University of Pretoria

Undergraduate Faculty Brochure
Natural and Agricultural Sciences
2014/15

Photo: Prof Rudi van Aarde

Photo: Prof Don Cowan

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2014/15

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Message from the Dean

Have you ever wondered who is responsible for the quality of the chocolate, canned beverages or pancake mixture you buy in the shops? What is the science behind a cricket ball or pitch? What is nanotechnology? How do specialists treat cancer patients with nuclear technology, or tuberculosis with phytomedicine? Why are actuaries the highest paid professionals in the world?

The Faculty of Natural and Agricultural Sciences offers graduate programmes that are not only at the forefront of the various disciplines, but also equip graduates to be leaders and problem-solvers in their chosen professions. The key to the Faculty's success is the high premium it places on quality education, research and innovation. This is embodied in the Faculty's approach to training and research – and above all, in the problem-solving mindset it nurtures in students.

The University of Pretoria aims to be internationally competitive, while at the same time being locally relevant. Its disciplines of plant and animal sciences are currently ranked the highest of all South African universities, based on citations (ie the number of times that an author's work has been referred to in academic publications) and the number of research papers produced by academics in the Faculty (according to the essential science indicators of the ISI Web of Knowledge).

Local relevance is assured through close cooperation with industry. In this field, the University has deployed a number of innovations. Its strategic alliance with the Council for Scientific and Industrial Research (CSIR), known as the Southern Education and Research Alliance (SERA), creates unequalled training and research opportunities for students and staff. The Innovation Hub right next to the University's experimental farm is a project of SERA and the Gauteng Provincial Government. Some of the world's foremost high-technology firms are establishing research and development laboratories at the Innovation Hub.

National and international accreditation is the norm for both graduate programmes and research laboratories. The Faculty is serious about ensuring that the market value of the degrees it awards will always give its students a competitive advantage. The Faculty adds value to its degrees, and has a good reputation in the market, which makes its students sought after.

The study programmes of the Faculty of Natural and Agricultural Sciences are accessible to everybody who meets the Faculty's academic standards. All undergraduate study programmes with adequate student numbers are presented in both English and Afrikaans (except in certain instances, such as Actuarial Sciences, where programmes are only presented in English). The University has various financial aid schemes to assist deserving students with bursaries and loans.

The Faculty is involved in several outreach programmes, such as the well-known UP with Science Programme and the BSc (Four-year programme). Learners with a love for the unknown, a curious mind and a will to work hard are welcome to apply.

Prof Anton Ströh
Dean: Faculty of Natural and Agricultural Sciences

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Produced by the Client Service Centre in November 2013.
Comments and queries can be directed to csc@up.ac.za or tel: +27 (0)12 420 311.

Introduction

The Faculty of Natural and Agricultural Sciences is a diverse faculty with 17 departments, supported by 22 centres and institutes that form an integral part of the departments. More than 5 000 students register in this Faculty annually, of which 70% are undergraduate and 30% are postgraduate students.

All study programmes are designed to produce problem-solving individuals who can easily adapt to changing circumstances and take the lead in their chosen fields of specialisation. The qualifications awarded are of world-class quality and provide access to a multitude of career opportunities for dynamic and creative people. Some of the Faculty's courses are unique to the University of Pretoria, while other programmes are also offered at a few other institutions, which include:

Undergraduate and postgraduate degrees are presented in the following fields:

Biological Sciences	Agricultural and Food Sciences
• Biochemistry • Biotechnology • Ecology • Entomology • Genetics • Human Genetics • Human Physiology • Human Physiology, Genetics and Psychology • Medical Sciences • Microbiology • Plant Science • Zoology	• Agricultural Economics/Agribusiness Management • Animal Science • Food Sciences and Technology • Food Management • Nutrition • Plant Pathology • Plant and Soil Sciences • Wildlife Management (Postgraduate) **Programmes in Consumer Science** • Food: Retail Management • Hospitality Management • Clothing: Retail Management
Physical Sciences	**Mathematical Sciences**
• Chemistry • Environmental and Engineering Geology • Environmental Sciences • Geography • Geoinformatics • Geology • Meteorology • Physics	• Actuarial and Financial Mathematics • Applied Mathematics • Mathematical Statistics • Mathematics

Unique programmes in the Faculty:

BSc (Nutrition): This is the only degree of its kind in South Africa that is offered on an undergraduate and postgraduate level. It includes two options: Nutritional Sciences and Public Health Nutrition.

BSc (Meteorology): This is the only degree of its kind offered in sub-Saharan Africa on an undergraduate and postgraduate level.

MSc in Applied Mineralogy: In South-Africa this postgraduate qualification is only offered at the University of Pretoria.

Undergraduate study programmes

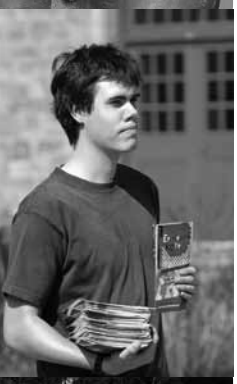
Faculty of Natural and Agricultural Sciences

Important information on undergraduate study programmes for 2015

• In order to register, NSC/IEB/Cambridge candidates must comply with the minimum requirements for degree studies as well as the minimum requirements for the relevant study programme. • Life Orientation is excluded in the calculation of the Admission Point Score (APS). • Grade 11 results are used for the provisional admission of prospective students. Final admission is based on the Grade 12 results.

University of Pretoria website: www.up.ac.za | **National Benchmark Test website: www.nbt.ac.za**

Study programme Duration Closing dates Careers	Minimum requirements for 2015												
	Achievement level												APS
BIOLOGICAL SCIENCES	Afrikaans or English				Mathematics				Physical Science				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BSc (Biochemistry) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Biochemistry offers virtually unlimited opportunities for exciting and challenging careers in industry (fine chemicals, food and pharmaceutical industry and waste processing firms) and research councils, such as the Medical Research Council (MRC), the Agricultural Research Council (ARC), the Cancer Association of South Africa and the Water Research Commission, as well as institutes, academic institutions, the Council for Scientific Research (CSIR) and forensic and pathology laboratories. Career opportunities include those of researchers, teachers, lecturers and medical representatives. Bioinformatics graduates are comfortable in work environments such as universities, research institutes, pharmaceutical companies, biotechnology companies and related industries.													
BSc (Biological Sciences) Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
This is a generic first-year programme in Biological Sciences. Students, who are not sure which specialisation degree programme to choose, may apply for this study programme. Students who intend on applying for admission to MBChB or BChD in the second semester when places become available in those programmes may register in the first semester for BSc (Biological Sciences) modules, replacing Mathematics (WTW 134) with Science and World Views (FIL 155), People and their Environment (MGW 112) and Medical Terminology (MTL 180), with the provision that these students, should they not be selected and should they wish to continue with one of the Biological Sciences study programmes, must complete Mathematics (WTW 134) in the second semester of their first year. Students who wish to apply for admission to one of the BVSc places that become available in the second semester of the same year may register for the prescribed subjects of Biological Sciences and for MTL 181 in their first semester. These students must register for WTW 134 in the first semester.													
BSc (Biotechnology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Graduates find work mostly 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/qualification plays an important role in determining what type of work a qualified biotechnologist can become involved in.													
BSc (Ecology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Environmentally based statutory and private conservation organisations, organisations involved in the direct or indirect use of natural resources, and academic and training institutions													
BSc (Zoology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Graduates of the Department of Zoology and Entomology can look forward to a range of exciting career prospects. They could be employed at nature conservancies, environmental consultancies, conservation planning agencies, medical and veterinary research institutions, biochemical and biotechnology industries, educational institutions, IT-related fields and the corporate sector. Career opportunities include the full spectrum of potential activities involved in modern research, development and training. These range from fulltime involvement in the field or laboratory to full-time training activities, and usually include a stimulating combination of analytical work, fieldwork and human resources-related work.													
BSc (Entomology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Employment at nature reserves, environmental consultancies, conservation planning agencies, the biochemical and biotechnology industries, medical and veterinary research, pest management, educational and research institutions, IT-related fields and the corporate sector													
BSc (Genetics) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August BSc (Human Genetics) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Graduates in Genetics 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 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/qualification plays an important role in determining what type of work a qualified geneticist can become involved in.													



Study programme Duration Closing dates Careers	Minimum requirements for 2015												
	Achievement level												APS
BIOLOGICAL SCIENCES	Afrikaans or English				Mathematics				Physical Science				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BSc (Human Physiology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August BSc (Human Physiology, Genetics and Psychology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Research is performed in cooperation with medical teams in private and government research laboratories, such as the CSIR and the MRC, the South African Bureau of Standards (SABS), pharmaceutical firms, universities, veterinary and industrial institutions, state departments (for example, the Department of Health) and health farms. Physiologists are also found in various other fields, such as education (teachers, lecturers and instructors), sport physiology, biostatistics, bioengineering, industrial hygiene, journalism, medical technology and in the industry as representatives of pharmaceutical firms. Graduates who completed their degrees with genetics and psychology also have access to postgraduate programmes offered by the departments of Genetics and Psychology (in the Faculty of Humanities).													
BSc (Medical Sciences) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Postgraduate studies are highly recommended. Honours, master's and doctoral degrees can be obtained in any of the subdisciplines of anatomy, namely neuro-anatomy, clinical anatomy, cell biology, physical and forensic anthropology, histology and embryology. Students who obtain this degree can also continue with postgraduate studies in Physiology, Genetics and Pharmacology. Career opportunities include research in any of the anatomy subdisciplines, academia, forensic sciences and the health science industry. Other careers that can be considered are in the sport sciences, virology, chemical pathology, immunology, health administration or ergonomics. Technical careers, for example, in the anatomy or physiology departments of universities, are also possible. There are only 72 places in the first year of BSc (Medical Sciences). Students who apply for BSc (Medical Sciences) as their first choice before 30 September and who meet the minimum entrance requirements will be admitted until the places are full. Students who indicate it as their second choice and who meet the minimum entrance requirements will be put on a waiting list and will be considered in January of the first year of study, if places are available.													
BSc (Microbiology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Microbiologists can pursue a variety of careers, ranging from practical applications to basic research. Career opportunities are available in the food, dairy, beer, wine and baker's yeast industries, in the fermentation industry, and at mines with regard to corrosion control. Graduates can also follow careers as medical or veterinary microbiologists, as researchers at organisations such as the CSIR, the MRC or the ARC, or as lecturers and researchers at various academic institutions.													
BSc (Plant Science) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Careers range from working in a laboratory to studying plants in their natural environment. Employment could be at biotechnology and pharmaceutical firms, South African National Parks, private ecological companies, research institutions such as the CSIR, the ARC, the South African National Biodiversity Institute, etc.													
Biological Sciences study programmes: Candidates who do not comply with the minimum admission requirements above, because they obtained a NSC/IEB achievement level of 4 in one of the prescribed prerequisite subjects, are required to write the NBT and may be considered for admission to the BSc or the BSc (Four-year Programme) based on the results of the NBT.													
BSc (Four-year Programme) – Biological and Agricultural Sciences NBT compulsory	4	3	D	D	4	3	D	D	4	3	D	D	24

Study programme Duration Closing dates Careers	Minimum requirements for 2015												
	Achievement level												APS
PHYSICAL SCIENCES	Afrikaans or English				Mathematics				Physical Science				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BSc (Chemistry) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	32
Careers: Graduates in Chemistry are employed in most technology based institutions and work in a laboratory environment as part of an industrial, research or academic institution. A chemist must be able to participate in teamwork in a multidisciplinary environment in 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 skills and financial planning. Many career opportunities are found in the sectors of education, research, journalism, environmental protection, food and beverages, energy, water, health, sport, pharmaceutics and cosmetics, geology, mining and law enforcement. These include the well-known professions of synthetic chemists, materials scientists, chemical pathologists, forensic chemists, analytical chemists, drug analysts, patent lawyers, environmental chemists, geochemists, food chemists, polymer chemists and soil chemists.													

Study programme Duration Closing dates Careers	Minimum requirements for 2015												
	Achievement level												APS
PHYSICAL SCIENCES	Afrikaans or English				Mathematics				Physical Science				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BSc (Physics) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	32
Careers: University academics, whose duties include lecturing, research and the supervision of postgraduate students, 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), researchers in industry such as at the CSIR or Element Six, science advisors for non-governmental organisations, industry or government, radiation scientists, medical and biophysicists, atmospheric scientists and climatologists, developers of renewable energy sources, geophysicists, innovators and entrepreneurs, computational scientists, etc. International collaboration with experts from abroad also takes place.													
BSc (Geography) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	32
Careers: There are three main career fields in geography: teaching, research and the application of geographical knowledge and skills in practice. Geographers can focus on environmental management, urban issues such as squatting, regional and rural development, or environmental issues, including pollution and the destruction of ecosystems through activities such as mining, agriculture and tourism. Geographers in the private sector are generally employed by real estate, planning, architecture and engineering firms, banks, tourism organisations, environmental conservation bodies and industry. Government departments involved in forestry, water and land affairs, the environment, tourism and education also employ geography graduates. Parastatal organisations such as the SABS and the CSIR offer career opportunities in the various specialised fields related to the earth and environmental sciences. Many geographers are self-employed. They are mainly involved in areas such as marketing, planning, development, tourism, cartography, geographic information systems (GIS), remote sensing, environmental analysis and environmental auditing. Graduates can also pursue academic careers.													
BSc (Geoinformatics) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	32
Careers: Graduates are employed, among others, in agriculture, mineral exploration, engineering, forestry, water resource management, weather forecasting, environmental impact assessment (EIA), land-use planning, land development, rural community development, transport planning, tourism, market research, crime prevention, vehicle tracking, cartography, GIS technology, environmental planning and analysis, and disaster and environmental management. Graduates can apply for professional registration as GIS technologists with the South African Council for Professional and Technical Surveyors (PLATO).													
BSc (Geology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	32
Careers: Large international mining companies are major employers of geologists and other geoscientists in research, exploration and mining projects. However, employment is increasingly to be found in smaller, entrepreneurial firms ("juniors"). Interesting careers are also offered by the Council for Geosciences, the CSIR, the Council for Mineral Technology (MINTEK), the Department of Water Affairs and at museums, engineering firms and consulting companies. Graduates may even operate as self-employed consultants in their own firms. Laboratory specialists like 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, in order to provide valuable information prior to construction. They also locate and evaluate suitable construction materials. The task of the hydro geologist is to look for groundwater and monitor the responsible exploitation of that water.													
BSc (Meteorology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	32
Careers: Meteorologists are employed by institutions involved in the study, interpretation and prediction of weather and phenomena relating to the climate. The South African Weather Service (SAWS), the CSIR, some universities, agricultural institutions and general industries employ meteorologists who mainly practise as specialists in the following areas. Researchers: They research all aspects of the weather and climate in order to improve 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 into climate change is receiving increasing attention. Weather forecasters: It is the duty of the forecaster to 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 valid for months ahead, as well as seasonal forecasts. There are also some private weather forecasting positions, such as presenting the weather on television. Climatologists: They manage important 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 are available for meteorologists and climatologists at South African universities. They ensure that the training of meteorologists meets international standards.													
BSc (Environmental Sciences) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	32
Careers: Environmental consultants, air quality managers, environmental impact analysts, environmental protection agents, hazardous material specialists, public health educators, researchers, water quality specialists, natural resource managers, risk managers, environmental educators, wetlands scientists, wildlife conservationists, environmental planners and analysts, wastewater treatment experts, programme and project managers, natural resources experts, researchers													
BSc (Environmental and Engineering Geology) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	32
Careers: Geologists, mineralogists, extraction metallurgists, economic geologists, geochemists, environmental and engineering geologists, geohydrologists, laboratory specialists, consultants													

Study programme Duration Closing dates Careers	Minimum requirements for 2015												
	Achievement level												APS
PHYSICAL SCIENCES	Afrikaans or English				Mathematics				Physical Science				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
Physical Sciences study programmes: Candidates who do not comply with the minimum admission requirements may be considered for admission to the BSc or the BSc (Four-year Programme) based on the results of the NBT.													
BSc (Four-year Programme) – Physical Sciences NBT compulsory	4	3	D	D	4	3	D	D	4	3	D	D	26

Study programme Duration Closing dates Careers	Minimum requirements for 2015												
	Achievement level												APS
AGRICULTURAL AND FOOD SCIENCES	Afrikaans or English				Mathematics				Physical Science				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BSc (Food Management) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Food service managers, quality controllers, teachers, researchers, food product developers, marketers, entrepreneurs, consultants, food journalists, teachers and trainers													
BSc (Food Science) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
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, food bio-scientists (brew masters, flavourists) in the food, food agro processing and related industries. The work environment of food scientists includes laboratories, food production sites and business premises, training areas, retail, government institutions and research organisations. Food scientists also work in industries and companies that manufacture and supply materials (packaging and food additives, such as colourants and flavourants) for the food industry or that have secondary involvement in food production and sales.													
BSc (Nutrition) • Nutritional Sciences • Public Health Nutrition **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
BSc (Nutrition): This four-year programme will provide for some specialisation in the third and fourth years of study by means of two options. The University of Pretoria is in the process of registering the Public Health Nutrition option with the Health Professions Council of South Africa (HPCSA). Students following the Nutritional Sciences option will be able to register as natural scientists with SACNASP and will be able to continue with a research-based MSc in Nutrition. The proposed programme will replace the existing BSc programme in Nutrition and Food Science. Students who wish to be selected to be admitted to the third year of Public Health Nutrition will have to apply at the CSC during the second year of registration with closing date 30 July of the preceding year. Only students who have passed all first and second-year prescribed and elective modules will be considered for selection. **Careers:** The need for graduates with training in nutrition is driven by the worldwide recognition that food does not only meet basic nutrition needs, but also plays a key role in the promotion and maintenance of long-term good health. Graduates from this four-year transdisciplinary programme will be able to specialise either as community nutritionists (registered with the HPCSA) or as nutritional scientists. Career opportunities include working in food or related industries (such as pharmaceutical companies), government departments, international organisations (such as the Food and Agricultural Organisation (FAO) and the World Health Organisation (WHO)) or research organisations, and as account managers and advisors in the food, health and consumer sectors.													
BScAgric (Food Science and Technology) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
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 and food bio-scientists (brew masters, flavourists) in the food, food agro-processing and related industries. The work environment of food scientists includes laboratories, food production sites and business premises, training areas, retail, government institutions and research organisations. Food scientists also work in industries and companies that manufacture and supply materials (packaging and food additives, such as colourants and flavourants) for the food industry or that have secondary involvement in food production and sales.													
BScAgric (Agricultural Economics/ Agribusiness Management) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Agricultural economists are involved in many different areas of the economy. Some are involved in analysing and understanding consumers' behaviour in terms of their wants, needs and willingness to pay for food and clothing. Other agricultural economists are involved in environmental management and assisting government and businesses to ensure the sustainable use of scarce resources such as water and arable land. Some agricultural economists are traders on global financial markets and work at the Johannesburg Stock Exchange (JSE) in Sandton or at Wall Street in New York. Some other agricultural economists work for banks and in finance, at food processors such as bakers and brewers, while others advise farmers and input suppliers. Some agricultural economists work for the government, advising them on how to ensure that there is enough food for all the people in the country, while other agricultural economists work in commercial banks, advising clients and managers how to manage finance, risk and commodity markets. Agricultural economists also play a vital part in research and development in the agricultural sector. Agricultural economists travel a lot and meet many interesting people. They travel both locally and to most other parts of the world, such as Africa, the USA, China, South America, Australia and Europe. They do this to buy the best inputs to produce food and clothing, but also to identify and understand markets for products. Therefore an agricultural economist is somebody who is interested in people and their culture, in nature, but also in business and management. An agricultural economist needs to be able to interact with people, but also use statistics and mathematics to understand the interaction between people, nature and the economy.													

Study programme Duration Closing dates Careers	Minimum requirements for 2015												
	Achievement level												APS
AGRICULTURAL AND FOOD SCIENCES	Afrikaans or English				Mathematics				Physical Science				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BScAgric (Animal Science) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August BScAgric (Animal Science/Pasture Science) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Animal science is a career that makes an important contribution to agriculture in South Africa. This career is focused on the application of the scientific aspects of animal production and quality control of the products to ensure consumer satisfaction. It is an actual field of science, subject to the most recent research and needs of both animals and humans. There are numerous career opportunities for animal and wildlife scientists in research, commercial farming, the public sector and for professionals in the animal science industry. Animal scientists can work on different levels in these sectors, ranging from researchers, animal nutrition or breeding consultants, technical representatives, game managers and policy-makers. The BScAgric (Animal Science) degree is acknowledged as a professional qualification by the South African Council for Natural Scientists in terms of Act 106 of 1993, and is recognised internationally.													
BScAgric (Plant Pathology) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Seed cultivators, farmers, researchers, lecturers, consultants													
BScAgric (Applied Plant and Soil Sciences) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	5	3	C	C	5	3	C	C	30
Careers: Education and training at schools and academic institutions. Research and management at various public and private institutions Public sector: The Agricultural Research Council (ARC), Department of Water and Environmental Affairs, Department of Tourism, Department of Agriculture, Forestry and Fisheries, Department of Mineral Resources, Department of Energy, the CSIR, provincial agriculture and nature conservation departments, the South African National Biodiversity Institute, municipalities, South African National Parks, national farming and food production agencies, etc. Private sector: Companies involved in seed, fertilizer and plant protection research and development, environmental planning and management, nurseries, vegetable, fruit and ornamental cut flower production, irrigation, etc. Extension services involving knowledge transfer: Nature conservation, national and provincial departments of agriculture and the environment, environmental management and rehabilitation, nurseries, crop, turf grass and weed management, private companies servicing field crops, vegetables, medicinal and aromatic plants, fruit, ornamental and cut flower production, etc. Entrepreneurial: Consultants in crop, pasture, vegetable, medicinal and aromatic plants, ornamental and cut-flower production systems and landscaping enterprises. Management of own farms and nurseries for extensive (field) or intensive (tunnel/greenhouse) production systems involving various crops. Managing companies specialising in irrigation, reclamation and soil conservation													
Agricultural and Food Sciences study programmes: Candidates who do not comply with the minimum admission requirements may be considered for admission to the BScAgric or the BSc (Four-year Programme), based on the results of the NBT. Please note that students who are placed in the BSc (Four-year Programme) will take a minimum of five years to complete the BScAgric study programme.													

Study programme Duration Closing dates Careers	Minimum requirements for 2015								
	Achievement level								APS
CONSUMER SCIENCES	Afrikaans or English				Mathematics				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BConsumer Science (Clothing: Retail Management) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	4	3	D	D	28
Careers: Retail management: Floor or store managers, visual merchandisers, buyers in the fashion industry, fashion advertising, fashion journalists, textile technologists (quality controllers) and entrepreneurs									
BConsumer Science (Foods: Retail Management) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	4	3	D	D	28
Careers: Managers in restaurants, catering, food service, marketing or sales managers, educators and trainers, journalists, consumer consultants, entrepreneurs, and marketing or sales managers									
BConsumer Science (Hospitality Management) **[4 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	4	3	D	D	28
Careers: Hotel and restaurant managers, hotel chefs de cuisine (executive chefs), hotel executive housekeepers, marketing, sales or catering managers, educators and trainers, journalists, consumer consultants, entrepreneurs									
Consumer Sciences study programmes: Candidates who do not comply with the minimum admission requirements may be considered for admission to the BConsumer Science study programme based on the results of the NBT. Please note: No extended programme is offered in BConsumer Science.									

Study programme Duration Closing dates Careers	Minimum requirements for 2015								
	Achievement level								APS
MATHEMATICAL SCIENCES	Afrikaans or English				Mathematics				
	NSC/IEB	HIGCSE	AS-Level	A-Level	NSC/IEB	HIGCSE	AS-Level	A-Level	
BSc (Actuarial and Financial Mathematics) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	7	1	A	A	34
Careers: Actuarial and financial mathematics is a popular field, with career opportunities in the business market and at investment institutions like banks and insurance companies. The skills of mathematicians are essential in portfolio management and the modelling of financial risk. This programme prepares students for professional careers as actuaries or financial engineers. For actuaries or actuarial technicians, activities include long-term capital projects, designing the benefits of medical schemes, the management of pension funds, the determination of contributions and financial management on a sound long-term basis, the evaluation of investments in shares, property and other transactions, and the determination of the premiums and reserves for outstanding claims of insurers. 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 such as options), designing new financial products, and devising strategies to control credit risk.									
BSc (Mathematics) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August BSc (Applied Mathematics) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	6	2	B	B	32
Careers: Graduates in mathematics and applied mathematics are employed by research institutions, educational bodies (universities and schools), the public sector (government, medical institutions, etc) and the private sector (engineering companies, financial institutions, the computer industry, etc). These graduates' training in abstract, analytical and computational thinking provides them with the background 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.									
BSc (Mathematical Statistics) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	3	C	C	6	2	B	B	32
Careers: Financial institutions: Statisticians specialising in economic applications of statistics (econometrics) deal with aspects such as national production and expenditure, international economic relations, employment, public finance and related issues. In the insurance business, statisticians are employed in areas such as actuarial work, marketing, share investments and property investments. Market research organisations play an indispensable role in the gathering of information that is used to improve the quality of decision-making in various industries. Industry: Statisticians are increasingly employed in industries such as mining and production, and government corporations, for example, Eskom, Sasol, AECI, and the pharmaceutical industry in general. Organised agriculture is another vitally important industry where sophisticated statistical techniques are used to meet the growing demand for food and services. Research councils: Research councils and educational institutions are well-known large employers of scientists of diverse disciplines and employ statisticians to ensure scientifically founded research outputs. These include the MRC, the CSIR, the ARC and the HSRC. Statisticians are also involved in the training of students at universities. The challenges of modern education and good research are of great relevance, especially in South Africa. The public sector: The government employs statistically proficient people in many of its departments, the most prominent being Statistics South Africa. This department is responsible for the five-yearly population census and the calculation of well-known economic indicators like the inflation rate.									
Mathematical Sciences study programmes: Candidates who do not comply with the minimum admission requirements for BSc (Actuarial and Financial Mathematics) and who obtained an APS of 30 to 33 and a minimum of 6 for Mathematics may be considered for admission to BSc (Actuarial and Financial Mathematics) or another degree in Mathematical Sciences based on the results of the NBT. Candidates who do not comply with the minimum admission requirements of the other study programmes may be considered for admission to BSc (Mathematics) or BSc (Mathematical Statistics) or for the BSc (Four-year Programme) based on the results of the NBT.									
BSc (Four-year Programme) – Mathematical Sciences NBT compulsory BSc (Actuarial and Financial Mathematics): Admissions from the BSc (Four-year Programme) to the BSc (Actuarial and Financial Mathematics) study programme will only be considered if students have passed all their first-year modules with an average percentage of at least 60% as well as a minimum percentage of 60% for WTW 143 and WTW 153.	4	3	D	D	5	3	C	C	26

More about the BSc (Four-year Programme)

The BSc (Four-year programme) provides access to science and science-based study programmes by setting lower entrance requirements than the entrance requirements for the BSc and BScAgric study programmes. It offers intensive training in order to prepare students for further studies in the normal BSc and BScAgric study programmes. The study programme is accessible to all Grade 12 candidates.

The study programme will be presented in English only. Students admitted to the BSc (Four-year programme) will attend classes at the Mamelodi Campus during the first year. Accommodation is available close to the Mamelodi Campus at the Naledi Residence, situated in the Savannah Estate. Students who successfully complete their first year, will attend lectures on the Hatfield Campus from their second academic year onwards.

The duration of the first phase of the study programme is 18 months (three semesters), during which students are trained and developed academically and psychologically for further studies. Students who successfully complete the first phase will obtain credits equivalent to the first semester of the first year of the BSc and BScAgric study programmes and may register for the modules of the second semester of a preferred first year in BSc or BScAgric. Transfer to the second year of the specific BSc or BScAgric study programme takes place in the third year of registration. The BSc (Four-year programme) covers the following subject fields: mathematical sciences, biological and agricultural sciences, and physical sciences. Students who wish to follow a career in engineering, should apply for the BSc (Four-year programme) – Physical Sciences, and those who wish to study in the health sciences or veterinary science, should apply for the BSc (Four-year programme) – Biological and Agricultural Sciences.

Features of the study programme

- In the first phase, the academic content is delivered at a pace that is slower than in the normal study programmes, so that students have more time to engage with the subject content and develop a deep understanding of the material. During the three semesters of this phase, the pace will be increased gradually. By the time students have completed the first phase, they should be able to work at the normal speed required of university students.
- There are extra modules and support to help students cope at university. These are language and study skills courses (focusing on the use of language in science), career guidance and counselling.
- Most of the teaching and learning takes place in smaller groups. This gives ample opportunity for interaction, questions and discussion.
- In addition to small classes, students also attend lectures in large groups, where the teaching style is more formal. This is excellent preparation for the second phase of the programme.
- A variety of methods are used to deliver subject content to remedy possible gaps in school knowledge. The programme focuses on understanding and develops critical thinking skills as well as the practical skills needed to continue with the subject.

Biological Sciences

Department of Biochemistry

The role of biomolecules in all living systems is studied in order to explain life processes, and structural and functional aspects of the macromolecules of the cell. By using modern techniques of genome analysis, determination of selective gene expression and metabolic profiles, challenges of national and international scope are addressed, such as HIV/AIDS, malaria, tuberculosis and animal diseases. Students who are interested in this field will be able to apply their knowledge in the fields of agriculture, veterinary science and medicine.

Description of the study programme

Biochemistry consists of different areas of specialisation. During the first year of study, students are exposed to a broad range of subjects in the biological and agricultural sciences. In the second and third year, they specialise in chemistry and biochemistry, and their fundamental knowledge is supplemented by appropriate practical studies that give them the opportunity to learn the principles and methodology of research. In the third year, macromolecules, including DNA, proteins and the immune system, are studied in detail in subjects such as proteome analysis, xeno-biochemistry, enzymology and immunobiology. Meaningful subject combinations are chemistry, microbiology, genetics and physiology. All subjects include theoretical and practical aspects. Students are provided with the opportunity to include elective modules of interest in the study programme. Postgraduate studies in this programme include honours, master's and doctoral degrees. The one-year honours degree generally includes a strong self-study component, exposure to a broad range of applicable technologies and a research project. At master's and doctoral level, students are required to complete research projects in one of the research fields of the Department, which include HIV/AIDS, malaria, tuberculosis, tick-related diseases and plant medicines.

Bioinformatics

Bioinformatics is the application of computer science, mathematics, statistics and informatics techniques to biological data. The biological data may be in the form of protein or nucleic acid sequences, whole genomes, macromolecular structures, expression levels, transcription levels or metabolic pathway models. Bioinformatics has applications at various levels, from pure application to biological problems, to software and algorithm design. Bioinformatics may be applied to the fields of agriculture, veterinary science, medicine, environmental sciences and to information technology-related fields. The Bioinformatics Unit at the University of Pretoria forms part of a national bioinformatics network at the South African National Biodiversity Institute (SANBI), and represents the Gauteng hub.

Description of the study programme

Bioinformatics is based on biological, mathematical and computer sciences. Postgraduate studies in this programme include honours, master's and doctoral degrees. The one-year honours degree is open to students with degrees in biological sciences, computer

science, mathematical statistics or other related fields. Additional biology, computer science or mathematics subjects may be prescribed. At master's and doctoral levels, students are required to complete research projects in bioinformatics.

Department of Human Physiology

Physiologists study the mechanisms by which the body functions – from molecular and cellular level through progressive differentiation to tissues, organs, systems and eventually the integrated interactions and control of the various body functions. This knowledge is applied in the research investigations of normal and abnormal life processes. Basic and clinical research can be entered into at various levels, such as molecular, cellular, structural and diagnostic. Human Physiology is a major for two study programmes in biological sciences: BSc (Human Physiology) and BSc (Human Physiology, Genetics and Psychology). Other special physiology modules form part of the training in medicine, dentistry, nursing, dietetics, biokinetics, communication pathology, food science, occupational therapy, physiotherapy, radiography and some consumer science courses. In Human Physiology, students study the functioning of the human body.

Description of the study programme

During the first year of study for BSc (Human Physiology), students are exposed to a generic, basic range of subjects in biological and agricultural sciences. In the second year, various physiological systems (neurophysiology, haematology, cardiovascular physiology, pulmonary physiology, renal physiology, nutrition and digestive physiology, endocrinology and reproductive physiology) are studied with biochemistry as a compulsory subject. The study programme is concluded in the third year with a selection of integrated physiology modules such as sport physiology, nutrition and development, psychoneuroimmunology and cell physiology, as well as industrial physiology. At third-year level there is an opportunity to select some elective modules in the programme. In addition to the above, psychology and genetics are compulsory subjects in all three years of study of BSc (Human Physiology, Genetics and Psychology).

Postgraduate degrees

Students may enrol for a BScHons, MSc and PhD in Human Physiology after completion of BSc (Human Physiology) or BSc (Human Physiology, Genetics and Psychology). After completion of the latter degree, postgraduate studies in genetics or psychology can also be undertaken. To be accepted for the honours degree in physiology, an average of 60% is required for the human physiology third-year modules. An entrance examination in general physiology also has to be written before selection. A maximum of 12 honours students will be accepted per annum. The one-year honours degree comprises self-study of basic physiology, writing of a seminar, exposure to a series of research techniques, and a research project in sport physiology, cellular physiology or neurophysiology. At master's and doctoral levels, students are expected to complete a research project on one of the research areas in the Department for their MSc dissertation or PhD thesis.

Department of Anatomy: BSc (Medical Sciences)

The Department of Anatomy forms part of the School of Medicine in the Faculty of Health Sciences and offers BSc (Medical Sciences) in the Faculty of Natural and Agricultural Sciences. The aim of this study programme is to train students in the basic medical sciences, including clinical anatomy, physical and forensic anthropology, histology and cell biology, as well as embryology. Students can combine these subjects with elective modules from physiology, pharmacology and genetics. This three-year study programme provides a graduate with broad background knowledge. It is highly recommended that students continue their postgraduate studies (honours, master's and doctorate) in the above main areas of anatomy. The support and guidance of staff members with close ties with the private and industrial sectors, high research publication output and a commitment to teaching have produced graduates that are widely sought after by the academic, government and private sectors. They are employed as lecturers, researchers, medical and forensic scientists, and sales representatives in the medical sciences and pharmacological industry. Several graduates are furthering their postgraduate studies at international research facilities in North America and Europe.

The aim of this study programme is to prepare students for a career in medical and medicine-related areas of research, and also as academics. Anatomy is the major subject, and students in the second and third years can choose between physiology, genetics and pharmacology. Anatomy is compulsory for medicine and all medicine-related studies. Anatomy comprises several sections, including clinical anatomy, cell biology, physical anthropology and histology. These study fields cover the general macroscopic structure or morphology of the body, the microscopic structure of cells and tissues, development on cellular and embryological levels and the evolution of humans. This theoretical knowledge is then applied through the analysis of human skeletal remains (forensic anthropology), tissue preparation for microscopy (histology techniques) and comparisons between human and animal anatomy (comparative anatomy).

Description of the study programme

A limited number of students are admitted to this study programme. Therefore, applications should be handed in on time. The first six months of this study programme are similar to those of other BSc fields of study. In the second six months of the first year, some anatomy modules are added. In the second year of study, full dissections on cadavers are performed, and courses in histology, cell and developmental biology, and palaeoanthropology (the evolution of man) are presented. Physiology or genetics and biochemistry modules are also taken. With anatomy as major subject in the third year, physiology, pharmacology and/or genetics module(s) can be selected. In the third year of study, anatomy modules are more applied, and students are taught comparative anatomy, methods for the analysis of skeletal remains for forensic purposes, as well as histology and cell biology techniques.

Department of Genetics

Genetics and Human Genetics

Genetics is a vibrant, cutting-edge discipline at the core of the biological, agricultural, veterinary and medical sciences, involving both commercial and research aspects. An ever-increasing array of newly available technologies continue to enhance existing research strategies and open exciting new avenues of research not only in Genetics, but often also in related bioscientific fields. Between 2001 and 2012, twelve Nobel prizes have been awarded for discoveries in the broader field of genetics.

Over the past few years, the genomes of many animals, plants and harmful pathogens, as well as those of humans have been decoded, and new, informative genome-wide methods for studying gene function and genetic diversity at the level of cells, organisms, populations and species have been developed. Techniques such as next-generation sequencing, high throughput genetic screening and DNA fingerprinting are already indispensable in drug discovery and the forensic sciences. These days computational models are also proving invaluable in finding genes that influence the severity of disease, understanding the origins and spread of newly emerging viruses (such as H1N1), as well as in understanding the relatedness of individuals within and between species. Knowledge of genetics is also integral to the field of population biology, including molecular ecology and evolution, behavioural ecology, biodiversity and conservation, as well as bioremediation and sustainable agriculture, all of which provide us with insights into the inevitable victims and consequences of our growing human population. Not surprisingly, given the power of genetics, its applications can be controversial. Therefore an understanding of the subject is required for informed debate on the ethics of genetically modified organisms, gene therapy, *in vitro* fertilisation, genetic testing and many other related aspects.

The Department of Genetics is an active player on the international scientific stage and offers internationally recognised undergraduate and postgraduate degrees. Our degrees are research oriented and have a strong emphasis on developing analytical skills. We furthermore emphasise the development of "transferable skills" throughout our study programmes, since such skills are important in the job-seeking process. Our graduates acquire skills in numeracy, analytical and critical thinking, as well as creativity in problem-solving and data-handling, all of which equips them for success in non-scientific careers such as sales and marketing, patent work and journalism.

Biotechnology

Molecular biotechnology involves the use of *in vitro* genetic manipulation and recombinant DNA methods to genetically alter plants, animals and microbes. This has become possible because of the considerable progress that has been made in understanding the composition, structure and functioning of the genetic material that occurs in the cells of all living organisms.

Biotechnologists aim to correct, modify, enhance or exploit specific traits in their target organisms for a wide range of practical purposes, including improved food production, disease management, conservation and bioremediation. It is clear that biotechnology is set to play a pivotal role in the future of the medical, agricultural, veterinary and ecological sciences. However, it is up to us to ensure that this progress is carried out in a responsible and controlled manner so as not to impact negatively on the environment and our own health.

Since biotechnologists function in the intersect between the sciences and the business world, a background in biotechnology will enable graduates to compete for jobs in a wide range of fields in the biosciences and related industries. There are exciting career opportunities available for innovative scientists and entrepreneurs in this dynamic field. Biotechnology laboratories could form part of industrial, research or academic facilities. There are, furthermore, an increasing number of opportunities available in privately owned biotechnology laboratories that specialise in contract work. The value of "transferable skills" is also emphasised throughout this study programme.

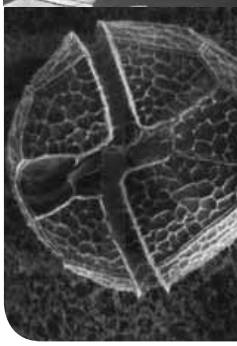
Description of the study programmes

Biology is by nature a multifaceted science, and there is a growing awareness that researchers need to employ integrative approaches to effectively address contemporary research challenges. The Department of Genetics has therefore decided to offer both single and dual major options in its Genetics and Human Genetics study programmes. This allows our students the choice to either specialise in genetics as a single major, or to embrace the opportunity to develop a multidisciplinary background by combining their genetics subjects with a second major, such as biochemistry, microbiology, plant science, zoology, or entomology, as well as human physiology in the Human Genetics study programme.

At undergraduate level, the Department provides students with a comprehensive study of the nature, transmission, expression and manipulation of genetic information in living organisms. Students are introduced to the various applications of genetic principles in fields as diverse as genomics, genetic engineering, molecular plant breeding, biotechnology, disease diagnostics and risk determination, bioethics, conservation ecology, as well as population, behavioural and evolutionary studies, all of which are also topics for further research.

The study programme in Biotechnology is an inter-departmental programme aimed at empowering students to pursue their interest in biotechnology with particular emphasis on the molecular sciences. Undergraduate training in this programme includes exposure to the basic modules in genetics, biochemistry, plant science and microbiology during the first two years. At third-year level students are exposed to aspects of biochemistry, molecular genetics and molecular microbiology in addition to the other subjects of their choice. At the end of their second year, Biotechnology students are encouraged to make some decisions about the direction of their postgraduate studies and to choose their electives accordingly, since their choice of electives on third-year level would be a guiding factor in any subsequent decisions regarding their postgraduate studies. All subjects include both theoretical and practical components.

Graduates are encouraged to continue on to further study, including honours, master's and doctoral degrees. The Department of Genetics offers postgraduate qualifications in genetics and biotechnology. The one-year honours degree includes a strong self-study theory component,



exposure to a broad range of applicable technologies and a limited research project. The biotechnology honours degree also includes an introduction to the principles of entrepreneurship. At master's and doctoral level, students are required to complete an approved research project in one of the recognised research fields in the Department.

Department of Microbiology and Plant Pathology

The disciplines of microbiology and plant pathology offer a fantastic diversity of themes. The smallest microbes are viruses, followed by bacteria and fungi. These micro-organisms form an essential part of our planet and students are trained to study their functions and roles, as well as how the microbes could be used or controlled in our everyday lives.

Microbiology

Students study micro-organisms, mainly bacteria, viruses and fungi (moulds and yeasts). This will enable them to understand the basic processes of life. There is also a focus on the different applications where beneficial micro-organisms are used for food production, water purification and other industrial applications. Other micro-organisms are important to health and agriculture due to the diseases they cause. In this regard, microbiologists study the pathogens responsible for the serious infectious diseases of humans, animals, wildlife and plants in order to treat and control them. Microbiologists at the University of Pretoria often work on the molecular and cellular level, with a focus on issues such as designing new vaccines and anti-microbial strategies, as well as developing new and better ways to detect and quickly identify microbes. Attention is also given to the discovery and description of new micro-organisms and to gaining a better understanding of the evolution, diversity and pathogenicity of microbes.

Microbiologists can pursue a variety of careers, ranging from practical applications to basic research. Career opportunities are available for graduates in the food, fermentation and water industries as medical or veterinary microbiologists, in agriculture as researchers at organisations such as the Council for Scientific and Industrial Research (CSIR), the Medical Research Council or the Agricultural Research Council (ARC), or as lecturers and researchers at various academic institutions.

Description of study programme

Microbiology has different areas of specialisation. During the first two years of study of the three-year study programme, students are exposed to a broad range of subjects in the biological sciences. In the third year, students focus more on specialised subjects in their own disciplines, for example, mycology, bacteriology, virology, microbial ecology, clinical microbiology, plant pathology, molecular microbiology, food and industrial microbiology, as well as microbe-plant interactions. All subjects include theoretical and practical aspects. The opportunity also exists for students to combine microbiology with genetics or plant sciences as part of a dual major degree.

Postgraduate studies include honours, master's and doctoral degrees. The one-year honours degree has a strong self-study component, exposure to a broad range of applicable technologies and a limited research project. At master's and doctoral levels, students are required to complete research projects in one of the research fields of microbiology.

Plant Pathology

In plant pathology, students are trained as specialists in plant health. To keep plants healthy, they study organisms that cause diseases, how plants are affected by diseases, and how plant diseases can be controlled. With this knowledge, they are able to help commercial growers, farmers and small-scale growers to control plant diseases by various means, including integrated pest and disease management. Students are also trained in post-harvest pathology and food safety, which contribute to the production of safer food products made from plants.

"I am currently a Plant Ecology honours student, from the Plant Science Department, which falls within the Faculty of Natural and Agricultural Sciences. The Faculty of Natural and Agricultural Sciences provides students with top-quality, beneficial educational opportunities in a variety of fields. It also encourages students to reach their highest potential and equips them with the necessary skills to develop and excel academically and professionally.

I was awarded the Margaretha Mes Memorial Prize for the best third-year Plant Science student in May 2013. I was also fortunate enough to receive a research grant from the National Research Foundation (NRF) in the same year.

My aspiration for the future is to further my studies in ecology and pursue a career in the field of research, as well as possibly lecture one day."

Morgan Raath

Description of study programme

The undergraduate Plant Pathology degree is a four-year BScAgric degree. The first two years of study expose students to a broad range of subjects in agricultural and biological sciences. From the third year of study onwards, specialised training is undertaken in mycology, virology, bacteriology, plant pathology, microbial ecology, plant genetics, soil science, plant nutrition, weed science, parasitology, epidemiology and disease control. Postgraduate studies include master's and doctoral degrees. At master's and doctoral levels, students are required to complete research projects in one of the research fields of plant pathology.

Department of Plant Science

Plants are amazing organisms and we actually know very little about their potential uses. It is, however, well known that plants are the best factories for synthesising valuable natural products.

In medicinal plant science, students learn about the discovery and use of plant medicines and phytotherapeutically important molecules obtained from plants. In plant biotechnology, molecular tools and the use of model plants are discussed to study whole-plant physiology. Gene and promoter identification, transfer techniques for plant improvement, and the analysis of plant transcriptomes for plant improvement by using micro-arrays are investigated. In the study of plant diversity and ecology, students learn about South Africa's rich and diverse vegetation and how to facilitate conservation and management strategies for future generations.

Although the Department of Plant Science at the University of Pretoria is one of the oldest in the country, it is dynamic, innovative and houses world-class researchers (70% of academic staff have National Research Foundation (NRF) ratings). In the latest survey done by the ISI Web of Knowledge, the plant and animal sciences of the University of Pretoria were rated number one in South Africa, based on the number of publications and the number of citations in ISI-accredited journals.

Description of the study programme

During the first two years of study, students are exposed to a broad range of subjects in biological sciences. They will be able to specialise during the third year. The Department specialises in plant diversity and ecology, plant biotechnology, and medicinal plant science. In the third year, students will get the opportunity to do several practical sessions, as well as experience plants in their natural habitat during a field excursion. The postgraduate study options in this programme are honours, master's and doctoral degrees. The one-year full-time or two-year part-time internet-based honours degree includes a research project and some theoretical modules. At master's and doctoral levels, students are required to complete research projects in one of the research fields of the Department. The Department annually awards the Schweickerdt Medal for the best honours student in Plant Science, the Margaretha Mes Medal for the best honours student in Plant Biotechnology/Physiology and the Margaretha Mes Memorial Prize for the best third-year female Plant Science student.

Department of Zoology and Entomology

The Department of Zoology and Entomology provides excellence in teaching and sustained productivity in research. It contributes to the educational, cultural, social, economic and sustainable development of southern African communities in the biological sphere, recognising that it must remain locally relevant and internationally competitive. The Department is staffed and managed by a highly skilled, internationally recognised scientific team, whose major research and teaching goals are to provide a comprehensive understanding of the patterns in, processes underlying, and threats to biodiversity in human-influenced landscapes.

While the Department's faunal interests lie mostly in insects (there are more of them than any other species) and mammals (Africa is home to an incredibly rich fauna), staff and students also work on a variety of other animals.

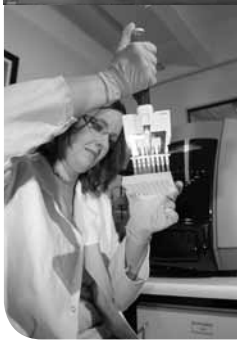
Research groups in the Department include the Mammal Research Institute (MRI), Conservation Ecology Research Unit (CERU), Centre for Environmental Sciences (CFES), and the informal Social Insect Research Group (SIRG) and Scarab Research Group (SCARAB). Current research projects in which postgraduate students are involved include the fields of eusociality, behaviour, epidemiology, chemical ecology, ecophysiology, population genetics, conservation and demographic modelling.

Projects are conducted in various countries of sub-Saharan Africa and in the Southern Ocean, and range from studies of cetaceans, pinnipeds and sharks off the South African coastline, and research on the subantarctic Prince Edward Islands and the frozen waters of Antarctica, to the Namib and Kalahari deserts, Namaqualand, Drakensberg, Karoo and the Kruger National Park. In addition to the imposing African elephant, rhino and lion, among others, the Department focuses on smaller mammals, such as bat-eared foxes, meerkats and mole rats.

The human impact on the environment has prompted studies on the influence and control of alien plant invaders, exotic fish introductions, forest fragmentation and bird assemblages, dung beetles as biological indicators of agro-ecosystem use and insect conservation. An interesting case in insect conservation is rare stag beetles that fetch thousands of dollars on collectors' markets. Healthy living and problem-free food production are addressed through projects investigating the potential of crop borders to reduce aphid-transmitted virus incidence in seed potatoes, and the role of bovine tuberculosis and other zoonotic diseases on human health during interaction with wildlife and livestock.

Description of the study programme

Zoology and entomology have different areas of specialisation. During the first two years of study, students are exposed to a broad range of subjects in the biological sciences. In the third year, the focus is on subjects related to zoology and entomology, for example, courses in ecology, conservation biology, evolution, behavioural ecology, physiology, mammalogy, insect diversity and insect pest management. Zoology is presented in three major streams, ie zoology, entomology and ecology.



Graduates can proceed with postgraduate studies in the form of honours, master's and doctoral degrees. The one-year honours comprises a strong self-study component and a research project. At master's and doctoral levels, students are required to complete research projects in one of the research fields of the Department of Zoology and Entomology.

Physical Sciences

Department of Chemistry

Everything around us involves chemistry, and as chemists, we recognise the major role this science plays in supporting modern lifestyles. The clothes we wear are made from synthetic fabrics produced by chemical processes. The drugs used for curing many illnesses are the result of intensive chemical research. A chemical process produces the paper we write on, and the ink we write with is a mixture of many chemicals. Chemistry assures the quality of the food we eat, the air we breathe and the water we drink. Our bodies are a complex mixture of chemicals. The principles of chemistry are fundamental to the understanding of the processes involved in all living organisms and the development of new medications and materials. It is the interaction and collaboration of chemistry with the other sciences and engineering that meet the ever-increasing demands, challenges and opportunities of a modern society.

Chemistry has been described as the central science; its impact on our lives and society is all-pervasive. Since 1901, the Nobel Prize in Chemistry has been awarded to 153 individuals for work covering all aspects of the chemical sciences. The concepts of sustainable growth, including the reduction of carbon emissions, renewable fuels, secure food and fresh water supplies, material recycling, environmentally responsible manufacture and waste disposal, are all firmly embedded in chemical know-how. Chemistry is also at the heart of cutting-edge research in biotechnology, nanotechnology and new materials required for faster computers and improved solar voltaic cells.

Description of the study programme

This programme focuses on the fundamental aspects of the discipline and aims to provide students with a thorough background in the chemical sciences. Undergraduate training in this study programme provides an opportunity to combine chemistry with other fields of interest, such as physics, geology, mathematics and computer science, or subjects from the biological sciences, such as biochemistry, microbiology and botany. In the first year of study, students are given an introduction to chemistry, which is followed by a more in-depth study of analytical, inorganic, organic and physical chemistry in the second and third years. All subjects have both theoretical and practical components.

First-year modules in mathematics and physics are compulsory subjects for the BSc degree in chemistry. More advanced modules in mathematics and programming are recommended if students want to pursue postgraduate studies in the computer modelling of molecules, materials or processes.

Postgraduate studies in this programme include honours, master's and doctoral degrees, and is research-orientated. The one-year honours degree consists of advanced modules in analytical, organic, inorganic and physical chemistry, including two practical projects with departmental research teams of the student's choice. MSc and PhD studies involve research projects in the specialised fields of organic and organometallic synthesis, electrochemistry, nanotechnology, the computer modelling of compounds and materials, chemical education and separation science, with the emphasis on industrial, environmental, food, forensic and clinical applications. Experienced research leaders and excellent research facilities are available to expand the international research profile of the Department of Chemistry and expose students to the frontiers of research in their field of choice.

"I am a first-year master's student, studying an MSc in Chemistry. I love going into the lab and creating molecules and being able to visually see their molecular structure from the crystals that we grow. There is a wonderful family-like community that is fostered in our labs, which creates an invaluable support system. I was awarded an NRF innovation bursary for 2013 as well as UP achievement bursaries for two years running. In 2012, I was awarded the Sasol, Bruker and Merck prizes for the best honours student. I was very fortunate to have been given NSFAS loans for my undergraduate years because without them I would not have been able to fund my undergraduate studies, let alone get to where I am today. My dream job would be to be a patent lawyer for Adams and Adams, or alternatively a lecturer at a tertiary institution."

Tamzin Levell

Department of Geology

Geology and Natural Hazard Studies

Geology is the scientific study of the dynamic system of the planet Earth, and includes the atmosphere, hydrosphere, lithosphere and biosphere. The study of geology integrates the principles of mathematics and physics as well as chemistry and biology in studying the history and processes of the earth. The ever-growing human population is continuously exerting pressure on natural resources, such as water, energy, minerals, and building materials that are required to meet the basic needs of humankind.

The aim of the Department of Geology at the University of Pretoria is to become the most respected department of its kind on the African continent. This objective is not undertaken lightly and will be difficult to achieve, yet it is quite serious in its striving to achieve this vision. Its graduates – at all levels – should be highly sought after by the private sector, mining and exploration companies, junior firms and smaller partnerships, as well as by state sectors; not only in Africa, but across the globe. Geology and its subdisciplines are truly global professions and most members of this profession will move from one country to another several times during their careers.

The Department of Geology at the University of Pretoria believes – first and foremost – in providing all BSc graduates with a very strong fundamental grasp of the foundations of the geological sciences. The BSc study programme is offered over a period of three years on a full-time basis. This study programme is both theoretically and practically orientated and leads to different fields of specialisation, such as mineralogy, igneous petrology, metamorphic petrology, sedimentology, engineering and environmental geology, geochemistry, hydrogeology, economic geology, structural geology, and geophysics and geostatistics.

Students who have successfully completed their undergraduate study programmes have the option to register for an honours degree in geology, engineering geology, or hydrogeology. The BSc honours degree is a one-year full-time programme that serves as a minimum requirement for employment and to practise as a professional geologist.

The Department of Geology offers two major undergraduate study programmes:
- Geology
- Engineering Geology and Hydrogeology

Geology

Diverse topics of importance for our daily life and for the general well-being of our society, such as the study of minerals and rocks, flowing water (such as rivers, beaches, lakes and glaciers), groundwater, volcanoes, earthquakes, plate tectonics, global climatic changes and the evolution of life are covered during undergraduate studies.

Undergraduate modules in Geology

First-year modules:
Introductory geology, historical geology and environmental geology, general physics, calculus, and general chemistry

Second-year modules:
Introduction to soil science, fundamental and applied mineralogy, sedimentology, structural geology, igneous petrology, metamorphic petrology, and groundwater

Third-year modules:
Engineering geology, rock mechanics, ore deposits, geodynamics of ore formation, geostatistics and ore reserve calculations

Honours modules in Geology

Volcanism, basin analysis, crustal evolution, mining methods, honours project, igneous petrology/ geochemistry, metamorphic geology, economic geology, mineralogy, and mapping camp

Engineering Geology and Hydrogeology

Engineering Geology and Hydrogeology is divided into subdisciplines:
- **Engineering Geology** is concerned with the study of geological structures as well as soil and rock properties at construction sites (such as dams, tunnels, mines, roads, buildings and stadiums) in order to provide accurate information prior to the erection of such structures.
- **Hydrogeology** is the study of water in the subsurface, and focuses on groundwater and soil moisture, for example, water quality (pollution, mine water), quantity for abstraction and the influence of water on engineering projects.

Undergraduate study programmes in Engineering Geology and Hydrogeology

Students who wish to pursue Engineering Geology and Hydrogeology at honours level need to take other modules in addition to modules covered by geology studies. The additional modules include mechanics in the first year, introductory soil science and strength of materials in the second year and soil mechanics and rock mechanics in the third year. Additional mathematics modules are also necessary.

Honours modules in Engineering Geology and Hydrogeology

The honours modules in Engineering Geology and Hydrogeology include honours projects, engineering geology of South Africa, environmental geochemistry, environmental management, hydro-geochemical modelling, contaminant transportation, construction materials, rock engineering, engineering applications and rock and soil improvement.

Fieldwork

One- to three-day field excursions and mapping camps are compulsory for undergraduates, and excursions of longer periods are compulsory for postgraduate students. Geologists gather scientific data in the field and a large part of their practical work is fieldwork.

In addition to the above, and starting at honours level, the Department of Geology also offers training in certain applied fields of natural hazard research (from MSc level, with the emphasis on seismic hazards, meteorological hazards and related actuarial studies). The Department of Geology at the University of Pretoria is one of only

two departments in the country that offer Engineering Geology and it has the only centre that studies all aspects of natural hazard research in Africa: the Aon-Benfield Natural Hazard Centre, Africa. At MSc and PhD level, the focus is on research in the fields of mineralogy and applied mineralogy (particularly precious metal fingerprinting), geodynamics (particularly of major basins and intrusive complexes, such as the world-famous Bushveld Igneous Complex), engineering geology and hydrogeology, and seismology.

Careers

Most jobs in geology involve fieldwork, laboratory work, office work, and computer modelling work and require written and/or oral reports on the completed task. Employment is often offered by small exploration and larger mining companies, in addition to the government, independent research laboratories, universities and other tertiary educational institutions. In general, geologists can work as environmentalists, mineralogists, geochemists, and exploration geologists. They can also work in the mines (production geologists), in the ocean (marine geologists), and in computer laboratories (databases, including GIS; 3D modelling) and as consultants when needed.

- **Engineering geologists** are employed by organisations such as the Council for Geosciences, the CSIR and mining companies, usually in the rock mechanics departments of these organisations. Consulting civil engineering firms design dams, tunnels, roads, bridges, railway lines and industry- or infrastructure-related slopes. Graduates may operate their own consulting practices where general site investigations for urban development and infrastructure construction will comprise a large part of their scope of work.
- **Hydrogeologists** are employed by the government (Department of Water Affairs), the Council for Geosciences, the CSIR, and mining companies and also by consulting practices. The four major focus areas are water resource evaluation, groundwater resource development, modelling mine water and contaminant transport problems. Consulting hydrogeologists are typically involved in water supply, groundwater quality, monitoring and remediation, and water licence applications.

Department of Geography, Geoinformatics and Meteorology

Geography and Environmental Sciences

Geography is unique in that it is positioned in both the natural and human sciences, and it is therefore able to bridge and link the natural and human components of the environment. While geomorphology, biogeography, climatology and meteorology are the natural science components of the discipline, the human science aspects focus on solutions to the problems confronting society, such as the population explosion and the depletion and destruction of resources. Geography is also a spatial science, involved with the location and distribution of cities and human activities, such as agriculture and tourism, as well as the processes, patterns, problems and potential answers associated with these activities. In addition, geography is a planning and management science, aimed at improving the quality of life of all people. At the University of Pretoria, the particular strengths of the geography curriculum are geomorphology, environmental change, urban development and land

"Environmental management can help you make a difference in the world by understanding the issues affecting our fragile planet and coming up with various solutions to our many environmental problems. It is about understanding that environmental problems are connected and not bound by national borders. It prepares students to be the future stewards of our natural resources. I have always had a passion for environmental science and I learn more every day about new environmental threats and how they are being solved in different parts of the world.

I studied for a BSc in Environmental Health Sciences at the University of Swaziland. I graduated in 2009 with a distinction and received two prizes: The Vice-Chancellor's Award, awarded to the most outstanding final-year student, and the Dean's Award, awarded to the best final-year student in the Faculty of Health Sciences.

I enrolled for the honours programme in Environmental Analysis and Management in the Faculty of Natural and Agricultural Sciences at the University of Pretoria in 2012 and I received a UP postgraduate bursary. In 2013, I was awarded an Outstanding Achievers Award, awarded to the best honours student in Geography/ Environmental Analysis and Management.

I was awarded a Canon Collins Trust Postgraduate Scholarship in 2013 to study for an MSc in Environmental Management at the University of Pretoria.

The field of environmental management has made me more aware and conscious of how humans are contributing to the degradation of our natural resources, but also of how we can better manage these resources."

Violet Mwendera

reform. A Geography Lecturers' Prize is awarded annually to the top third-year geography student.

Environmental sciences is the study of the multitude of interactions between humans and the living and non-living components of the earth. As a result of the increase in the human population and technological advances, humans' impact on the earth has become more widespread and severe. Environmental impacts, in turn, create challenges that are multidisciplinary. They include, but are not limited to, impacts on ecosystems, natural resources, human health and well-being. This exciting and challenging field of study requires a new breed of students capable of taking the best from the natural science subjects and integrating it with economic, social and political sciences in order to find sustainable solutions to protect our planet. Training in spatial analytical techniques, including GIS and remote sensing, gives graduates the ability to analyse complex environmental issues. One of the most exciting subjects presented to environmental science students is the study of the physical, social and economic impacts of global warming and climate change, together with adaptation and mitigation strategies. Research on the impacts of climate change on human health, agriculture and natural resources prepares environmental science graduates to be locally relevant and internationally competitive.

Description of the study programme

The two study programmes that can be followed are as follows:

- BSc (Environmental Sciences)
- BSc (Geography)

These study programmes comprise fundamental modules at first-year level that develop general skills, for example, computer literacy, language proficiency and calculus. Core modules at first-, second- and third-year levels depend on the field of specialisation of the study programme. Elective module choices can be made from the following disciplines: anthropology and archaeology, botany, chemistry, computer science, economics, geology, geography, geoinformatics, meteorology, historical and heritage studies, mathematics and applied mathematics, plant science, plant production and soil science, political sciences, psychology, sociology, statistics, town and regional planning, and zoology and entomology.

Geoinformatics

Geoinformatics is the study of how geographic data is collected, stored, retrieved and communicated, of how geographic data is processed into geographic information that is suitable for decision-making, and of how computer and other technologies can be used to support these processes. The focus areas are as follows:

- **Geographic Information Systems (GIS),** focusing on the science behind geographic information processes and technology, and their application to scientific questions. It provides the theoretical underpinning of geographic information and the technology used to capture and analyse the data and display the information for decision-making.
- **Geographic information technology,** focusing on the specialised set of information technologies that are used to handle geographic data, including data acquisition, storage, manipulation, analysis and display.
- **Applications,** focusing on the increasingly diverse uses of science and technologies in government, industrial and research institutions.

Students who complete BSc (Geoinformatics) readily find work at organisations such as Geographic Information System (GIS) vendors (ESRI or Integraph), the Council for Scientific and Industrial Research (CSIR), GIS consultants (AfriGIS, GeoTerralmage), civil engineering consultants (Aurecon, SSI) and the South African National Space Agency (SANSA), South Africa's national mapping agency, National Geospatial Information (NGI), or any municipality in the country.

Description of the study programme

BSc (Geoinformatics) is aimed at producing scientists who have a basic knowledge of the environment and the accompanying developmental problems, a thorough knowledge of geographic information and the associated computer technology, together with the practical skills to apply information technology in support of the various disciplines involved in environmental management.

The undergraduate study programme is focused on the requirements for a GIS technologist. Graduates can apply for professional registration as a GIS technologist with the South African Council for Professional and Technical Surveyors (PLATO), the statutory body for professional surveyors and GIS professionals, governed by the PLATO Act (Act 40 of 1984).

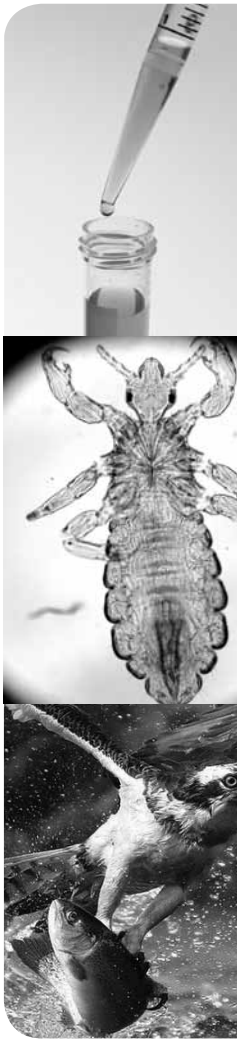
Meteorology

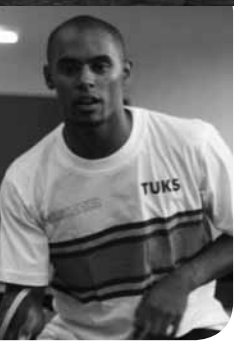
Weather and climate play a fundamental role in people's lives, because daily activities such as agriculture, sport, travel and tourism depend on it. It may even determine whether humankind survives or not. However, there is also a great concern that people's activities may irreversibly change the world's weather and climate. Air pollution is a matter of increasing concern. Meteorologists and atmospheric scientists are interested in understanding how the physics and dynamics of the atmosphere work. The meteorologists at the University of Pretoria specialise in dynamic meteorology and they are involved in cutting-edge research in numerical weather prediction. They are also involved in award-winning community projects where water supply is established at schools in rural areas.

Description of the study programme

Compulsory subjects are mathematics, physics, atmospheric processes, atmospheric circulation, physical meteorology, dynamic and numerical meteorology and weather forecasting projects. Optional subjects can be chosen from the following disciplines: mathematics and applied mathematics, physics, statistics, chemistry, computer science, geography, geoinformatics and geology.

Students learn about atmospheric sciences by means of specialised computer software in laboratories and do practical work in collaboration with professional meteorologists. An honours degree in Meteorology is required for practising as a professional meteorologist. Master's and doctoral degrees are also offered.





Department of Physics

Physics is the study of the laws of nature. Its principles form the basis of all the basic sciences, such as astronomy, biology, chemistry and geology. Physics also forms the basis of applied science and engineering, which led to major technological developments, from the horse-drawn cart to the supersonic jet, from the candle to the laser, from smoke signals to satellite transmission. Physicists are researchers who study nature and are not afraid to ask the big questions in life. When studying physics, students will develop their creativity, inventiveness and problem-solving abilities, which will enable them to advance successfully to management positions at all levels of industry.

The Department of Physics at the University of Pretoria is staffed with excellent physicists in a wide range of physics subdisciplines, such as astronomy, biophysics, theoretical physics, material science and physics education. Materials are studied for nuclear applications and their behaviour when irradiated. Materials for solar cells and optoelectronics applications, as well as carbon-based magnetic systems, are also investigated. Furthermore, there are active studies in physics, mathematical physics, high energy theory, quantum theory (resonances and information theory), solid state physics, incorporating computational physics, as well as the effect of symmetries. The Department has a high international standing, with many international collaborators.

The Department of Physics has facilities to probe matter by using atomic force microscopy, Auger electron spectroscopy and secondary electron microscopy, two million volt particle acceleration and Raman and infrared spectroscopy. It also has excellent facilities to do electrical measurements and make thin films. Computer clusters are used for computational studies.

There is a growing number of master's and doctoral students drawn from all parts of South Africa, and increasingly now from the African continent. A postgraduate student committee oversees the interests of the postgraduate students, which includes organising social functions. This helps create an inviting and supportive environment for students to pursue their research degrees.

The undergraduate curriculum is modern and attractive, and is constantly under review to introduce new and current topics. Students learn useful and transferable skills in experimental, theoretical and computational physics that enable them to become competent physicists, and they are also able to use their skills in a variety of career choices outside academia, for example in commerce and industry. Prizes are available for the best-performing BSc (Physics) student, and undergraduate students have many opportunities to become familiar with ongoing research in the Department by pursuing project work for their degree or doing vacation work.

For more information, please visit the Physics Department website www.up.ac.za/physics

Agricultural and Food Sciences

Department of Agricultural Economics, Extension and Rural Development

The recent sharp rise in food prices highlighted the importance of agriculture and food production in South Africa, as well as the importance of agricultural economists in our society. The agricultural and food industry delivers basic products and resources to feed and clothe the people of South Africa. It contributes to the gross domestic product of the economy and creates

"I started with my BSc (Chemistry) degree at the University of Pretoria in 2010 knowing only one thing: I do not have an idea what I want to study. The BSc degree, of which physics was a major, gave me the opportunity to study very broadly and choose the subject I liked most for further studies: physics. I graduated my BSc degree cum laude and am currently busy with BSc Honours in Physics. Physics is an absolutely beautiful subject that necessitates the use of both mind and imagination. It is structured, logical and diverse, but the best part of studying physics is that you will always stay a student.

The Physics Department has excellent researchers and lecturers – something that motivates students to excel at their own studies. The research groups in the Department do very interesting and relevant research, which is diverse enough, like the Department itself, to cater for every student.

Physics can be recommended to anyone who does not understand the world they live in, but continuously wants to."

Towan Nöthling

jobs for approximately 1.2 million workers. At the same time, the sector contributes substantially to the livelihood of approximately six million people in South Africa's rural areas. Food and clothing are one of mankind's most basic needs, which means that any person qualified in agricultural economics and agricultural extension will always be guaranteed job opportunities. So, what is the relevance of agricultural economics and agricultural extension as disciplines in this sector?

Agricultural Economics

Have you ever eaten a McDonald's burger and wondered where the bread, meat, lettuce and ketchup come from? Why is there a difference in the price and quality of Nando's and KFC's chicken? Why do some people drink red wine and others beer? What is the price of the wheat used in bread, what are the costs associated with the milling of the wheat and the baking of the bread? What influences the costs of slaughtering cattle and processing the beef to mincemeat? What are the profit margins of the farmers and middlemen in all these transactions in the supply chain? These are some of the questions agricultural economists answer on a daily basis. If you are interested in getting answers to these questions and have a passion for science, economics and people, then agricultural economics is the field of study for you.

The world of food and textiles and, therefore, the world of agricultural economics, is a dynamic and vibrant world. It deals with fashion and fads, but also with the basic needs of people. Agricultural economics deals with the economics of producing food or clothing and then getting these items to the consumer. It deals with various issues, from growing grapes to producing and selling wine, from analysing a current business to determining the investment potential of a new venture, from selling commodities on global futures markets to selling vegetables in the local Spar. It deals with nature, but also with people. It deals with making money, but also helping poverty-stricken people. All in all, agricultural economics deals with making a difference in people's lives.

The undergraduate training of an agricultural economist consists of a four-year BScAgric (Agricultural Economics/ Agribusiness Management) or a three-year BCom (Agribusiness Management) degree. In postgraduate studies, an agricultural economist can specialise in agribusiness management, agricultural policy analysis, environmental economics, and agricultural and rural finance. There are many opportunities for UP students to study agricultural economics at universities in the USA. This ensures that they get world-class training and can, therefore, work anywhere in the world in the food and textile system in an endeavour to ensure that people's most basic needs are met in the most economic and sustainable manner.

The Department offers various courses where the emphasis is on agribusiness management and agricultural economics.

BScAgric (Agricultural Economics/ Agribusiness Management)

The first year of study comprises a combination of BSc subjects (for example, chemistry, genetics, biology and botany) and commercial subjects (such as financial accounting). The second year of study is also a combination of BSc subjects (such as plant production, livestock science and soil science) and economics subjects (for example, economics, business management, statistics and business law). In the third and fourth years of study, students have a choice with regard to combinations of BSc and commercial subjects, with agricultural economics as the main focus.

BCom (Agribusiness Management)

Students follow basic economics subjects in the first and second years (for example, accounting, statistics, business law, marketing, financial management, business management and economics) and in the third year they specialise in agricultural economics.

Department of Animal and Wildlife Sciences

The Department of Animal and Wildlife Sciences at the University of Pretoria has all the resources to give you an education that will provide you with a sought-after qualification in the field of animal and wildlife sciences. The Department has a commitment to provide outstanding and relevant academic study programmes and appropriate practical training in animal and wildlife sciences. The Department is proud of its rich tradition spanning more than 100 years, its excellent academic staff, experimental farms and a legacy of service to its students, alumni and the agricultural industry.

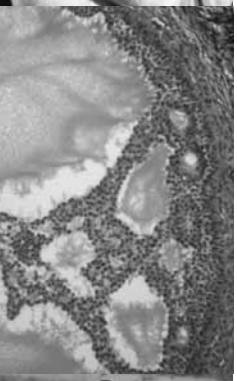
Animal and wildlife sciences include the sciences and practices whereby domesticated animals and wildlife are used for the benefit of mankind. Our dependence on nature makes us responsible for conserving the environment as part of our natural heritage. The work environment of animal and wildlife scientists spans a continuum from primary farming or wildlife production to the marketing of animals and the processing of animal products. Every link in this long chain offers a career opportunity according to one's own field of interest, needs and personality. The study programmes presented by the Department of Animal and Wildlife Sciences at the University of Pretoria are acknowledged as professional qualifications by the South African Council for Natural Scientists (SACNASP) in terms of Act 106 of 1993, and are recognised internationally.

BScAgric (Animal Science) and BScAgric (Animal Science and Pasture Science)

Production physiology, animal nutrition and animal genetics and breeding are important subjects and find application in subjects such as meat science, large-stock and small-stock sciences, poultry (including ostriches), and wildlife management. These study programmes can lead to a BScHons (Wildlife Management), an MPhil (Wildlife Management) (web-based) or an MScAgric. Duration: Eight semesters of full-time study.

Postgraduate education and specialisation

Postgraduate qualifications include MScAgric and PhD degrees. Four main research focus areas have been identified in which the majority of postgraduate students are accommodated, namely animal physiology



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(growth, reproduction, adaptation, meat science), animal breeding (quantitative and molecular), animal nutrition (monogastric and ruminant nutrition) and production management (different species and production systems).

A PhD is offered in Animal Science. The duration of the MScAgric and PhD is a minimum of four semesters.

BScHons, MPhil, MSc and PhD in Wildlife Management
The Centre for Wildlife Management functions through the Department of Animal and Wildlife Sciences, and it offers the postgraduate degrees BScHons, MPhil (web-based), MSc and PhD in Wildlife Management. Duration: Varies, depending on the degree programme.

Department of Consumer Science

Consumer science offers students the opportunity to specialise in various fields of interest, namely clothing retail management, food retail management or hospitality studies. Undergraduate and postgraduate study programmes have been developed in collaboration with industry to ensure that they conform to the expectations of potential employers and that graduates are successful and in demand in a scientific, highly competitive market environment. The Department has a strong postgraduate and research culture and attracts students from all over the country and the rest of Africa. It has well-equipped facilities and students are involved in several community projects under the supervision of outstanding, enthusiastic lecturers. It has secured excellent relations with industry and potential employers, and strives to keep its students' interests at heart.

Description of the study programmes

All the undergraduate study programmes are structured over four years of full-time study. UP is at present the only South African university that offers consumer science degrees with a focus on the economic and management aspects of the specific specialisation fields. Students are therefore sought after, especially in the retail sector. Graduates can eventually pursue postgraduate studies (at master's or doctoral level) in either consumer science or in economic and management sciences. Every study programme revolves around a specific product category in terms of its properties, consumers' purchasing and consumption behaviour, product management (inclusive of global distribution and sustainable consumption), as well as the development of new products and services. Consumer science aims to encourage strategies to enhance informed, responsible buying and consumption behaviour as well as consumer satisfaction, and to address the needs of individuals and groups in small businesses and the retail sector. Lectures and practicals follow a problem-solving approach and encourage students to work independently. A BSc degree in Food Management that focuses on the consumer aspects of food and nutrition is also offered.

Career opportunities

Career opportunities are diverse and a graduate's eventual career path is mostly determined by the individual's personality and interest. Students are therefore provided with the opportunity to investigate different possibilities through compulsory experiential training during their studies. During their fourth year of study, students also have to complete a research paper that offers them the opportunity of participating in a formal research project and to consider the possibility of postgraduate studies. The Department has acquired valuable contacts over the years, and students who perform well during their experiential training are often assured of appointments before the completion of their final exams.

Performance excellence

Several organisations are involved in the frequent evaluation of the study programmes and are also involved in the annual award ceremony for top achievers in the various study programmes. Several students have also participated and won awards in international competitions in the past. Lecturers and postgraduate students participate annually in international conferences, which demonstrate the quality of the teaching that is offered by the Department.

Postgraduate studies

Students who have completed a four-year degree in Consumer Science can apply for the master's degree that involves two years of full-time study or three years of part-time study. Four areas of specialisation are offered: clothing management, food management (that allows for a focus in the hospitality or nutrition domains), interior merchandise management, and general (which is recommended for students who do not have a marketing background and who have not specialised in the previously listed areas during their undergraduate studies). Students attend classes in five to six scheduled sessions to complete fundamental subjects and elective modules during the first year. Thereafter, they work mainly under the guidance of a supervisor to complete a research protocol and the final research that is eventually examined by a subject specialist at another tertiary institution.

Several research projects are supported by industry. The outcomes of the research initiatives are published internationally. The completed research of students of the Department is also presented at international conferences every year. After completion of a master's degree in Consumer Science, a student may register for a PhD. Consumer science offers students the opportunity of converting their passion into their profession.

Department of Food Science

The Department of Food Science is well on its way to being recognised internationally as the training and research leader in food science and nutrition, specialising in the health and well-being of the people of Africa. The food industry is South Africa's largest manufacturing sector. In the modern age, all food is processed to some extent. Food scientists are concerned with the chemical composition, structure and nutritional value of foods. They monitor and study the chemical, physical and biological changes that occur in foods during processing, preservation and storage. Food scientists are trained to meet the challenge of developing and supplying foods that comply with the ever-changing demands of the modern consumer. Just as important, food scientists lead the fight against hunger and malnutrition through the development of affordable, nutritious foods.

Students in the Department of Food Science may register for one of the following study programmes:

- BSc (Food Science) (three years)
- BScAgric (Food Science and Technology) (four years)
- BSc (Nutrition) (four years)

Postgraduate studies can lead to honours, master's and doctoral degrees. The Department of Food Science has an internationally recognised research record driven by top-rated scientists. Active participation in national and international research programmes attracts the cream of students from within and outside South Africa. The Department is actively involved in the South African Association for Food Science and Technology (SAAFoST) and industry associations for meat, dairy and cereals. Students organise education and social activities through their own student body, TUKSFoST.

Ample opportunities are provided for students to gain career exposure during practical training sessions, visits to food companies and organisations, attendance of national and international conferences and events, participation in competitions, eg the food product development competition and mentorship programmes of the international Institute of Food Technologists. Research activities in the Department focus on food product safety, nutritious and health-promoting African foods and beverages, plant biopolymer and bioplastic microstructures and nanomaterials, and sensory science research contributing to food, nutrition and well-being in Africa.

Description of the study programmes

The study programmes are designed to meet the increasing responsibility of ensuring healthy, safe and affordable food for the people of Africa.

BSc (Food Science) (three years)

Career-relevant training in the natural and biological sciences, is followed by specialisation in food science and technology. The programme is both academically and practically based and prepares students for economically satisfying careers in the food industry. It provides the skills to apply the concepts of food science and technology, develops critical thinking and problem-solving skills and provides opportunities for personal intellectual growth, and for making contributions to science and society. Students also undertake research projects. Food Science graduates can register as natural scientists with the South African Council for Natural Scientific Professions (SACNASP).

Year 1: Chemistry, Physics, Mathematics, Genetics, Microbiology, Plant Biology, Animal Diversity, Biometry, Language skills, Academic Information Management

Year 2: Food Science (Introduction to Food Science and Technology, Principles of Food Processing and Preservation), Microbiology (Food Microbiology, Bacteriology, Mycology), Biochemistry (Biochemistry in Perspective, Introduction to Proteins and Enzymes, Carbohydrate Metabolism, Lipid and Nitrogen Metabolism)

Year 3: Food Chemistry, Food Engineering, Food Microbiology, Animal and Plant Food Sciences, Integrated Food Science (seminars)

BSc (Food Science) graduates are encouraged to also complete a one-year postgraduate BScHons (Food Science) with the following modules: Research Project, Research Methodology and Seminar, Advanced Plant and Animal Food Science and Technologies, Sensory Analysis, Product Development and Quality Management, Advanced Food Science.

The honours programme can also be completed on a part-time basis over two years. Graduates with an average of 60% for the honours degree may enrol for MSc (Food Science).

BScAgric (Food Science and Technology) (four years)

For this degree students follow a similar programme to BSc (Food Science), but with inclusion of a selection of agricultural economics modules during the second and third years. During the fourth year of study, students follow a similar programme as BScHons (Food Science). Graduates with an average of 60% for their final year may enrol for MScAgric (Food Science and Technology).

BSc (Nutrition) (four years)

The Nutrition discipline deals with the human requirements for food and the effects food has on the well-being of individuals and communities. This study programme provides graduates with the skills to understand the nutritional requirements of developed and developing communities in South Africa and elsewhere in the world. This four-year degree is presented jointly by the Department of Food Science (Faculty of Natural and Agricultural Sciences) and the Department of Human Nutrition (Faculty of Health Sciences).

Two specialisation options are available: Nutritional Sciences and Public Health Nutrition (Community Nutrition). The Public Health Nutrition option will enable graduates to register as nutritionists with the Health Professions Council of South Africa (HPCSA). The Nutritional Sciences option will enable graduates to register as natural scientists with the South African Council for Natural Scientific Professions (SACNASP).

Year 1: Chemistry, Physics, Mathematics, Genetics, Microbiology, Biology, Biometry, Language Skills, Academic Information Management, Introduction to Food, Nutrition and Health, Anatomy

Year 2: Nutrition (Human Nutrition), Biochemistry (Biochemistry in Perspective, Introduction to Proteins and Enzymes, Carbohydrate Metabolism, Lipid and Nitrogen Metabolism, Biochemical Principles of Nutrition and Toxicology), Physiology (Introductory Neurophysiology, Circulatory Physiology, Lung and Renal Physiology, Acid-base Balance and Temperature, Digestion, Endocrinology and Reproductive System), Food Science (Principles of Food Processing and Preservation)

Students who wish to be admitted to the Public Health Nutrition option in Year 3 have to apply by 30 July during Year 2. Only students who have passed all the modules of years 1 and 2 will be considered for selection.


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Year 3: Biochemistry (Immunobiology, Molecular Basis of Disease), Nutrition (Nutritional Assessment, Food Composition and Applied Nutritional Programmes, Food and Nutrition Security), Food Science (Chemistry of Macro- and Micro-nutrients, Food Safety and Hygiene), Ethics and Human Rights in Healthcare, Research Project

Public Health Nutrition	Nutritional Sciences
• Community Nutrition • Application of Communication Principles in a Dietetics and Nutrition Context	• Biochemistry • Biochemistry of Proteins • Macromolecules of Life • Immunobiochemistry • Xeno Biochemistry

Year 4:

Public Health Nutrition	Nutritional Sciences
• Advanced Food, Nutrition and Health • Community Nutrition • Public Health Nutrition • Community Aspects of Food • Research Project • Internship Training	• Research Project • Research Methodology and Seminar • Biometry • International Nutrition • Advanced Food, Nutrition and Health

Graduates with an average of 60% for their final year may enrol for MSc (Nutrition).

Department of Plant Production and Soil Science

The Department of Plant Production and Soil Science specialises in the following disciplines: agronomy, horticultural science, pasture science, soil science and forestry. These disciplines are at present complemented by 13 academics, two emeritus professors, two honorary professors, four extraordinary professors and 11 support staff members. The diverse disciplines and the strong complement of academics attract many postgraduate students locally and from the rest of Africa. The highly qualified academics also attract substantial external project funding to the Department. Apart from the laboratories on the Hatfield Campus, the Department also has a 'living laboratory' in the middle of Pretoria, namely the Hatfield Experimental Farm. The experienced technical staff at the experimental farm ensure the smooth running of the research that is undertaken at this facility. The Department of Plant Production and Soil Science focuses on educating and training students on conducting research that will contribute to improved food security and reduce negative impacts on the environment.

Description of the study programmes

The same study programmes are prescribed for all undergraduate students in BScAgric (Applied Plant and Soil Sciences) in order to ensure exposure to agronomy, horticultural science, pasture science, soil science and forestry. This gives students who enter the job market a wide range of career options and provides those who wish to continue with postgraduate studies the opportunity to make informed career decisions on future specialisation.

The following postgraduate degrees are also available:
- PhD (Agronomy, Horticulture, Pasture Science, Soil Science and Forestry Science)
- MScAgric (Agronomy, Horticulture, Pasture Science and Soil Science)
- BScHons (Environmental Soil Science)
- BScAgricHons (Plant Production)
- MSc (Environmental Soil Science)
- MSc (Forestry Management and the Environment) (lectured programme)
- MSc (Forestry) (interdepartmental programme)

The research component of postgraduate study focuses on five main scientific disciplines: agronomy, horticulture, pasture science, soil science and forestry. The research activities of each of the disciplines are set out below, with specialisation in aspects of the listed subtopics:

Agronomy
- Field and vegetable crops
- Industrial crops
- Irrigation and plant-soil water balance
- Weed management

Horticultural science
- Fruits
- Medicinal and aromatic plants
- Ornamentals
- Biofuels

Pasture science
- Planted pastures
- Veld management
- Environmental management (land reclamation)
- Integrated land-use systems

Forestry
- Agro-forestry
- Integrated land-use systems
- Forest resource-use planning and management
- Forest resource economics and policy

Soil science
- Plant nutrition
- Soil classification
- Environmental soil physics
- Environmental soil chemistry
- Soil biology

Mathematical Sciences

Department of Insurance and Actuarial Science

The Department is extremely proud of its alumni. Former students occupy the highest positions in the insurance and investment world, not only in South Africa, but also abroad. It strives to keep its study programme competitive and to afford its students the opportunity to leave the University with the maximum number of exemptions from the examinations of the Actuarial Society of South Africa (ASSA). It has highly skilled academics who serve on various committees of ASSA.

Developments that have taken place in the modern financial industry have led to a financial world that is rapidly changing. These changes have created a growing need in the business market for graduates who are well skilled in the financial models and quantitative techniques that are used in modern actuarial and

financial engineering applications. Students enrolled for BSc (Actuarial and Financial Mathematics) will be able to tailor their coursework in either an actuarial or a financial engineering option. The study programme provides students with a broad education that will serve them beyond what is usually expected of a graduate in these fields and that will enable them to cope with the actuarial and financial problems of the future.

The study programme has a core of compulsory and elective subjects. With regard to the actuarial option, the programme is structured in such a way that it gives an aspiring actuary the opportunity to fulfil the requirements needed for exemption from the courses of the ASSA in the minimum time. However, to obtain maximum exemption, a follow-up honours degree is recommended. Students who do not aim to qualify as actuaries will also be well equipped for careers as actuarial technicians with BSc (Actuarial and Financial Mathematics).

For aspiring financial engineers, the programme provides depth and develops the student's ability to design and analyse financial products. The analytical techniques that are essential for the modelling of the stochastic behaviour of financial processes and the simulation of the resulting effects on investment portfolios are studied.

Description of the study programme

Compulsory subjects are mathematical statistics, analysis, financial engineering (third-year level), calculus, linear algebra, differential equations, actuarial mathematics, informatics (second-year level), numerical analysis, financial management, economics and computer science (first-year level). Elective subjects include financial mathematics and insurance and actuarial applications, actuarial modelling, dynamical systems and stochastic processes.

Department of Mathematics and Applied Mathematics

Mathematics is the language of science and technology. Mathematics, which originated from arithmetic and geometry, is about pattern and structure. Applied mathematics is concerned more 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. Nowadays, mathematics is essential for all technological, financial and managerial industries which form the backbone of the South African economy.

Studying mathematics

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 18 000 students enrolled for mathematics modules. The Department prides itself on excelling in both its teaching and research activities, and in community-based activities. The Mathematics Building itself has a classical old-time character, surrounding a quad where the bustle of students adds to the vibrancy of the academic environment.

The diverse and competent staff complement has expertise in various fields. Researchers regularly travel abroad to attend conferences and to pay research visits. The Department has 18 NRF-rated researchers in fields ranging from the more traditional abstract analysis to the contemporary epidemiology field where the modelling of biological phenomena leads to exciting options. The Department regularly hosts illustrious visitors, such as the Fields Medallist, Prof Laurent Lafforgue from France.

Mathematically minded students enjoy the stimulating academic atmosphere of the Department and can compete for prestigious awards such as the Dewald Hattingh Prize for the best third-year student. A degree in Mathematics trains the student to apply, evaluate and adapt existing problem-solving techniques, or to develop new mathematical models and new techniques to solve problems stemming from natural, technological and financial phenomena.

Description of the study programmes

- **BSc (Mathematics).** Compulsory subjects are analysis, abstract algebra, geometry (third-year level), calculus, linear algebra, differential equations, discrete structures (second-year level), mathematical modelling, mathematical statistics, numerical analysis and dynamical processes (first-year level).
- **BSc (Applied Mathematics).** Compulsory subjects are analysis, continuum mechanics, numerical analysis, partial differential equations, dynamical systems (third-year level), calculus, linear algebra, discrete structures, differential equations (second-year level), mathematical modelling, mathematical statistics and dynamical processes (first-year level).

Henry Thackeray, a BSc Honours in Mathematics student at UP, won the first ever South African Tertiary Mathematics Olympiad (SATMO) in 2012. The Olympiad was written by mathematics undergraduate students from universities across the country. Henry Thackeray's achievement is especially remarkable. With a score of 90%, Henry beat the others by far, the closest score countrywide being 65%. Henry also received the Dewald Hattingh book prize for the best third-year student in Mathematics for 2012.

His mathematical talents were evident from an early age and mathematics has remained a source of interest and pleasure into his adult years. He has a history of excelling in mathematics Olympiads, winning the national mathematics Olympiad early in his high school years, against considerably more senior competitors, also representing South Africa in the International Mathematics Olympiad, winning a silver medal. Henry's passion for mathematics has brought many awards and prizes since school days, continuing this trend at university. He is currently entering the postgraduate level where he is positioning himself for a PhD qualification and a research career, investigating problems at the cutting edge of mathematics.

Henry Thackeray (above left)

Postgraduate studies

Postgraduate studies and research constitute the highest priorities of the Department and are performed in a variety of highly relevant areas.

- **Honours.** A student will have to do a number of modules and write an essay under the guidance of a supervisor. The duration of the degree is one year of full-time study and two years of part-time study.
- **Master's.** The duration of the MSc is a minimum of one year (full-time), but it usually takes two years to complete. The student does three master's modules, as well as a dissertation that demonstrates that the student has the ability to plan, initiate, carry out and write a report on a scientific investigation.
- **Doctorate.** During study for the PhD degree, students are required to do original research in one of the research areas that is supported by the Department.

Department of Statistics

Mathematical statistics is the art and science of collecting, organising, analysing, interpreting and presenting data for the purpose of drawing scientifically founded conclusions. In short, statistics can be regarded, among others, as the science of gaining information from data. With the interactive use of the computer, the statistician is able to apply statistical models and methods in all types of research. Statisticians are expected to possess proficiency in a multitude of skills. A strong numerical background and interest, the desire to master computer programming and the use of various software packages, the ability to interact with professionals from various disciplines and communication skills, both verbally and in writing, are of importance.

Description of the programme

Compulsory subjects are mathematical statistics (third-year level), mathematics subjects, namely calculus, linear algebra, analysis (second-year level) and computer literacy, as well as language proficiency (first-year level). Elective modules include subjects from various disciplines, such as computer science, mathematics, insurance sciences, physics, chemistry, meteorology, zoology and many more, depending on the student's field of interest.

Top achiever awards

At the end of students' final undergraduate year in mathematical statistics, an award ceremony is held where students who obtained distinctions throughout their three years of undergraduate study of the subject receive a special certificate. At the same ceremony, the top overall achiever in mathematical statistics on the third-year level, as well as the top achiever in the practical component of mathematical statistics on the third-year level, also receive certificates and prizes. A number of bursaries, sponsored by Statomet and the South African Research Chair Initiative (SARChI) Chair in Statistics, are made available annually for top achievers who decide to continue with an honours degree in mathematical statistics.

Community engagement initiatives

Sci-Enza

Sci-Enza (previously known as the Exploratorium) is a science centre where the general public, mostly groups of schoolchildren, can discover aspects of science and technology. A variety of interactive exhibits in physics, botany, zoology, mathematics and engineering are available. Organised groups visiting the centre are given a science show, as well as a guided tour of the botanical garden and a visit to the Camera Obscura on the Hatfield Campus. A reading corner, containing popular scientific books, magazines and video facilities, can be used by visitors. Sci-Enza is open during office hours on weekdays. Individuals may visit free of charge and organised groups attending a science show pay a nominal fee of R10 per person. Bookings may be made with the curator at tel: +27 (0)12 420 2865/3767.

Technology workshops

Sci-Enza presents technology workshops for about 30 participants on request. Sets of Lego blocks, K'nex and other commonly available materials are used by attendees to solve basic technology problems. Gears, levers, structures and other topics corresponding to the schools' technology syllabuses are covered under the guidance of an instructor. A nominal fee is charged for these workshops. Interested parties should arrange their workshop by making an appointment with the curator at tel: +27 (0)12 420 2865/3767.

UP with Science

The UP with Science enrichment programme was launched in 1998 and is aimed at increasing learners' knowledge of, and interest and skills in science. Approximately 50 candidates are selected from schools in the vicinity of the University to take part in the programme. The programme is offered over a period of three years, from Grade 10 to Grade 12. It includes Saturday classes once a month and a week-long winter school during the July school holidays. Participants who complete the programme will receive study bursaries in the form of university tuition fees if they are admitted to study programmes in the University's Faculty of Natural and Agricultural Sciences. Because the UP with Science programme is mainly presented in English, the information is made available in English. However, Afrikaans-speaking candidates are welcome to submit their applications in Afrikaans.

Each school may nominate a maximum of two candidates from which the University will select approximately 50 candidates. Successful applicants will be informed of their selection. The UP with Science group will be constituted in such a way that it reflects the racial and gender diversity of the South African population. The two most important criteria for the selection panel are academic potential and an interest in science. Please contact Ms Helga Nordhoff at tel: +27 (0)12 420 2638 for more information.

General information

Faculty-specific information

Tel: +27 (0)12 420 4578 (Ms Grace Zitha)
Email: grace.zitha@up.ac.za
Location: At the entrance of the Agricultural Sciences Building Hatfield Campus

Client Service Centre contact details

Tel: +27 (0)12 420 3111
Email: csc@up.ac.za
Website: www.up.ac.za
Parent's page: www.up.ac.za/parents
Location: University of Pretoria cnr Lynnwood Road and Roper Street Hatfield
Postal address: University of Pretoria Private bag X20 Hatfield 0028

GPS coordinates of UP campuses

Hatfield: S25º 45' 21" E28º 13' 51"
GIBS: S26º 07' 46" E28º 02' 46" (56 km from Hatfield Campus)
Groenkloof: S25º 46' 10" E28º 12' 34" (3.5 km from Hatfield Campus)
LC de Villiers: S25º 45' 10" E28º 14' 46" (1.2 km from Hatfield Campus)
Mamelodi: S25º 43' 22" E28º 23' 56" (12 km from Hatfield Campus)
Onderstepoort: S28º 10' 54" E25º 38' 52" (22 km from Hatfield Campus)
Prinshof: S25º 43' 57" E28º 12' 10" (6 km from Hatfield Campus)

UP banking details

Absa Branch: Hatfield Branch code: 632005 Account number: 214 000 0054 Swift code: ABSAZAJJ	Standard Bank Branch: Hatfield Branch code: 011545 Account number: 012 602 604 Swift code: SBZAZAJJ

Welcoming Day and the Programme for Registration and Start of the Academic Year

Attendance of the Welcoming Day on Saturday, 18 January 2014 and the programme for registration and start of the academic year is compulsory for all new first-year students. This programme has been designed to assist students with their academic preparedness, enabling them to successfully make the adjustment from high school to university.

Applications

New students may only register after successful admission. If provisionally admitted, they will still have to comply with the requirements of the faculty in which they wish to register with the end examination results of their final school-year[1]. Thus, new students will only be permitted to register once their application and admission processes have been approved. Provisional admission is based on the results obtained in the Grade 11 end examination. Please take note that the end examination results of the final school-year remain the determining factor for admission. Furthermore, please note that the achievement of the minimum requirements does not necessarily guarantee admission to any study programme.

[1] The end examination results of the final school-year refer to the examination results regarded by Higher Education South Africa (HESA) as the minimum requirement for tertiary study in South Africa.

Late applications

Before you submit a late application, please contact the Faculty Administration Office to ensure that there is still space available. If the study programme is not subject to selection and if the Faculty still has space available, your application will be considered. Late applications are only accepted on condition that all the admission requirements for the relevant study programmes are fully complied with. Should you not comply with the requirements, your application will not be considered. Application fees will not be refunded.

Admission (new first-year students)

- If you have been provisionally admitted to the University, the end examination results of your final school-year must still comply with the admission requirements for the study programme to which you were provisionally admitted. If the end examination results of your final school-year do not comply with the admission requirements, contact the relevant Faculty's Student Administration Office with regard to your admission status.
- If you have been placed in a residence, please refer to your placement letter for occupation dates.
- If you have been provisionally admitted to a residence, but the end examination results of your final school-year are lower than the admission requirements, you may not move into the residence until the relevant Faculty's Student Administration Office has confirmed your admission. Admission in such cases is not guaranteed.
- If you apply to have some of your final school-year subjects re-marked, and you do not comply with the minimum admission requirements based on your current results, you will not be allowed to register in the interim. Re-marked results are only available in February and in terms of the University's policy such marks will not be taken into consideration. You are welcome to apply for the next academic year.

National Benchmark Test (NBT)

The National Benchmark Test is not compulsory for all study programmes. Please refer to the relevant study programmes in this brochure. Please note that the Academic Literacy Test does not replace the National Benchmark Test.

Contact information

Tel: +27 (0)21 650 3523
Website: www.nbt.ac.za

The calculation of the Admission Point Score (APS) is based on a candidate's achievement in any six recognised 20-credit subjects (not only designated subjects) by using the seven-point rating scale below. Life Orientation is excluded from the calculation of the APS.

Achievement	Achievement level	Mark
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%

Language policy and medium of instruction

In conducting its business, the University uses two official languages: English and Afrikaans. In formal education, the medium of instruction is English or Afrikaans, or both of these languages – provided that there is a demand and that it is academically and economically justifiable. However, it remains the student's responsibility to ascertain on an annual basis in which language a module and any further level of that module is presented. In respect of administrative and other services, students have the right to choose whether the University should communicate with them in English or Afrikaans.

Academic Information Management (AIM)

- Academic Information Management modules (AIM 101 or both AIM 111 and AIM 121), depending on your study programme, are compulsory for all new first-year students.
- AIM 101 will be presented in the first or second semester, depending on your study programme.
- AIM 111 will be presented in the first semester and AIM 121 in the second semester.
- There are no exemption examinations available for AIM 101 or AIM 111 and AIM 121.

Academic literacy for first-year students

An inadequate level of academic literacy can impact negatively on a student's chances of academic success. The University of Pretoria has processes in place to identify students who might need development. This is done by way of evaluating Grade 12 marks in English or Afrikaans or the results of the Academic Literacy Test. Full details will be communicated to all admitted students in the information brochure for the programme for registration and start of the academic year, which is distributed in November or December. If you are required to write the test, time will be scheduled in the programme. If your Grade 12 English or Afrikaans marks are to be used, the Faculty's Student Administration Office will register you for the appropriate study programme as identified by your Faculty.

Please note that the Academic Literacy Test does not replace the National Benchmark Test (NBT).

Bursaries, awards and loans (financial aid)

The University reserves the right to amend, without prior notice, the regulations and conditions applicable to bursaries, awards and loans. Students who are interested in the support bursaries and loans administered by the University should submit an application via the University's website www.up.ac.za/feesfunding. This is, however, not applicable to achievement awards as a different process is followed in this regard.

Contact information
Website: www.up.ac.za/feesfunding

Information on study costs, accounts and financial aid is published on the University's website at www.up.ac.za/feesfunding and in the Fees and Funding brochure available at the Client Service Centre.

Sports bursaries
Sports bursaries are available, subject to various conditions, to sports achievers who obtained at least provincial colours in selected sport. It is expected of these students to actively participate in this sport for a UP Club while studying at the University. The closing date for applications is 30 September of the year preceding commencement of study. Bursary application forms are available from the Sports Centre.

Contact information
Tel: +27 (0)12 420 6060
Email: sportinfo@up.ac.za
Website: www.up.ac.za/sport

Other bursary options
You may also visit the following websites for information on bursaries:

- www.up.ac.za/feesfunding
- www.gostudy.mobi, which lists bursaries according to field of study
- http://bursary.hcifoundation.co.za
- The Bursary Register:
  Tel: +27 (0)11 672 6559
  Email: slevin@mweb.co.za

Edu-loan
Edu-Loan is a registered credit provider, allowing access to study loans for employees as well as full-time students. A student loan can include a whole range of student-related necessities such as books, accessories, laptops, university and private accommodation, as well as study tuition with a fixed monthly instalment.

Anyone (students, parents or guardians) can apply for a loan, provided that the applicant is in full-time employment or has a registered business.

Contact information
Tel: +27 (0)12 420 5175/2161 or
+27 (0)86 632 8882/3
Email: Isaac.senosi@up.ac.za
Location: R1-13 Student Centre
Business hours: 08:00–16:00

Guaranteed undergraduate achievement awards: 2015
Learners do not apply for the achievement awards below. These awards are awarded based on academic achievement.

Qualifying average percentage	Faculty of Engineering, Built Environment and Information Technology and Faculty of Natural and Agricultural Sciences	Faculty of Health Sciences and Faculty of Veterinary Science	Other faculties
75%–79.99%	R6 000	–	–
80%–89.99%	R15 000	R6 000	R15 000
90%–100%	R40 000	R20 000	R40 000

Note: The University of Pretoria reserves the right to amend award values without prior notice. Please refer to www.up.ac.za/feesfunding for the criteria applicable to the above achievement awards.

Other achievement awards: 2015

Learners do not apply for the following two awards. These awards are awarded based on academic achievement. Only students with South African citizenship or permanent residency in South Africa are considered for these awards.

Description	Award value	Faculty	Notes
JuniorTukkie Grade 11 Empowerment Programme (15 awards)	R13 600	• Natural and Agricultural Sciences • Health Sciences • Engineering, Built Environment and Information Technology	The 15 learners with the best Grade 12 results who attended the JuniorTukkie Grade 11 Empowerment Week, will each receive an amount of R13 600.
Grade 12 dux learner (top academic achiever in Grade 12) at selected feeder schools (one award per school)	R5 000	Any faculty	The final decision regarding the selection of schools for this award rests with the University of Pretoria.

Note: The University of Pretoria reserves the right to amend award values without prior notice. Please refer to www.up.ac.za/feesfunding for the criteria applicable to the above achievement awards.

Contact information

Tel: +27 (0)12 420 3111
Email: csc@up.ac.za
Website: www.up.ac.za/feesfunding
Location: Hatfield Campus
Postal address: Client Service Centre
University of Pretoria
Private bag X20
Hatfield 0028

Special offer for academic achievers

Please take note of a special offer for top academic achievers based on average percentages obtained in the end examination of the final school-year. This special offer is only applicable to new first-year students who obtained 75% or more in the end examination of their final school-year. For more information on the University's special offer to new first-year students, visit web.up.ac.za/admissioninfo

"I am currently pursuing my master's degree in Actuarial Sciences, which means this is my fifth year of study. The things I enjoy most about my course are the challenges it presents, not only in terms of academic life, but in every other aspect as well. My favourite thing about the Faculty of Natural and Agricultural Science is the warmth and help I receive from people both in and outside of my department.

I have been given the opportunity to lecture second-year students, which I think is an amazing opportunity as I can help develop both their and my understanding of actuarial mathematics. The University has encouraged me to branch between different faculties for my research which has allowed me to meet many talented people, who will have a huge effect on my future. I have won several prizes in my varsity career, these include the FNB prize for best second-year student in mathematical statistics, the FNB prize for the best second-year student in actuarial mathematics, the Momentum prize for the best honours student in life insurance and the Prudential prize for the best honours student in life contingencies.

My dream job… This is difficult to answer seeing that I am still very young. If I had to decide now, it would be one where I could be on the cutting edge of actuarial sciences. I would like to be part of the development of new techniques and products, which revolutionise and safeguard the financial industry."

Matthew Smith

Fees

For the estimated tuition fees for 2014 in this Faculty, please consult www.up.ac.za/feesfunding. All amounts are subject to change and should not be considered to be the final cost. The rate of inflation during 2014 can be used as a guideline to estimate the increase in tuition fees for 2015.

Payments, rebates and pay-outs

The fees below are for 2014 unless otherwise indicated.

Description	Amount payable	When to pay	Notes
Application fee	R300 (for 2015)	This fee is payable with submission of application for studies.	This fee is non-refundable.
Registration fee • Payable prior to registration • Also payable every subsequent year before registration	R4 600	**Selection study programmes** This fee is payable WITHIN 30 days of placement to reserve your study place.	• The registration fee forms part of the tuition fees and is an initial payment towards the tuition fees. • R950 of the R4 600 will be retained for cancellations made WITHIN 30 days after placement. • R2 300 of the R4 600 will be retained for cancellations made MORE THAN 30 days after placement.
		All other study programmes The fee is payable at least 5 days before registration in January/ February.	• The registration fee forms part of the tuition fees and is an initial payment towards the tuition fees. • This fee is fully refundable if the student does not register.
International levy for all non-South African citizens	R2 500	This levy is payable before registration in January/February.	This levy is fully refundable if the student does not register.
Tuition fees	Refer to www.up.ac.za/ feesfunding	• Half (50%) of the student account is payable before or on 30 April. • The full (100%) student account is payable before or on 31 July.	• Accounts are available on the UP Portal (Student Centre) after registration. • Accounts are mailed monthly, starting March.
Discount for early payment		A discount of 2.5% is granted if the student account is paid in full by 30 April.	
Family rebate	• Two students – 10% rebate is granted on the tuition fees for each of the students. • Three or more students – 20% rebate is granted on the tuition fees for each of the students.	Apply before 31 March.	• This rebate is only applicable on tuition fees. • Students must apply annually. • Students must apply in writing. • The 2.5% discount for early payment will not be given on the family rebate • Application forms are available on www.up.ac.za/feesfunding or at the Client Service Centre.
Summer School and **Winter School**	Full tuition fees are payable for the modules taken.	Fees are payable with the rest of the student account.	When modules are repeated, the full tuition fee will be charged again.
Fees paid by bursars	• Bursaries may or may not cover the full costs of study. • Ensure that you are aware of the full value of your bursary.	External companies or other institutions that sponsor students with bursaries, need to make the required payments to the students' accounts by the same dates as if the students were paying the accounts themselves. • Half (50%) of the student account is payable before or on 30 April. • The full (100%) student account is payable before or on 31 July.	• Students must submit written proof from the sponsors of the bursary awarded to them prior to registration, otherwise the registration fee will be payable by the student. • Students remain responsible for their student accounts if their bursary sponsor does not pay the account.
Credit balances	Amounts in credit on your account are payable.	Payment depends on the source of the credit balance.	The Refund form is available on www.up.ac.za/feesfunding or at the Client Service Centre (CSC).
Other living costs	These costs are not included on the account.	Payment should be done as required, for example books, food, travel, stationery, printing and internet.	Students should manage these costs themselves.
Cancellation fees Discontinuation of studies and discontinuation of a module	Refer to www.up.ac.za/ feesfunding.	Payment of these fees are determined by the official date the University was notified in writing of the discontinuation.	In cases where discontinuation is due to the hospitalisation or death of a student, cancellation fees may be waived if sufficient proof is provided.

Accommodation on UP campuses

Campus	Single rooms (2014 amount)*	Double rooms (2014 amount)*
Hatfield		
Ladies' residences: Asterhof, Erika, Jasmyn, Katjiepiering, Madelief, Klaradyn, Magrietjie, Nerina	R29 700	R27 500
Ladies' residence: Nerina (new wing)	R33 100	
Men's residences: Kollege, Maroela, Mopanie, Taaibos	R29 700	R27 500
Men's residences: Boekenhout, Olienhout	R32 000	R29 700
Men's and ladies' residence: TuksVillage	R33 100	
Groenkloof		
Ladies' residences: Zinnia, Lilium, Inca	R29 700	R27 500
Men's residence: Kiaat	R29 700	R27 500
Mamelodi		
Men's and ladies' residence: Tuks Naledi		R27 500
Onderstepoort		
Men's and ladies' residence: Onderstepoort	R29 700	R27 500
Men's and ladies' residence: Onderstepoort (new wing)	R36 000	
Prinshof		
Ladies' residence: Curlitzia	R29 700	R27 500
Men's residence: Olympus	R31 500	
Men's and ladies' residence: Hippokrates (single room)	R39 100	

*Amounts will be adjusted for 2015.

Contact information

Tel: +27 (0)12 420 3111
Email: csc@up.ac.za
Website: www.up.ac.za/accommodation
www.up.ac.za/feesfunding

Private accommodation

The University can unfortunately not provide accommodation to all applicants, as the demand exceeds the available places. The following private facilities may be considered for alternative private accommodation:

Private accommodation in the vicinity of Hatfield Campus

Accredited men's residence	Telephone number	Email and/or website
Sonop	+27 (0)12 460 5723/7830	toniev@sonop.org.za
Accredited accommodation	**Telephone number**	**Email and/or website**
Midcity	+27 (0)12 426 3400 +27 (0)82 887 4165	www.midcity.co.za
South Point	+27 (0)80 078 833 687	www.staysouthpoint.co.za
The Fields (City Property)	+27 (0)12 362 4473/4504	propworld@cityprop.co.za
Urban Nest	+27 (0)12 343 5138	info@urbannest.co.za

Private accommodation in the vicinity of Prinshof Campus

Accredited accommodation	Telephone number	Email and/or website
Craig's Place (City Property)	+27 (0)12 319 8700	propworld@cityprop.co.za
Jakaranda Lodge	+27 (0)12 330 2424	bookings@jaklodge.co.za

Alternative private accommodation

Accredited accommodation	Telephone number	Email and/or website
190 On-Suite	+27 (0)12 322 0277 +27 (0)82 551 8676	conradk@mmaphuti.co.za www.mmaphuti.co.za
Arlon Property	+27 (0)12 362 5499/1868	arlon@icon.co.za
Off Campus Rental	+27 (0)12 362 6123 +27 (0)83 438 2548	ocrental@telkomsa.net

UP Open Day

Date: 24 May 2014
Time: 08:00-14:00

The following persons should attend the UP Open Day:

- Grade 12 learners (final school-year) who have received confirmation that they have been provisionally admitted to a study programme
- Grade 12 learners (final school-year) who meet the admission requirements and wish to hand in their application forms
- Grade 11 learners who are fairly certain that they will apply at UP
- the parents of the abovementioned learners

Sport

Sport represents a significant part of student life. The University of Pretoria provides students with opportunities to participate in a variety of sporting disciplines at club, national and international level. The University also boasts excellent sports facilities, which are highly regarded both nationally and internationally.

The LC de Villiers Sports Grounds are centrally located and are easily accessible to students. TuksSport has a large number of sports clubs and is currently the largest source of athletes for a variety of sports disciplines and national teams. TuksSport forms a vital part of the UP experience. You are therefore encouraged to choose the University of Pretoria for an outstanding sports and academic career.

Contact information

Tel: +27 (0)12 420 6060
Fax: +27 (0)12 420 6095
Email: sportinfo@up.ac.za
Website: www.up.ac.za/sport

High Performance Centre (hpc)

The University of Pretoria's High Performance Centre (hpc) is Southern Africa's first elite performance sports facility.

Contact information

Tel: +27 (0)12 362 9800
Fax: +27 (0)12 362 9890
Email: info.hpc@up.ac.za

TuksSport High School

Tel: +27 (0)12 343 4527
Fax: +27 (0)86 636 4019
Location: TuksSport Study Centre
Technical Building (Building 5)
Groenkloof Campus
cnr Leyds Street and
George Storrar Drive, Groenkloof

Student Affairs

The Student Affairs offices are located in the Roosmaryn Building on the Hatfield Campus. The Department of Student Affairs has two divisions: Student Support and Student Development.

Student Support Division

This division includes student health, student counselling and the Unit for Students with Special Needs.

Services provided by the Student Support Division include the following:

- academic development (career counselling and assessment, study methods and reading courses, stress management, psychometric testing, time management and career planning)
- potential development (conflict management, communication skills, goal setting and problem solving)
- individual and relationship counselling (interpersonal problems, stress, depression, eating disorders, life trauma, emotional problems and the development of life skills)

Contact information

Tel (office hours): +27 (0)12 420 2333
Tel (after hours): +27 (0)12 420 2310/2760
24-hour crisis line: +27 (0)80 000 6428 (toll free)
Email: ethel.motlhamme@up.ac.za
Location: Student Centre (opposite Pie City)
Hatfield Campus
Office hours: 07:30–16:00

Groenkloof Campus

Tel: +27 (0)12 420 5687
Location: R505 Sports Centre

Hatfield Campus

Tel: +27 (0)12 420 2333
Location: Student Centre (opposite Pie City)

Mamelodi Campus

Tel: +27 (0)12 842 3724
Location: Student Health Centre

Onderstepoort Campus

Tel: +27 (0)12 529 8476
Location: Arnold Theiler Building
(Student Administration Offices)

Prinshof Campus

Tel: +27 (0)12 420 2333
Location: 8th floor
Basic Medical Sciences Building

Student Development Division

This division includes all student governance structures and organised student life initiatives:

- Student Forum (SF)
- Student Representative Council (SRC)
- Constitutional Tribunal (Student Court)
- day houses
- faculty houses (www.up.ac.za/facultyhouses)
- over 100 religious, cultural, academic, political and other societies
- Tuks Top Junior/Senior and ENACTUS UP
- Mentorship programme
- service providers:
  - TuksRAG (Reach Out and Give)
  - Stuku (student culture)
  - *Perdeby* (student newspaper)
  - Tuks FM (campus radio station)
  - Student Sport

Contact information

Tel: +27 (0)12 420 6600/1411
Location: Roosmaryn Building
Hatfield Campus

Day houses

If you are not living in a residence, but would like to have a great student life, then you should consider joining one of the day houses on campus. This will give you the opportunity to take part in organised student life activities such as rag and sport, as well as cultural and social events.

You can join one of the official day houses: Vividus Men, Vividus Ladies, Zeus or Luminous. An annual membership fee is payable. Don't miss out – be sure to sign up with the day house of your choice!

Contact information

Website: www.up.ac.za/dayhouses

Faculty houses

By default, all students (day and residence students) belong to the faculty house of the faculty in which they are registered. Faculty houses have an academic focus and play an important role in linking students and lecturers in the faculty.

There are no membership fees payable to join a faculty house, but students have the option to purchase items such as T-shirts or to attend camps and other events for which fees are charged. Typical activities include personal and professional as well as development opportunities, such as presentations by speakers on various topics and excursions to relevant industries. Faculty houses are also involved in various community service projects. Some faculty houses participate in sport leagues.

The faculty house also serves as a link with the class representative system in the faculty.

Contact information
Website: www.up.ac.za/facultyhouses

Library services

The Department of Library Services is host to a world-class modern academic research library network spread over the campuses of the University. This service is aligned to the University of Pretoria's faculties with customised services for undergraduates, postgraduates, staff, alumni and visiting academics. All services are designed to create a gateway to global information and support learning, teaching and research through interaction with professional staff.

Key initiatives include an e-service (online), access to wide-ranging print and electronic collections, the Learning Centre at the Merensky Library and online assignment support for undergraduate students, an online reference service (Ask-a-Librarian), wireless hot spots, search engines to access electronic journals, books and databases, electronic theses and dissertations, an institutional repository, various audiovisual materials, dedicated facilities for the physically challenged and postgraduates, and interlending library facilities to national and international collections. All of these actively contribute to a world-class learning environment.

Contact information
Website: www.library.up.ac.za and
www.library.up.ac.za/mobi

International students

All non-South African citizens must report to the International Students Division in the Client Service Centre on the Hatfield Campus prior to registration. The Client Service Centre will be open from 6 January 2014. The international students' special orientation programme will take place on 17 and 19 January 2014. Students can obtain more information from the International Students Division in the Client Service Centre.

Non-South African citizens will have to submit proof of legal status in South Africa, as well as proof of adequate medical aid cover at the International Students Division in the Client Service Centre before they will be able to register.

Contact information
Tel: +27 (0)12 420 3111
Email: csc@up.ac.za
Website: www.up.ac.za/ISD
Location: Client Service Centre
Hatfield Campus

Supporting documents
Please note that students must have photocopies ready before going to the International Students Division in the Client Service Centre. Copies can be made at the Xerox Copy Centre in the Student Centre on the Hatfield Campus.

All non-South African citizens will have to show their original documents and submit two photocopies of the documents listed below:

- the International Students Information form, completed and signed
- a valid passport or an ID (in the case of students with permanent residence in South Africa)
- a valid study permit endorsed for studies at the University of Pretoria or one of the following:
  - an asylum-seekers permit
  - a Certificate of Refugee Status
  - a diplomatic passport (not a diplomatic card) and a diplomatic permit
- proof of medical cover (medical cover must be paid a year in advance, January to December)

The abovementioned documents must be submitted to an international consultant and the information must be captured before you can register.

Study permit
Every non-South African citizen is required to have a valid passport and temporary residence permit, such as a study permit, endorsed for studies at the University of Pretoria. Non-South African citizens wishing to enter South Africa should only apply for study permits once an official letter of admission has been received.

How to apply for a study permit
You are required to apply for a study permit at the South African High Commission, Embassy, Consulate or Trade Mission in your country of residence or the nearest South African High Commission, Embassy, Consulate or Trade Mission. The SADC countries are Angola, Botswana, DR Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

The following documents should be submitted to the South African Embassy or Consulate in order to obtain your study permit:

- a passport valid for not less than 30 days after the intended study period
- proof of payment of an administrative fee (as required at the time by the Department of Home Affairs of South Africa)
- confirmation of South African medical cover and proof of payment of membership fee to a medical aid scheme registered with the Council for Medical Schemes in South Africa. Cover must be valid for the duration of one academic year (January to December)
- an admission letter from the University stating the following:
  - the duration of the study programme;
  - confirmation that the admitted student is not taking the place of a local student; and
  - undertaking to inform the Department of Home Affairs if the student deregisters.
- a medical report (less than six months old) by a registered medical practitioner
- a radiological report (less than six months old)


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- proof of the availability of funds to cover tuition fees and self maintenance for the duration of studies in South Africa
- a police clearance certificate for the past six months or longer if the applicant is older than 18 years of age
- details regarding arranged accommodation while in South Africa

Other documents that may be required are the following:
- a yellow fever vaccination certificate
- a certificate or other documentary proof of marital status (eg married, widowed, divorced or separated)

Repatriation guarantee
A cash deposit equal to a return ticket to the country of origin (repatriation guarantee) may be required.

Change of institution (study permit holders)
The University may only register a student for academic studies once the prospective applicant has produced a valid study permit. It usually takes at least six weeks for an application to be processed. It is also important to note that a study permit is issued to study at one institution and a student would have to apply for a change of conditions, should they want to change institutions. This can be done in South Africa in the municipal area applicable to the new institution of study.

Before applying for this permit, a student must obtain a release letter from the current institution, stating that this institution has no objections to the transfer.

Change of conditions (study permit holders)
A change to the conditions of a study permit should be available in a situation where a student holds a valid study permit with a condition to study at another institution in South Africa (other than the one the student is applying to). This is usually the case with learners and students studying at South African high schools, colleges and other academic institutions. Their permits would therefore need to be endorsed with a condition to study at the institutions mentioned above. In order to register at the University of Pretoria, the permit will need to be endorsed for the applicant to study at the University of Pretoria. Application for a change to the conditions of a study permit constitutes a new application for a study permit. Although the applicant will need to complete a separate form, the requirements are the same as those for the initial application for a study permit.

Please note the following:
- These forms are available on the internet (www.home-affairs.gov.za). They can also be collected at any South African visa-issuing authority (Department of Home Affairs offices, consulates or embassies).
- This information is meant to serve as a guide only. Requirements for studying in South Africa are subject to change and each application is treated as an individual case. Always make enquiries before travelling to South Africa.
- The holder of a study permit for studies at a higher education institution may conduct part-time work, but the period for undergraduate students may not exceed 20 hours per week; and for postgraduate students the period may not exceed 20 hours per week, for as long as their study permits are valid.

Medical cover for study permit holders
Non-South African citizens who are holders of study permits, or who wish to apply for a study permit must, in terms of South Africa's Immigration Act, have sufficient medical aid cover for the duration of their stay in South Africa. Non-South African citizens intending to study at the University of Pretoria can join one of the following medical aid schemes:

Momentum Health (Ingwe option)
Membership fees are payable in advance annually.

Tel:	+27 (0)12 671 8511
Email:	studenthealth@momentum.co.za
Website:	www.ingwehealth.co.za

BestMed Medical Scheme (Blueprint student option)
Membership fees are payable in advance annually.

Tel:	+27 (0)12 339 9800 or +27 (0)86 000 2378 or +27 (0)86 000 BEST
Fax:	+27 (0)12 323 4106 or +27 (0)12 339 9900
Email:	lineyl@curemed.co.za

Higher Education South Africa (HESA)

A full or foreign conditional exemption certificate is a prerequisite and applicable to non-South African citizens and to students who do not have a South African National Senior Certificate (NSC) qualification or Independent Examination Board (IEB) qualification and who want to enrol for undergraduate studies at the University of Pretoria. This certificate can only be obtained from HESA.

HESA requires the following documentation when applying for a full or foreign conditional exemption certificate:
- copies of foreign qualifications certified as correct by the registrar of a South African university, a South African Embassy or Consulate in a foreign country or a public notary – result slips, faxes and copies certified by a commissioner of oaths are not acceptable

"I am currently doing my second year in BSc Biochemistry. The Faculty of Natural and Agricultural Sciences gave me the opportunity to approach life sciences in a practical manner. I enjoy every hour I spend in the laboratory where I was nurtured into a great team player. I won the best achievement award in advanced-level biology at my high school in 2010, and a Shimadzu best academic achievement award in biochemistry at 100-level, University of Pretoria in 2012. I dream of myself as a medical researcher concerned with improving human health. I believe that determination and passion for science took me to where I am today. Thanks to my lecturers and all the people I came across in my life who made important contributions towards realising my dream of being a scientist."

Linience Maposa

- a certified copy of your South African identity document (in the case of permanent residents only) or a valid foreign passport reflecting your full names and date of birth, passport number and photograph or a certified copy of your birth certificate
- a completed M30E form (http://hesa-enrol.ac.za – follow the link to Applications)

Contact information

Tel:	+27 (0)10 591 4401/2
Fax:	+27 (0)12 481 2922/2718
Email:	exemptions@hesa-enrol.ac.za
Website:	www.hesa.org.za
Location:	Building 3 Level 1 Unisa Sunnyside Campus Pretoria
Postal address:	PO Box 3854 Pretoria 0001

South African Qualifications Authority (SAQA)

Postgraduate applicants must have all previous post-school qualifications evaluated by SAQA when applying for postgraduate study programmes at the University of Pretoria.

Contact information

Call centre:	+27 (0)12 431 5000/70
Helpdesk:	+27 (0)86 010 3188
Fax:	+27 (0)12 431 5039
Website:	www.saqa.org.za
Location:	SAQA House 1067 Arcadia Street Hatfield
Postal address:	Postnet Suite 248 Private bag X06 Waterkloof 0145

Evaluation of foreign qualifications:

Tel:	+27 (0)12 431 5070
Helpdesk:	+27 (0)86 010 3188

Admission Point Score (APS) conversion

The following tables can be used to convert your marks/symbols into an Admission Point Score (APS) when applying for studies at the University of Pretoria (UP).

Admission Point Score (APS) Conversion Table

APS (requirement level for subjects as well as overall APS)	NSC/IEB	SC HG M-score	SC SG M-score	HIGCSE NSSC HL	AS-Level	IB SL	IGCSE/ GCSE/ NSSC OL/ O-Level Grade 11*	IGCSE/ GCSE/ NSSC OL/ O-Level Grade 12**
7	7 (80–100%)	A		1	A	7	A	
6	6 (70–79%)	B	A	2	B	6	B	
5	5 (60–69%)	C	B	3	C	5	C	A
4	4 (50–59%)	D	C	3	D	4	C	B
3	3 (40–49%)	E	D	4	E	3	D	C
2	2 (30–39%)	F	E			2	E	D/E
1	1 (0–29%)	G	F			1	F	F/G

Admission Point Score (APS) Conversion Table only for Cambridge Advanced Level and IB Higher Level

APS		A-Level	IB HL
Requirement level for subjects	Requirement level for overall APS		
7	10	A	7
6	8	B	6
5	7	C	5
4	6	D	4
3	5	E	
2	4		
1	3		

NSC – National Senior Certificate (completed Grade 12 in and after 2008)
IEB – Independent Examination Board
SC HG – Senior Certificate Higher Grade (completed Grade 12 before 2008)
SC SG – Senior Certificate Standard Grade (completed Grade 12 before 2008)
HIGCSE – Higher International General Certificate of Secondary Education
A-Level – Advanced Level
AS-Level – Advanced Subsidiary Level
IB – International Baccalaureate Schools (Higher Levels and Standard Levels)
IGCSE – International General Certificate of Secondary Education
GCSE – General Certificate of Secondary Education
NSSC – Namibia Senior Secondary Certificate
O-Level – Ordinary Level

*Grade 11 = IGCSE/O-Level: APS conversion for Grade 11 equivalent qualifications only and for conditional admission and selection purposes

**Grade 12 = IGCSE/O-Level: APS conversion for Grade 12 equivalent qualifications – not for final admission and must be taken together with Advanced Subsidiary Level and Advanced Level for exemption purposes

Hatfield Campus map