administration or ergonomics. Technical careers, for example in the departments of anatomy or physiology at universities, are another possibility.

Which companies employ our graduates?

Graduates are sought after by institutes in the academic, government and private sectors, where they are employed as lecturers, researchers, medical and forensic scientists and sales representatives in the medical and pharmacological industries. Several of our postgraduate students are currently studying at research facilities in North America and Europe.

Graduates may find work in forensic science, with organisations such as the South African Medical Research Council (SAMRC) or the Council for Scientific and Industrial Research (CSIR) and in state institutions like the National Health Laboratory Service or the Forensic Science Laboratory of the South African Police Service. They can also pursue careers in the health science and pharmaceutical industries with companies such as Aspen Pharmacare and Adcock Ingram.

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Medical Sciences* [3 years]	5	5	5	**32**

**The programme name is currently under review and may be subject to change.*

BIOLOGICAL SCIENCES

Biochemistry, Genetics and Microbiology

Bachelor of Science in Microbiology

Microbiology is the study of organisms that cannot be seen with the naked eye, such as bacteria, fungi, algae and viruses. Essentially, the microbiology study programme, with its focus on the structure, function and classification of microbial species, is the gateway to the fascinating microbial world.

Students in this programme will gain access to a wide range of tools and theoretical knowledge. These can be applied to harness and control microbial activities to enhance industrial and agricultural processes, as well as to improve the well-being of animals, humans, plants and the environment.

Who is the ideal candidate?

Aspiring microbiologists should have a strong foundation in science and a natural curiosity about the functioning of biological systems in their environments. Microbiology intersects with fields such as botany, chemistry, zoology, physiology, genetics, medicine, nutrition and environmental sciences.

Candidates should also appreciate that microbiology is an ever-evolving field that spans multiple scientific disciplines and recognise the profound impact microbes have on every aspect of life on Earth.

What makes this programme unique?

In microbiology, students learn about the different types of microbes which, even though invisible to the naked eye, represent the most abundant life forms on earth. It is believed that many microbes have not yet been discovered and others are well adapted to survive in extreme conditions that resemble conditions believed to have been prevalent when life began on Earth billions of years ago. Microbiology is also one of only a few degree programmes that unites a diverse group of individuals (such as immunologists, geneticists, bioinformaticians, computational biologists, environmental scientists) under one umbrella.

Career opportunities

Since the field of microbiology has many branches, graduates can follow various careers in industry or in academia, where they can contribute to increasing scientific knowledge, or they can establish their own businesses.

Which companies employ our graduates?

Graduates with microbiology degrees are employed by leading research institutes in South Africa, including the Council for Scientific and Industrial Research (CSIR), the Agricultural Research Council (ARC), the National Institute for Communicable Diseases (NICD), the South African Sugarcane Research Institute (SASRI), the South African Medical Research Council (SAMRC) and the National Research Foundation (NRF).

They also find opportunities in biotech industries such as Inqaba Biotec, CapeBio, Akili Labs and BioTech Africa. Generally they are employed as:

- Managers (e.g., land remediation/laboratory managers)
- Food technologists
- Laboratory technicians
- Quality assurance specialists
- Plant pathologists
- Medical/clinical microbiologists
- Biomedical scientists
- Bioinformaticians
- Agricultural scientists
- Scientific writers

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Microbiology [3 years]	5	5	5	**32**

BIOLOGICAL SCIENCES

Plant and Soil Sciences

Bachelor of Science in Plant Science

Although plants are incredible organisms, much of their potential remains unexplored. What is well established, however, is that plants are unparalleled factories for producing valuable natural products.

A three-year degree in Plant Sciences provides a broad foundation in the field, with opportunities for further specialisation in medicinal plant science, plant biotechnology or ecology and biodiversity.

In medicinal plant sciences, students explore the discovery and application of plant-based medicines and naturally occurring compounds with healing properties. Those studying plant biotechnology learn about molecular tools and work with specific plant species to understand how plants function. In ecology and biodiversity, students study South Africa's rich vegetation, its origins and strategies for conservation and sustainable management.

Who is the ideal candidate?

The ideal candidate is someone who is inquisitive, has a broad interest in plants and the environment, conservation and in improving wellness and quality of life.

What makes this programme unique?

The Department of Plant and Soil Sciences is dynamic, innovative, modern and relevant. Staff members undertake world-class research and 70% have received NRF ratings.

Much of the research is of an applied nature and contributes to the improvement of agricultural crops and methods, knowledge of plant diseases, the use of plant-derived compounds, biodiversity (including evolutionary systematics and ecology) and plant biotechnology.

Which companies employ our graduates?

Our graduates are employed at organisations/institutions such as:
- The South African Medical Research Council (SAMRC)
- The Council for Scientific and Industrial Research (CSIR)
- The South African National Biodiversity Institute (SANBI)
- Pharmaceutical industries
- Tertiary institutions
- Government departments

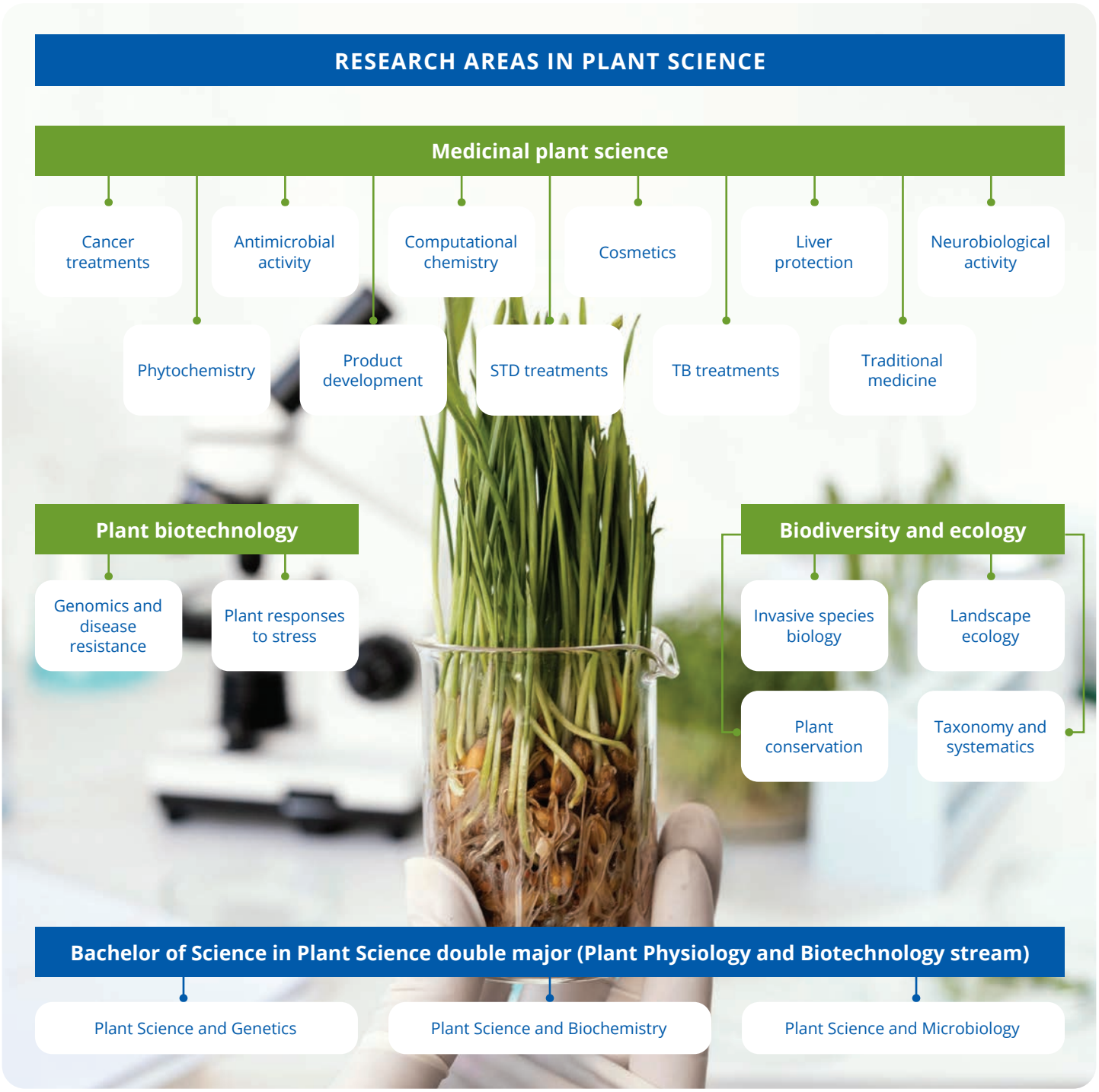
Career opportunities

- Academic/ teacher
- Agricultural specialist
- Climate change biologist
- Conservationist
- Ecological consultant
- Pharmaceutical researcher
- Plant biotechnologist
- Plant systematist

BIOLOGICAL SCIENCES

Plant and Soil Sciences

Bachelor of Science in Plant Science (continued)



Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Plant Science [3 years]	5	5	5	**32**

BIOLOGICAL SCIENCES

Zoology and Entomology

Bachelor of Science in Zoology

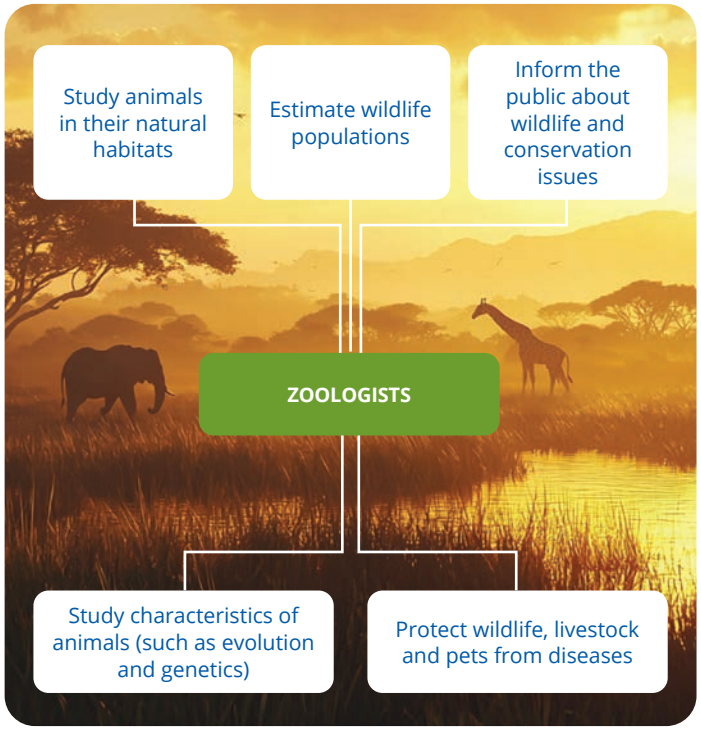
Zoology is the scientific study of animal life. The Bachelor of Science in Zoology programme equips students with the knowledge and skills to understand, protect and manage the diversity of wild African animals. The programme includes training in animal evolution and diversity, physiology, behaviour, ecology and related scientific fields.

Who is the ideal candidate?

This programme is ideal for those interested in understanding how animals interact with each other, sense and respond to their environment, are harvested sustainably and are protected from human-induced threats.

What makes this programme unique?

The University of Pretoria is the top-ranked institution in Africa for Zoology and hosts the internationally renowned Mammal Research Institute.



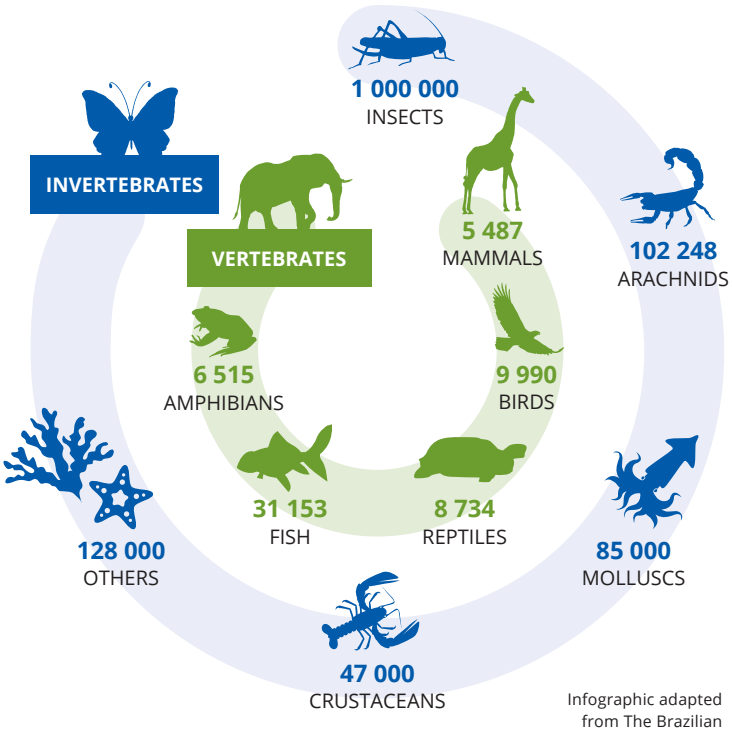
Career opportunities

This degree can lead to a career as a wildlife or marine biologist, biology teacher, conservation officer, animal welfare officer, environmental consultant or manager, zoo or aquarium curator, museum collection curator, game ranger, epidemiologist and researcher, among others.

Which companies employ our graduates?

Our graduates are employed by national, provincial and local governments, international and private conservation organisations, zoos and aquariums, museums, environmental consultancies, environmental education initiatives, academic and training institutions and many other organisations.

The vast diversity of animal species awaits discovery!



Infographic adapted from The Brazilian Biodiversity Information System

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Zoology [3 years]	5	5	5	32

MATHEMATICAL SCIENCES

Actuarial Science

Bachelor of Science in Actuarial and Financial Mathematics

The financial world is changing fast, and there is a big demand for graduates who can think analytically, solve problems and work confidently with numbers and data.

This programme helps students build those skills through a strong mix of theory and practical learning. Students can choose to focus their studies on either Actuarial Science or Financial Mathematics.

If you are interested in becoming an actuary, the actuarial option is designed to help students achieve exemption from the Actuarial Society of South Africa's examinations in the shortest possible time. If you see yourself as a financial analyst or financial engineer, the financial mathematics option gives students the knowledge and skills to design and analyse financial products and make sense of complex financial systems.

What is an actuary?

An actuary is a professional who applies analytical, statistical and mathematical skills to financial and business problems. This is especially valuable when facing real-world problems that involve uncertain future events or financial risk. By turning uncertainty into measurable risk, actuaries help people and businesses protect their future confidently and fairly in a constantly changing world (Actuarial Society of South Africa).

Who is the ideal candidate?

The ideal candidate is a high-achieving student who consistently earns seven or more A's (80%-100%) in high school. They are actively involved in sports and cultural activities, and often hold leadership roles. This student is well-rounded, highly motivated, and likely to excel in an AP Mathematics course if available. The ideal candidate also enjoys coding and solving problems with computers when given the opportunity.

Which companies employ our graduates?

Graduates are generally employed by accounting firms, banks, consulting firms, insurance companies, investment companies, medical schemes and universities.

What makes this programme unique?

The study programme prepares students for qualification as actuaries or financial engineers. Specialisation in either of these fields occurs in the third year of study and continues at postgraduate level.

The programme is accredited with the Actuarial Society of South Africa and gives students the opportunity to earn exemptions from the A100 and A200 subjects of the Actuarial Society of South Africa during their undergraduate degree. To achieve further exemptions, a follow-up honours degree is recommended.

We prepare our students to succeed in the actuarial workplace. Leading companies value our graduates highly, and some even actively seek out students from our programme.

Career opportunities

Many actuaries follow careers in the more traditional fields of insurance and retirement funds. However, actuaries are also increasingly working in other fields due to their advanced analytical skills. This includes healthcare, financial consulting, risk management and banking. Because of their unique skills, many actuaries are appointed to senior management positions after their initial analytical roles.

Financial engineers are employed by banks and financial institutions, brokerage firms and investment institutions. They are essential in portfolio and risk management. Activities include asset management (trading in bonds, futures and derivative instruments such as options), designing new financial products and devising strategies to control credit risk.

Application requirements

Programme	Application requirements for NSC/IEB for 2027		
	Achievement level		APS
	English Home Language or English First Additional Language	Mathematics	
Bachelor of Science in Actuarial and Financial Mathematics [3 years]	5	7	**36**

MATHEMATICAL SCIENCES

Mathematics and Applied Mathematics

Bachelor of Science in Mathematics and Bachelor of Science in Applied Mathematics

Mathematics, which originated from arithmetic and geometry, is based on patterns and structures and is the fundamental language of science and technology.

Applied mathematics is concerned with the modelling and treatment of real-life problems in a variety of fields, such as engineering, finance, statistics, physics and biology. The power of mathematics and applied mathematics lies in their abstract, analytical and computational nature. Today, mathematics is essential for all technological, financial and managerial industries, which form the backbone of the South African economy.

Who is the ideal candidate?

The ideal candidate is someone who enjoys mathematics and excel in the subject. They have a strong foundation in basic mathematical concepts and a passion for solving problems.

What makes this programme unique?

The Department of Mathematics and Applied Mathematics is not only one of the largest departments on the Hatfield Campus, but also one of the largest mathematics departments in the country, with approximately 17 500 student enrolments for mathematics modules. The Department prides itself on excelling in teaching and research, as well as in community-based activities.

The diverse and competent staff has expertise in various fields. The Department regularly hosts international visitors and its researchers frequently travel abroad to attend conferences and pay research visits. No fewer than 30 of its researchers have received NRF ratings in fields ranging from more traditional abstract analysis to contemporary epidemiology, where the modelling of biological phenomena leads to exciting options.

A degree in mathematics trains students to apply, evaluate and adapt existing problem-solving techniques, or to develop new mathematical models and techniques to solve problems stemming from natural, technological and financial phenomena.

Career opportunities

Graduates in mathematics and applied mathematics are employed by research institutions, in education (universities and schools), the public sector (government and medical institutions) and the private sector (engineering companies, financial institutions and the computer industry).

Training in abstract, analytical and computational thinking gives graduates a versatile foundation, allowing them to adapt easily to changing professional environments and to create mathematical models of natural, technological and financial systems. Mathematicians and applied mathematicians apply, evaluate and refine existing problem-solving methods or develop new ones to tackle complex challenges.

Which companies employ our graduates?

A Bachelor of Science in Mathematics or Bachelor of Science in Applied Mathematics degree is a solid foundation for a professional career in many fields. Many of our graduates are employed by the banking and financial sector, but also in new fields like bioinformatics, genetics, management consulting and weather forecasting. As there is a general shortage of mathematicians in South Africa, top performing students opt for further studies and an academic career.

Bachelor of Science in Mathematics

Compulsory modules are:

- Analysis
- Abstract algebra
- Calculus
- Linear algebra
- Differential equations
- Mathematical modelling
- Mathematical statistics
- Dynamical processes (first-year level)
- Numerical analysis (first-year level)
- Discrete structures (second-year level)
- Geometry (third-year level)

Bachelor of Science in Applied Mathematics

Compulsory modules are:

- Analysis
- Continuum mechanics
- Partial differential equations
- Calculus
- Linear algebra
- Discrete structures
- Mathematical modelling
- Mathematical statistics
- Dynamical processes (first-year level)
- Differential equations (second-year level)
- Dynamical systems (third-year level)
- Numerical analysis (third-year level)

Application requirements

Programmes	Application requirements for NSC/IEB for 2027		
	Achievement level		APS
	English Home Language or English First Additional Language	Mathematics	
Bachelor of Science in Mathematics **Bachelor of Science in Applied Mathematics** [3 years]	5	6	**34**

MATHEMATICAL SCIENCES

Statistics

Bachelor of Science in Mathematical Statistics

Statistics is the science of extracting valuable information from diverse data sources using cutting-edge technologies. These tools enable companies and institutions to stay competitive on a global scale.

Statistics is the backbone of data science and is fundamental to driving future advancements. This degree will prepare a graduate for a career in data science. Exceptional opportunities await students eager to excel in this field. Graduates will not only enjoy a fulfilling and dynamic career but also receive above-average compensation.

Who is the ideal candidate?

An ideal candidate for this programme is someone with:
- strong numerical skills;
- an interest in computers and computer programming;
- logical reasoning ability and critical thinking skills; and
- strong problem-solving skills.

What makes this programme unique?

The Statistics programme can uniquely combine students' interest in mathematical statistics with their interest in, for example, insurance science, economics, mathematics and applied mathematics. By completing this programme you will be positioned at the forefront of analytical thinking and application in the statistical, computational and interdisciplinary environments, like data science, in the future.

Which companies employ our graduates?

- Commerce companies (especially online shopping, customer analytics and recommender systems)
- Financial and banking companies
- Health companies
- Information technology companies
- Insurance and accounting companies
- Logistics and transport companies
- Pharmaceutical industries
- Research and development organisations
- Telecommunication companies
- Universities and other educational bodies

Career opportunities

- Artificial intelligence scientist
- Bio-statistician
- Business analyst
- Consultant in banking and finance
- Data analyst
- Data scientist
- Environmental scientist
- Forensic investigator
- Financial risk analyst
- Geospatial information scientist
- Investment analyst
- Market researcher
- Statistical software engineer
- Quality analyst

Application requirements

Programme	Application requirements for NSC/IEB for 2027		
	Achievement level		APS
	English Home Language or English First Additional Language	Mathematics	
Bachelor of Science in Mathematical Statistics [3 years]	5	6	34

PHYSICAL SCIENCES

Chemistry

Bachelor of Science in Chemistry

Chemistry is the study, understanding and analysis of substances and materials and how they interact. This is achieved through carefully designed laboratory experiments using sophisticated instrumentation, mathematical calculations, data processing and modelling.

Who is the ideal candidate?

The ideal candidate will have the following characteristics:
- The ability to work with high precision and accountability;
- good time management;
- proficiency in scientific writing;
- ability to work in a team;
- good management skills; and
- environmental consciousness in work ethic.

What makes this programme unique?

Bachelor of Science in Chemistry graduates have the ability to combine concepts across different fields. They develop excellent analytical and problem-solving skills, which can also be applied in less traditional fields, for example, the financial sector and information technology. Chemistry is a central science and links with many other subjects, including physics, mathematics, biochemistry, computer science, geology, etc.

Career opportunities

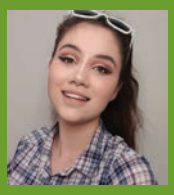
Graduates are equipped for careers in the following fields:
- Chemical manufacturing;
- education;
- environmental studies;
- health;
- industrial chemistry;
- information technology;
- journalism;
- law; and
- research.

Which companies employ our graduates?

Our graduates are employed by:
- Chemical manufacturers;
- mining companies;
- government departments;
- the media;
- law firms;
- laboratories;
- cosmetic companies;
- instrument manufacturers;
- pharmaceutical companies; and
- education companies.

'If someone had told me while I was in high school that I would one day enrol for a degree in chemistry, I would have called them crazy. Not that I did not like the subject but I did not find it interesting. When I registered for the module in first year, it was just a core module that I had to do but when I started learning more, I fell in love with it. For the first time, everything that I had been introduced to in high school made perfect sense. It was even more amazing that I could explain why and how certain reactions take place. My dream has always been to work in the field of forensic science. The added fact that it is such a broad field makes forensic chemistry my destination.'

Daisy Mdeka – Bachelor of Science in Chemistry



'Chemistry used to be that one class I dreaded taking back in high school, but that completely changed for me when I started taking chemistry in my first year as a Bachelor of Science student. Chemistry went from this impossible amount of memorisation to this fascinating field of logic that I got to witness in my everyday life. I started realising how applicable the principles of chemistry are in my life and found myself wanting to learn more for that reason. When it came to choosing a career, I decided to focus on biochemistry and delve into how chemistry plays a role in biotic factors. I am now pursuing a career in food safety.'

Chrizelda Visser – Bachelor of Science in Chemistry

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Chemistry [3 years]	5	5	5	**34**

PHYSICAL SCIENCES

Geology

Bachelor of Science in Environmental and Engineering Geology

This degree offers specialisation in engineering geology and hydrogeology. Engineering geology is the study of how the ground—soil and rock—behaves and how it can affect engineering projects. It includes geotechnical studies and is closely related to construction, such as building foundations or excavation, using geological materials like rocks and soil. It also examines how geological, landform and water-related processes can influence construction and development.

Hydrogeology, on the other hand, is the study of water's occurrence, distribution and movement beneath the Earth's surface. This field encompasses both quantitative aspects, such as water supply, safe abstraction and pumping effects, as well as qualitative concerns like contamination, remediation and drinking water quality.

Who is the ideal candidate?

The programme requires a strong understanding of mathematics and mechanics. Genuine concern for our planet, a desire to work outdoors and an interest in geology or geomorphology will be an advantage. Depending on your personality, you can choose how you would like to divide your time between doing fieldwork and working on a computer.

What makes this programme unique?

Very few universities offer professional qualifications in engineering geology and hydrogeology, but UP offers both. This gives the university a strong advantage at the intersection of infrastructure development and underground water management. The qualification complies with the requirements for professional registration.

Career opportunities

Engineering geologists work closely with civil engineers, mining engineers, town planners and environmental scientists. Your work will require you to identify geological hazards, source building materials and supply foundation solutions.

As a hydrogeologist, you will be involved in the supply of water for urban, agricultural and industrial use. Today, many graduates work in contaminant transport and remediation, which involves identifying sources of pollution and finding suitable remediation solutions.

Which companies employ our graduates?

Graduates find employment in the civil and infrastructure industries, the mining sector and parastatals such as the Council for Geoscience and the Council for Scientific and Industrial Research (CSIR). They also work in government departments, including the Department of Water Affairs, the National Home Builders Registration Council (NHBRC) and local municipalities.

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Environmental and Engineering Geology [3 years]	5	5	5	**34**

PHYSICAL SCIENCES

Geography, Geoinformatics and Meteorology

Bachelor of Science in Geography
Option: Geography and Environmental Science

Geographers and environmental scientists study processes, relationships and the interdependence between the natural environment and humans.

Anyone who has a passion for the environment and has a background in the sciences will be interested in the Bachelor of Science in Geography Option: Geography and Environmental Science programme.

What makes this programme unique?

The programme enhances students' understanding of the physical, social and constructed environments, incorporating all the natural processes that take place on Earth, as well as the socio-political and cultural activities that dominate the planet.

Which companies employ our graduates?

- **Private sector**, such as real estate, planning, architectural and engineering firms, banks, tourism organisations, environmental conservation bodies
- **Government departments**, such as the Departments of Forestry, Fisheries and the Environment (DFFE), Agriculture, Land Reform and Rural Development (DALRRD), Water and Sanitation (DWS), Tourism (DT), Basic Education (DBE) and Higher Education and Training (DHET) and Statistics South Africa (Stats SA)
- **Parastatal organisations**, such as the South African Bureau of Standards (SABS), the South African National Biodiversity Institute (SANBI) and the Council for Scientific and Industrial Research (CSIR)
- **Self-employed**, working mainly in areas such as marketing, planning, development, tourism, cartography, remote sensing, environmental analysis, social impact assessments and environmental auditing

Career opportunities

Geography and environmental science offer a range of career paths, including teaching, research (for a variety of bodies) and careers requiring the application of geographical knowledge and skills in practice. Graduates can focus on environmental management; urban development issues, regional and rural development; and environmental health or environmental issues, including pollution, climate change and the understanding and addressing of negative impacts on biodiversity/ ecosystem services through activities such as mining, agriculture and tourism.

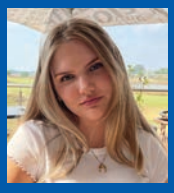
PHYSICAL SCIENCES

Geography, Geoinformatics and Meteorology

Bachelor of Science in Geography
Option: Geography and Environmental Science (continued)

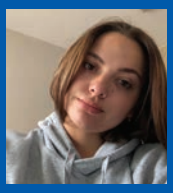
'Geography and Environmental Science is an interesting degree that allows you to explore an array of different fields relating to the environment and enables you to understand the planet holistically. The degree looks into natural environments, human societies and their interactions, encouraging critical thinking and leading to the development of problem-solving skills. I thoroughly enjoyed the degree and liked that it allowed me to choose elective modules depending on my interests.'

Bridget Lotter – Bachelor of Science in Geography



'Deciding to study Geography and Environmental Science has been the best decision I could have made in the journey of pursuing my passion. This carefully compiled degree has combined the social and physical aspects of geography, while also equipping us with the necessary GIS knowledge to excel in this field. I cannot wait to apply these diverse skills in my future environmental consulting career, where I aim to increase people's positive environmental impact.'

Hilét Boshoff – Bachelor of Science in Geography



'I chose the Geography and Environmental Science programme because of my passion for learning about the environment. I am also deeply interested in the scientific foundation of geographical studies in nature and our ever-changing world. This programme has helped me expand my knowledge, enabling me to effectively integrate it into my teaching career and classes.'

Sunè Peenz – Bachelor of Science in Geography

'There is nothing more empowering than learning about the world around us and discovering how we can make a difference—understanding the problems we face and identifying solutions. The Geography and Environmental Science programme has provided me with tools I will use for the rest of my life, as well as a perspective on how we are harming the environment and what I can do to help.'

Cameron MacLean-Banks – Bachelor of Science in Geography

'I initially signed up for Geography and Environmental Science because I have a strong interest in issues pertaining to the environment, specifically how humans, the agricultural sector and biodiversity are affected by climate change. According to my personal beliefs, I believe God has commanded us to protect the environment from harmful elements. My ability to think critically about the challenges we face today and those we will encounter in the future as we continue with business as usual, has been greatly enhanced by my enrollment in the Geography and Environmental Sciences degree. While it may be difficult to reduce or change our current struggles, we can still strive to improve the world.'

Liyema Zitasi – Bachelor of Science in Geography

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Geography Option: Geography and Environmental Science [3 years]	5	5	5	**34**

PHYSICAL SCIENCES

Geography, Geoinformatics and Meteorology

Bachelor of Science in Geoinformatics

The Bachelor of Science in Geoinformatics programme entails the collection, storage, analysis, visualisation and management of geospatial information by using an assortment of geospatial analytical methods and tools to help with decision making and providing solutions to geographic problems.

Our graduates have a passion for geography, with an interest in collecting, processing, displaying and analysing geographic information. They are skilled in deriving data, like geospatial data products and using computing technology and quantitative techniques to address geographical problems.

What makes this programme unique?

The South African Geomatics Council endorses the Bachelor of Science in Geoinformatics programme. Upon completing the Bachelor of Science in Geoinformatics , you can register as a Candidate Geomatics Practitioner (CGP) - GISc Technologist.

Career opportunities

Career opportunities include roles such as web programmer, geospatial data officer, geospatial software developer, mobile app developer, geovisualisation specialist, GIS project manager, GISc consultant, map designer, spatial data analyst, earth observation data analyst and systems analyst.

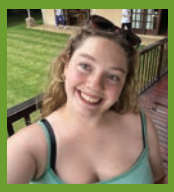
Which companies employ our graduates?

Graduates with a Bachelor of Science in Geoinformatics readily find work at organisations such as:

- The Environmental Systems Research Institute (ESRI) South Africa;
- Intergraph Systems Southern Africa;
- The Council for Scientific and Industrial Research (CSIR);
- The Agricultural Research Council (ARC);
- AfriGIS; GeoTerra Image; GISCOE; Zutari; Kartoza;
- The South African National Space Agency (SANSA);
- South Africa's national mapping organisation, National Geo-Spatial Information (NGI);
- Any municipality in the country;
- Government departments, such as the Departments of Forestry, Fisheries and the Environment (DFFE), Agriculture, Land Reform and Rural Development (DALRRD), Water and Sanitation (DWS), Science and Innovation (DSI) and Statistics South Africa (Stats SA).

'My decision to pursue Geoinformatics at the University of Pretoria was sparked by the realisation of GIS's limitless potential to solve real-world problems. I was particularly struck by its widespread applications during the COVID-19 pandemic in my first year of studies, when GIS became instrumental in tracking the virus's spread, identifying high-risk areas and optimising resource allocation. The ability to integrate spatial data with other disciplines – such as healthcare, urban planning and environmental management – truly fascinated me. UP's programme not only deepened my understanding of GIS's technical aspects but also fostered my passion for its transformative potential across diverse industries. I am confident that my education at UP has equipped me to make a meaningful impact in this exciting and rapidly evolving field.'

Sonet Vermaak – Bachelor of Science in Geoinformatics



'I study Geoinformatics as it is something that I feel is relevant to our current world and can be used in many applications. It has capacities beyond our imaginations and I have really enjoyed studying something so unique yet also so applicable in every domain. I've enjoyed learning many different skills and being exposed to various areas and fields such as programming, legislation, business and, of course, spatial applications. I've really enjoyed what the degree has given me so far and I can't wait to see what the future holds for GIS and where it will take me next. I highly recommend Geoinformatics to anyone interested in understanding and aiding the world around us. If you are keen to study something very dynamic and impactful, then this degree is for you.'

Scout Yatt – Bachelor of Science in Geoinformatics

'I chose this degree because I love the outdoors and the natural environment. I find it really fascinating to learn how mankind and society interact with one another, as well as how they interact with and influence the natural environment around them. Upon discovering this degree and reading through its yearbook, I knew that this was definitely the one for me. The intelligently designed outline of the course allowed me to choose a major I knew I would enjoy (Geoinformatics). It also allowed me to develop useful interdisciplinary skills that I know will be extremely useful in the working world and when applying for jobs.'

Kyle Theron – Bachelor of Science in Geography Option: Geography and Environmental Science, majoring in Geoinformatics

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Geoinformatics [3 years]	5	5	5	**34**

PHYSICAL SCIENCES

Geology

Bachelor of Science in Geology

Geology is the study of the Earth, including its formation, composition, structure and natural processes. South Africa is famous for its large reserves of gold, platinum, chromium, vanadium and other metal ores, as well as significant diamond and coal deposits.

Just an hour's drive from UP, you can reach the Karoo coalfields, the site of the Cullinan diamond discovery, the Bushveld platinum mines and the Witwatersrand gold mines. South Africa also features some of the Earth's oldest and best-exposed geology, along with important fossils that reveal the planet's history.

Who is the ideal candidate?

The programme requires an appreciation for mathematics and chemistry. A love for the Earth and working outdoors and an interest in geology or geomorphology will be beneficial. Depending on your personality, you can decide how you would like to divide your time between working in the field and working in the office.

What makes this programme unique?

UP is well situated within easy reach of the mining and applied geological industries and offers a strong programme in the applied fields of economic geology, structural geology and mechanics and engineering geology and hydrogeology. Candidates who successfully complete this programme qualify for professional registration as geological scientists.

Career opportunities

Geology is split into many subdisciplines which include mineralogy (the study of rock-forming minerals), petrology (the study of rock formation), structural geology (the deformation and behaviour of rock under stress) and economic or mining geology (identification of mineral resources and contribution to the day-to-day operations of mines).

As a geologist, you can choose whether you would prefer to work in a mine or laboratory, or as an exploration geologist in the field. The programme also allows entry into applied geological professions such as hydrogeology and engineering geology.

Apart from working in the mining industry, candidates also find employment at analytical facilities, in forensics or in the insurance industry.

Which companies employ our graduates?

Our graduates are employed as economic or exploration geologists in the mining industry, or work for parastatals (eg the Council for Geoscience, CSIR, MINTEK) or government departments (eg, the Department of Mineral Resources and Energy).

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Geology [3 years]	5	5	5	**34**

PHYSICAL SCIENCES

Geography, Geoinformatics and Meteorology

Bachelor of Science in Meteorology

The Bachelor of Science in Meteorology programme focuses on the study of atmospheric processes. An ideal candidate is someone who is fascinated by weather phenomena and is interested in all things concerned with natural science.

What makes this programme unique?

This is the only Meteorology programme offered in South Africa and the SADC region. A student who has successfully completed the Bachelor of Science Honours in Meteorology degree will be regarded as a Class 1 Meteorologist by the World Meteorological Organisation.

The Bachelor of Science Honours in Meteorology degree, which is required to become a professional meteorologist, complies fully with the Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology Volume I – Meteorology.

Which companies employ our graduates?

Meteorologists are employed by institutions involved in the study, interpretation and prediction of weather and climate-related phenomena.

Our graduates are employed at:
- The South African Weather Service (SAWS)
- International Weather Services and companies (for instance in New Zealand, Dubai and Australia)
- The Council for Scientific and Industrial Research (CSIR)
- Universities in South Africa and abroad

'I am studying the Bachelor of Science in Meteorology programme because I'm curious about the forces behind weather events like thunderstorms, heat waves and tropical cyclones. My dream job is to work as a weather forecaster, because providing accurate and timely forecasts is crucial for helping communities prepare for and mitigate the dangers of severe weather. Analysing satellite images and seeing the cloud patterns associated with these powerful systems is amazing!'

Mulisa Mudau – Bachelor of Science in Meteorology

Career opportunities

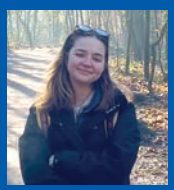
Researchers
They research all aspects of the weather and climate to improve humanity's understanding of atmospheric phenomena. Atmospheric modellers use supercomputers to solve complex flow dynamic equations of the atmosphere. The monitoring of air quality and the modelling of the impact of air pollution on society are two important aspects that need to be addressed. Research on climate change is receiving increasing attention.

Weather forecasters
The weather forecaster must analyse data and predict the weather by using models that are run on supercomputers. Weather forecasts are issued on different time scales, from very short-range forecasting to forecasts that are valid for months ahead, as well as seasonal forecasts. Private positions for people with this qualification include presenting the weather forecast on television.

Climatologists
They manage essential data sets that contain large volumes of information gathered by the SAWS and other organisations.

Consultants
Some meteorologists who work as consultants in the private sector and at universities provide specialised research services.

Lecturers
A few academic positions for meteorologists and climatologists are available at South African universities.



'I have a passion for meteorology because it propels me beyond the confines of conventional thinking, allowing me to delve into the intricate workings of our atmosphere each day. Embracing meteorology opens doors to a realm where every cloud, breeze and storm becomes a captivating puzzle waiting to be solved, fostering a profound understanding of our planet's dynamic nature.'

Anika Meyer – Bachelor of Science in Meteorology

Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Meteorology [3 years]	5	5	5	**34**

PHYSICAL SCIENCES

Physics

Bachelor of Science in Physics

The useful and transferable skills that physics students acquire in theoretical, experimental and computational physics equip them for a variety of career options. The Bachelor of Science in Physics programme will appeal to students who are passionate about understanding nature, are driven by curiosity, are interested in mathematics and are willing to put in the required effort.

What makes this programme unique?

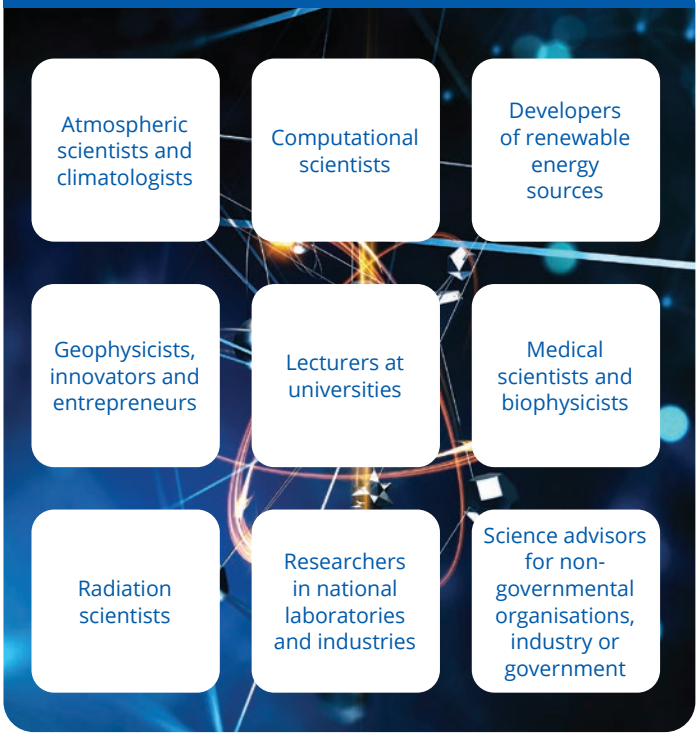
Physics students will develop their creativity, inventiveness, problem-solving abilities, analytical thinking skills and their ability to communicate complex ideas.

Which companies employ our graduates?

Our graduates are employed by organisations/companies such as:

- The Nuclear Energy Corporation of South Africa (NECSA)
- The South African Astronomical Observatory (SAAO)
- The Square Kilometre Array Observatory (SKAO)
- The South African National Space Agency (SANSA)
- iThemba LABS (Laboratory for accelerator-based Sciences)
- The Council for Scientific and Industrial Research (CSIR)
- Denel and IBM

Career opportunities



Application requirements

Programme	Application requirements for NSC/IEB for 2027			
	Achievement level			APS
	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
Bachelor of Science in Physics [3 years]	5	5	5	**34**

STUDENT LIFE/COMMUNITY ENGAGEMENT INITIATIVES

Student life

NATHouse

NATHouse is the official student house of the Faculty of Natural and Agricultural Sciences. By default, all students registered with the Faculty of Natural and Agricultural Sciences are members of NATHouse. Our logo, which shows a stem sprouting leaves, represents our belief that the desire to learn is a guide to life. It expresses our drive to continuously overcome daily difficulties by looking for new methods to solve them. Science is, after all, focused on research and innovation.

We aim to help students reach their academic goals and achieve optimal academic performance. The House also assists with non-academic issues and provides some 'off-the desk' activities to help students take a break from their studies.

Our Vision

We believe that the love of learning is a guide to life and aim to:

- motivate our student members to achieve academic excellence in the sciences;
- connect our members with the working sector, inspiring them to cultivate their talents and contribute to society;
- emphasise the value of sciences – on campus and in our communities;
- participate in university activities on various levels; and
- provide students with the necessary personal and professional development through personal and professional well-being sessions, various community engagement projects and sports.

Contact information

Address Faculty of Natural and Agricultural Sciences
Agricultural Annex 2–6
Hatfield Campus
Tel +27 (0)12 420 6540
Email nathousetuks@gmail.com
Website www.up.ac.za/nathouse

A problem shared is a problem halved! Visit us at our offices to discuss any issues, academic or non-academic that might be troubling you. We are here to assist you and while we are at it, we may even offer you some coffee!

Community engagement initiatives

Sci-Enza

Sci-Enza, the first science centre on the African continent, has been inspiring curiosity and raising science awareness for almost 60 years. Situated at the University of Pretoria, our mission is to make science fun and engaging for everyone, sparking excitement for learning across all ages.

With a passion for fostering public engagement, we aim to create a vibrant environment where science and imagination unite! Through hands-on exhibits, thrilling programmes and unforgettable experiences, we bring science to life both at our centre and through exciting outreach activities.

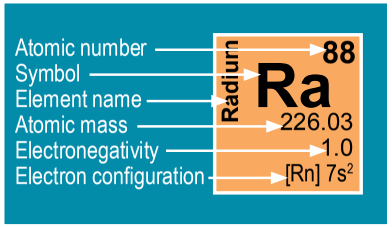
Sci-Enza is open weekdays during office hours. For more details or to book an appointment, call +27 (0)12 420 3767 or email sci-enza@up.ac.za.

Periodic Table of the Elements

- **Pink** *(left)*: the **s** block elements (consisting: hydrogen, alkali metals, alkaline earth metals).
- **Blue** *(middle)*: the **d** block elements (they are the transition metals).
- **Yellow** *(right)*: the **p** block elements (consisting:some metals, metalloids, non-metals, noble gases, and halogens).
- **Peach** *(two rows at the bottom):* the **f** block elements (they are the inner transition elements, consisting of actinides and lanthanides).
- **Symbols** printed in **solid black:** solids at 25˚C.
- **Symbols** printed in **white with outline:** gases at 25˚C.
- **Symbols** printed in **grey with outline:** liquids at 25˚C.

1 Ia	2 IIa	3 IIIb	4 IVb	5 Vb	6 VIb	7 VIIb	8 VIIIb	9 VIIIb	10 VIIIb	11 Ib	12 IIb	13 IIIa	14 IVa	15 Va	16 VIa	17 VIIa	18 VIIIa
Hydrogen **H** 1 1.0079 2.2 $1s^1$																	Helium **He** 2 4.0026 $1s^2$
Lithium **Li** 3 6.941 1.0 $[He]\ 2s^1$	Beryllium **Be** 4 9.0122 1.5 $[He]\ 2s^2$											Boron **B** 5 10.811 2.0 $[He]\ 2s^2\ 2p^1$	Carbon **C** 6 12.011 2.5 $[He]\ 2s^2\ 2p^2$	Nitrogen **N** 7 14.007 3.1 $[He]\ 2s^2\ 2p^3$	Oxygen **O** 8 15.999 3.5 $[He]\ 2s^2\ 2p^4$	Fluorine **F** 18.998 4.1 $[He]\ 2s^2\ 2p^5$	Neon **Ne** 10 20.18 $[He]\ 2s^2\ 2p^6$
Sodium **Na** 11 22.990 1.0 $[Ne]\ 3s^1$	Magnesium **Mg** 12 24.305 1.2 $[Ne]\ 3s^2$											Aluminium **Al** 13 26.982 1.5 $[Ne]\ 3s^2\ 3p^1$	Silicon **Si** 14 28.086 1.7 $[Ne]\ 3s^2\ 3p^2$	Phosphorus **P** 15 30.974 2.1 $[Ne]\ 3s^2\ 3p^3$	Sulphur **S** 16 32.066 2.4 $[Ne]\ 3s^2\ 3p^4$	Chlorine **Cl** 17 35.453 2.8 $[Ne]\ 3s^2\ 3p^5$	Argon **Ar** 18 39.948 $[Ne]\ 3s^2\ 3p^6$
Potassium **K** 19 39.098 0.9 $[Ar]\ 4s^1$	Calcium **Ca** 20 40.078 1.0 $[Ar]\ 4s^2$	Scandium **Sc** 21 44.956 1.2 $[Ar]\ 3d^1\ 4s^2$	Titanium **Ti** 22 47.88 1.3 $[Ar]\ 3d^2\ 4s^2$	Vanadium **V** 23 50.942 1.5 $[Ar]\ 3d^3\ 4s^2$	Chromium **Cr** 24 51.996 1.6 $[Ar]\ 3d^5\ 4s^1$	Manganese **Mn** 25 54.938 1.6 $[Ar]\ 3d^5\ 4s^2$	Iron **Fe** 26 55.845 1.6 $[Ar]\ 3d^6\ 4s^2$	Cobalt **Co** 27 58.933 1.7 $[Ar]\ 3d^7\ 4s^2$	Nickel **Ni** 28 58.693 1.8 $[Ar]\ 3d^8\ 4s^2$	Copper **Cu** 29 63.546 1.8 $[Ar]\ 3d^{10}\ 4s^1$	Zinc **Zn** 30 65.41 1.7 $[Ar]\ 3d^{10}\ 4s^2$	Gallium **Ga** 31 69.723 1.8 $[Ar]\ 3d^{10}4s^2\ 4p^1$	Germanium **Ge** 32 72.64 2.0 $[Ar]\ 3d^{10}4s^2\ 4p^2$	Arsenic **As** 33 74.922 2.2 $[Ar]\ 3d^{10}4s^2\ 4p^3$	Selenium **Se** 34 78.96 2.5 $[Ar]\ 4d^{10}4s^2\ 4p^4$	Bromine **Br** 35 79.904 2.7 $[Ar]\ 3d^{10}\ 4s^2\ 4p^5$	Krypton **Kr** 36 83.8 $[Ar]\ 3d^{10}\ 4s^2\ 4p^6$
Rubidium **Rb** 37 85.468 0.9 $[Kr]\ 5s^1$	Strontium **Sr** 38 87.62 1.0 $[Kr]\ 5s^2$	Yttrium **Y** 39 88.906 1.1 $[Kr]\ 4d^1\ 5s^2$	Zirconium **Zr** 40 91.2245 1.2 $[Kr]\ 4d^2\ 5s^2$	Niobium **Nb** 41 92.906 1.2 $[Kr]\ 4d^4\ 5s^1$	Molybdenum **Mo** 42 95.94 1.3 $[Kr]\ 4d^5\ 5s^1$	Technetium **Tc** 43 98.906 1.4 $[Kr]\ 4d^6\ 5s^1$	Ruthenium **Ru** 44 101.07 1.4 $[Kr]\ 4d^7\ 5s^1$	Rhodium **Rh** 45 102.91 1.5 $[Kr]\ 4d^8\ 5s^1$	Palladium **Pd** 46 106.42 1.4 $[Kr]\ 4d^{10}$	Silver **Ag** 47 107.87 1.4 $[Kr]\ 4d^{10}\ 5s^1$	Cadmium **Cd** 48 112.41 1.5 $[Kr]\ 4d^{10}\ 5s^2$	Indium **In** 49 114.82 1.5 $[Kr]\ 4d^{10}5s^2\ 5p^1$	Tin **Sn** 50 118.71 1.7 $[Kr]\ 4d^{10}5s^2\ 5p^2$	Antimony **Sb** 51 121.76 1.8 $[Kr]\ 4d^{10}\ 5s^2$	Tellurium **Te** 52 127.6 2.0 $[Kr]\ 4d^{10}\ 5s^2\ 5p^4$	Iodine **I** 53 126.904 2.2 $[Kr]\ 4d^{10}\ 5s^2\ 5p^5$	Xenon **Xe** 54 131.29 $[Kr]\ 4d^{10}\ 5s^2\ 5p^6$
Caesium **Cs** 55 132.91 0.9 $[Xe]\ 6s^1$	Barium **Ba** 56 137.33 1.0 $[Xe]\ 6s^2$	Lanthanum **La** 57 138.91 1.1 $[Xe]\ 5d^1\ 6s^1$	Hafnium **Hf** 72 178.49 1.2 $[Xe]\ 4f^{14}\ 5d^2\ 6s^2$	Tantalum **Ta** 73 180.95 1.3 $[Xe]\ 4f^{14}5d^3\ 6s^2$	Tungsten **W** 74 183.84 1.4 $[Xe]\ 4f^{14}\ 5d^4\ 6s^2$	Rhenium **Re** 75 186.21 1.5 $[Xe]\ 4f^{14}\ 5d^5\ 6s^2$	Osmium **Os** 76 190.23 1.5 $[Xe]\ 4f^{14}\ 5d^6\ 6s^2$	Iridium **Ir** 77 192.22 1.6 $[Xe]\ 4f^{14}\ 5d^7\ 6s^2$	Platinum **Pt** 78 195.08 1.4 $[Xe]\ 4f^{14}\ 5d^9\ 6s^1$	Gold **Au** 79 196.97 1.4 $[Xe]\ 4f^{14}\ 5d^{10}\ 6s^1$	Mercury **Hg** 80 200.59 1.5 $[Xe]\ 4f^{14}\ 5d^{10}\ 6s^2$	Thallium **Tl** 81 204.38 1.4 $[Xe]\ 4f^{14}5d^{10}6s^2 6p^1$	Lead **Pb** 82 207.20 1.6 $[Xe]\ 4f^{14}5d^{10}6s^2 6p^2$	Bismuth **Bi** 83 208.98 1.7 $[Xe]4f^{14}5d^{10}6s^2 6p^3$	Polonium **Po** 84 208.98 1.8 $[Xe]\ 4f^{14}5d^{10}6s^2 6p^4$	Astatine **At** 85 210 2.0 $[Xe]\ 4f^{14}5d^{10}6s^2 6p^5$	Radon **Rn** 86 222.02 $[Xe]\ 4f^{14}5d^{10}6s^2 6p^6$
Francium **Fr** 87 223.02 0.9 $[Rn]\ 7s^1$	Radium **Ra** 88 226.03 1.0 $[Rn]\ 7s^2$	Actinium **Ac** 89 227.03 1.0 $[Rn]6d^1 7s^2$	Rutherfordium **Rf** 104 261.11	Dubnium **Db** 105 262.11	Seaborgium **Sg** 106 266	Bohrium **Bh** 107 264	Hassium **Hs** 108 277	Meitnerium **Mt** 109 268	Darmstadtium **Ds** 110 271	Roentgenium **Rg** 111 272	Copernicium **Cn** 112 285	Nihonium **Nh** 113 286	Flerovium **Fl** 114 289	Moscovium **Mc** 115 289	Livermorium **Lv** 116 293	Tennesine **Ts** 117 294	Oganesson **Og** 118 294

Cerium **Ce** 58 140.12 1.1 $[Xe]\ 4f^2\ 6s^2$	Praseodymium **Pr** 59 140.91 1.1 $[Xe]\ 4f^3\ 6s^2$	Neodymium **Nd** 60 144.24 1.1 $[Xe]\ 4f^4\ 6s^2$	Promethium **Pm** 61 146.92 1.1 $[Xe]\ 4f^5\ 6s^2$	Samarium **Sm** 62 150.36 1.1 $[Xe]\ 4f^6\ 6s^2$	Europium **Eu** 63 151.96 1.0 $[Xe]\ 4f^7\ 6s^2$	Gadolinium **Gd** 64 157.25 1.1 $[Xe]\ 4f^7\ 5d^1\ 6s^2$	Terbium **Tb** 65 158.93 1.1 $[Xe]\ 4f^9\ 6s^2$	Dysprosium **Dy** 66 162.50 1.1 $[Xe]\ 4f^{10}\ 6s^2$	Holmium **Ho** 67 164.93 1.1 $[Xe]\ 4f^{11}\ 6s^2$	Erbium **Er** 68 167.26 1.1 $[Xe]\ 4f^{12}\ 6s^2$	Thulium **Tm** 69 168.93 1.1 $[Xe]\ 4f^{13}\ 6s^2$	Ytterbium **Yb** 70 173.04 1.1 $[Xe]\ 4f^{14}\ 6s^2$	Lutetium **Lu** 71 174.97 1.1 $[Xe]\ 4f^{14}5d^1\ 6s^2$
Thorium **Th** 90 232.04 1.1 $[Rn]\ 6d^2\ 7s^2$	Protactinium **Pa** 91 231.04 1.1 $[Rn]\ 5f^2\ 6d^1$	Uranium **U** 92 238.03 1.2 $[Rn]\ 5f^3\ 6d^1\ 7s^2$	Neptunium **Np** 93 237.05 1.2 $[Rn]\ 5f^4\ 6d^1\ 7s^2$	Plutonium **Pu** 94 244.08 1.2 $[Rn]\ 5f^6\ 7s^2$	Americium **Am** 95 244.06 1.2 $[Rn]\ 5f^7\ 7s^2$	Curium **Cm** 96 247.07 1.2 $[Rn]\ 5f^7\ 6d^1\ 7s^2$	Berkelium **Bk** 97 247.07 1.2 $[Rn]\ 5f^9\ 7s^2$	Californium **Cf** 98 251.08 1.2 $[Rn]\ 5f^{10}\ 7s^2$	Einsteinium **Es** 99 252.08 1.2 $[Rn]\ 5f^{11}\ 7s^2$	Fermium **Fm** 100 257.10 1.2 $[Rn]\ 5f^{12}\ 7s^2$	Mendelevium **Md** 101 258.10 1.2 $[Rn]\ 5f^{13}\ 7s^2$	Nobelium **No** 102 259 $[Rn]\ 5f^{14}\ 7s^2$	Lawrencium **Lr** 103 262.11 $[Rn]\ 5f^{14}\ 6d^1\ 7s^2$



For more information please visit our website at www.up.ac.za/nas

FLY@UP ASSIST FIRST-YEAR AWARDS

TABLE 1: FLY@UP ASSIST FIRST-YEAR AWARDS 2026 *Umalusi issued school-leaving certificates such as NSC, IEB and SACAI, irrespective of citizenship*		
Award A	**Qualifying average percentage**	**Amount**
Average percentage for the six (6) best subjects taken, excluding Life Orientation	80%–89.99%	R18 000
	90%–100%	R45 000
NOTE: Award B is only applicable if you achieved Award A.		
Award B*	**Qualifying average percentage**	**Amount**
Percentage obtained for Mathematics	80%–100%	R2 000
Percentage obtained for Advanced Mathematics	80%–100%	R2 000
Percentage obtained for Further Mathematics	80%–100%	R2 000
Percentage obtained for Alpha Mathematics	80%–100%	R2 000
Percentage obtained for Additional Mathematics	80%–100%	R2 000
Percentage obtained for Physical Sciences	80%–100%	R2 000
Percentage obtained for Advanced Physical Sciences	80%–100%	R2 000
Percentage obtained for Further Physical Sciences	80%–100%	R2 000

Conditions for the above awards:

- Table 1 primarily applies to UP candidates with Umalusi school leaving certificates (NSC, IEB and SACAI).
- FLY@UP Assist First-Year Awards are based on the final school-year examination results as issued by Umalusi via the Department of Basic Education.
- These awards are made automatically to first-time entering first-year registered undergraduate students who meet the award criteria. Students do not apply for these awards.
- First-time entering first-year students who register for studies at UP directly after Grade 12 (final school year) or who took a gap year(s) after their final school year and who meet the award criteria will be considered.
- Students who have previously registered at a tertiary educational institution before registration at UP will not be considered for FLY@UP Assist First-Year awards. Students who registered at UP in previous years, are also not considered.
- For candidates who present an NSC/IEB Certificate, the percentages obtained for the six (6) best subjects taken, excluding Life Orientation are used. Certain subjects are EXCLUDED in the calculation of average percentages:
  - Life Orientation
  - Practical Music Grade 4 and 5 (Note: Practical Music Grades 6, 7 and 8 are considered for inclusion in the calculation of the average percentage—if your music report for this subject is not part of your NSC report, please submit your official music report to the Student Service Centre at ssc@up.ac.za, before commencement of classes.)
- Mathematical Literacy, Technical Mathematics, Technical Sciences and equivalent subjects are not eligible for this award.
- *A candidate only qualifies for Award B if the candidate meets the criteria for Award A. Therefore, candidates who obtained 80% and above for the subjects in Award B only, will not be eligible for the subject awards.
- The calculation of the average percentage is based on the University of Pretoria's formula, per examination authority and not on the number of distinctions achieved.
- The average percentage is not rounded off.
- Results obtained for papers that have been re-marked are not considered for award purposes.
- This award will be cancelled for students who discontinue, are excluded or who terminate their studies for whatever reason during the year in which the award is made. No payouts of the award will be allowed.

TABLE 2: FLY@UP ASSIST FIRST-YEAR AWARDS 2026 *School-leaving certificates not issued by Umalusi. A maximum of R30 000 per student can be awarded, irrespective of citizenship*			
Cambridge Assessment International Education (CAIE)		**International Baccalaureate Diploma Programme (IBDP)**	
Award	**Amount**	**Award**	**Amount**
A-Level: A*, A or B symbol	R5 000	IBDP: Higher Level 6 or 7 symbol	R5 000
AS-Level: A symbol	R5 000	IBDP: Standard Level 7 symbol	R5 000

Conditions for the above awards:
The University of Pretoria (UP) reserves the right to amend award values without prior notice.

- The awards in Table 2 are made automatically to first-time entering first-year registered undergraduate students who meet the award criteria. Students do not apply for these awards.
- R5 000 is awarded per symbol and only once per subject achieved, eg if you achieved an A*, an A or a B-symbol on A-Level in Mathematics as well as an A-symbol on AS-Level in Mathematics, you will only be awarded R5 000 for Mathematics.
- First-time entering first-year students who register for studies at UP directly after Grade 12 (final school year) or who took a gap year(s) after their final school-year and who meet the award criteria will be considered.
- Students who have previously registered at a tertiary educational institution before registration at UP will not be considered for FLY@UP Assist First-Year awards. Students who registered at UP in previous years, are also not considered.
- Results obtained for papers that have been re-marked are not considered for award purposes.
- This award will be cancelled for students who discontinue, are excluded or who terminate their studies for whatever reason during the year in which the award is made. No payouts of the award will be allowed.
- Any international school-leaving qualification that can be converted to the UP bursary formula, based on the UP conversion approved guidelines, may be eligible for an award of up to R30 000.
- The University's decision is final.
- These awards are subject to the availability of funds.

TABLE 3: OTHER FLY@UP AWARDS 2026		
Award	**Amount**	**Who**
JuniorTukkie Grade 11 Empowerment Week Award	R16 000	The 40 learners with the best Grade 12 results (NSC or equivalent) who attended the JuniorTukkie Grade 11 Empowerment Week.
Grade 12 Dux Scholar Award	R11 000	This award will be applicable to schools identified by the University of Pretoria.
Vice-Chancellor's Previously Disadvantaged Group Award	R15 700	Top prospective African and Coloured students with the highest average percentage will be considered.
Vice-Chancellor's Distinguished Merit Award (VCDMA)	The award covers three years' tuition fees and additional years may be considered on a case-by-case basis. An amount of R150 000 can be awarded in the first year of study.	This offer will be made to: 1. The first-time entering first-year student who has achieved the highest overall average percentage in the final school-year results. 2. The first-time entering first-year student from a Quintile 1, 2 and 3 school who has achieved the highest overall average percentage in the final school-year results. Based on the decision of the University, additional awards may be offered. The terms and conditions of the full offer will be contained in the candidate's specific award letter.

Conditions for the above awards:

- Specific terms, conditions and exclusions do apply for each award in Table 3.
- These awards are made automatically to first-time entering first-year registered undergraduate students who meet the award criteria.
- Students do not apply for these awards.
- Qualifying students will be notified.

Contact information
Tel +27 (0)12 420 3111 | **Email** ssc@up.ac.za
Awards information www.up.ac.za/student-funding/article/2746337/flyup-assist-1st-year-awards
More information www.up.ac.za/article/2749200/fees-and-funding
For FLY@UP Assist Senior Undergraduate Awards 2026, refer to www.up.ac.za/fees-and-funding

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

jT Junior Tukkie

20 2004 - 2024
Discover, Learn, Grow

JuniorTukkie helps you to STEP UP.

Make today matter

1 Register for the JT App
(for learners, parents, teachers)

Where to find the **JuniorTukkie App**:
- Go to Google Play Store or Apple App Store and download the 'UP Mobile App'.
- Select 'Allow notifications'.
- On the 'Please select a Persona' screen, select 'JuniorTukkie'.

2 Become a JT member
(for Grade 9-12 learners)

Complete the **JuniorTukkie membership** form that is available on the JT App.
- On the JT App, click on the 'JuniorTukkie' tile.
- Then, select 'Become a JuniorTukkie'.

OR

Complete the JT membership form at www.up.ac.za/juniortukkie > Become a JuniorTukkie > Register for JT membership

3 Join jTOnline
(for Grade 8-12 learners)

Join **jTOnline** to improve your marks in Mathematics, Physical Sciences, Accounting, Life Sciences and English. jTOnline will prepare you to connect with a world of opportunities.
- On the JT App, select the 'jTOnline' tile.

OR

Go to juniortukkie.online
- Complete the jTOnline registration form.

4 Consult a student advisor
(for Grade 9-12 learners)

Consult a **student advisor** to:
- decide on Grade 10 subject choices;
- discuss study and career options; and
- assist with your UP application.

Email carol.bosch@up.ac.za

5 Join JTSAS and JT Alumni
(for students, graduates and postgraduates)

Join the **JT Student Ambassadors Society (JTSAS)** and **JT Alumni** for students, graduates and postgraduates. We will:
- equip you with the skills to succeed at university;
- develop your leadership skills, among others; and
- provide you with opportunities to give back to society.

Register at www.up.ac.za/juniortukkie > Become a JuniorTukkie

#JoinJT

2027

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Natural and Agricultural Sciences

Fakulteit Natuur- en Landbouwetenskappe
Lefapha la Disaense tša Tlhago le Temo

University of Pretoria
Private Bag X20, Hatfield, 0028, South Africa
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www.up.ac.za

Make today matter

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