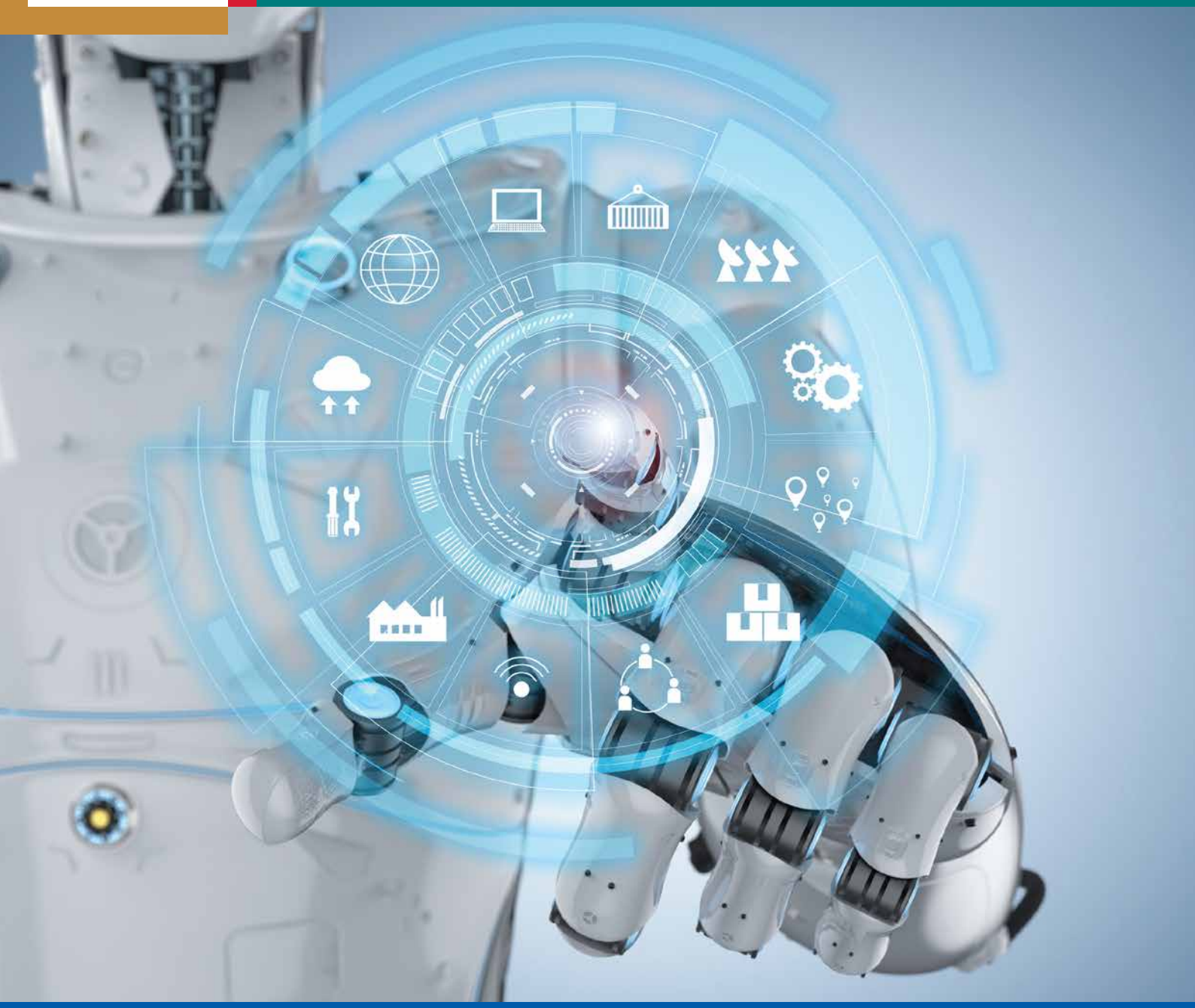
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere, Tikologo ya Kago le Theknolotši ya Tshedimošo



2019/2020 | Undergraduate faculty brochure

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Message from the Dean

As South Africa prepares for the Fourth Industrial Revolution (4IR), the Faculty of Engineering, Built Environment and Information Technology (EBIT) focuses its research, teaching and learning activities on bringing competitive knowledge to industry, education and society.

Prof Sunil Maharaj
Dean: Faculty of Engineering, Built Environment and Information Technology

We aim for research excellence and are keen on international collaboration. The Faculty is organised into four Schools:

- the School of Engineering;
- the School for the Built Environment;
- the School of Information Technology; and
- the Graduate School of Technology Management

Global technology is evolving on an exponential scale and EBIT is eager to embrace the challenges. We are armed with exceptional researchers, follow a hybrid-teaching model and we have superb laboratory facilities. Learning is delivered by a motivated team of committed and dedicated academics and are supported by highly motivated administrative and support staff, and together they serve our student community.

EBIT offers 23 undergraduate degree programmes, which are locally relevant and internationally competitive. We ensure that our graduates are work-ready and able to address and overcome future challenges. Our graduates enter ever-changing job markets—some of which were not even in existence when they commenced their studies.

EBIT is highly ranked globally. Our programmes are accredited by statutory and professional bodies at national and international levels.

This Faculty with its 30 research chairs and entities, attracts high-quality students and staff, and is well equipped in terms of research and teaching activities.

Our ties with industry partners are close and we continually search for opportunities to collaborate in order to enhance the relevance of our academic programmes and to enable our students to acquire scarce and highly specialised skills. As a result, there is a high demand for our graduates. Data shows that 90% of our graduates get employment within 6 months of graduation.

The Faculty strives to accommodate students who meet the admission criteria. As places are limited, we recommend that learners who excel in their studies apply early. If you are an academic achiever, but have limited financial means, this should not discourage you from applying as government and various industries have financial schemes to assist deserving academic achievers with grants, bursaries or scholarships. Submit your online application as soon as possible after applications open on 1 March. Prospective students are also encouraged to visit www.up.ac.za/fees-and-funding for information on bursaries, scholarships and financial support.

We look forward to your application to join one of our programmes and trust that you will have an enriching and rewarding experience in the dynamic EBIT Faculty. We look forward to welcoming you.

Tel +27 (0)12 420 5318
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Website www.up.ac.za/ebit

Content

Produced by the Department of Enrolment and Student Administration in December 2018.
Comments and queries can be directed to ssc@up.ac.za or tel: +27 (0)12 420 3111.

Undergraduate programmes

Important information on undergraduate programmes for 2020

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution, and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements as indicated in the table.
  Note: Candidates who do not comply with the minimum requirements, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- From 2019, tuition will be presented in English only.

University of Pretoria website www.up.ac.za/ebit
National Benchmark Test website www.nbt.ac.za

Programmes	**Minimum requirements for 2020**						
	Achievement level*						**APS**
SCHOOL OF ENGINEERING	**English Home Language or English First Additional Language**		**Mathematics**		**Physical Science**		
	NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
BEng (Industrial Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Industrial engineers design, test, implement and manage a wide range of man/machine systems for the delivery of production and services. Organisational matters that require optimisation include site selection and layout of facilities, manufacturing, inventory control, materials handling, supply chain management, quality management, cost control, financial services, maintenance, reliability, computer simulation, information systems, human resources and business law.							
BEng (Chemical Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Chemical engineers are involved in industrial processes that convert raw materials into products with a higher economic value. This is achieved by means of physical, thermal, chemical, biochemical and mechanical changes and processes. Chemical engineers apply their specialised knowledge in the petroleum, food, minerals processing, power generation, and the paper and pulp industries, water and effluent treatment, as well as environmental engineering activities, including air pollution control. Like other engineering disciplines, chemical engineers are involved in research and development, techno-economic evaluation, equipment and plant design, process control and optimisation, construction, commissioning, operation and management as well as marketing and distribution of final products.							
BEng (Civil Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Civil engineers design, build and maintain constructions such as tower blocks and skyscrapers, dams, canals and pipelines, roads, bridges, tunnels, railways, airports, power stations, towers, water works and outfall installations. They are involved in financial modelling, feasibility studies and the management and rehabilitation of large asset portfolios.							
BEng (Electrical Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Electrical engineers are active in the generation, storage, transmission, distribution and utilisation of electrical energy. There is a brilliant future in renewable energy. Electrical engineers design, supervise the construction, oversee the optimal operation and assure perfect and timely maintenance of all electrical installations for municipalities, residential areas, commercial buildings, factories, mines and industries. Rail transport, water pumping, electrical grids, telecommunications, energy management and smart lighting are all fields of application of electrical engineering.							

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Undergraduate programmes

Programmes	Minimum requirements for 2020						
	Achievement level*						APS
SCHOOL OF ENGINEERING	English Home Language or English First Additional Language		Mathematics		Physical Science		
	NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
BEng (Electronic Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Electronic engineers are active in various fields, such as telecommunications (fixed networks, wireless, satellite, television, radar and radio frequency networks), entertainment and medicine (magnetic resonance imaging, X-rays, cardiopulmonary resuscitation, infrared tomography, electroencephalograms (EEG), electrocardiograms (ECG), rehabilitation engineering and biokinetics), integrated circuit design, bioengineering, military (vehicle electronics, smart bombs, night vision, laser systems), transport (e-tags, speed measuring, railway signalling, global positioning system (GPS) and mapping), 'smart' dust, safety and security systems (face and speech recognition), banking (ATMs), commerce, robotics, education, environmental management, tourism and many more.							
BEng (Mechanical Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Mechanical and aeronautical engineers are concerned with power-generating machines and systems such as vehicles, ships, air-conditioners, pebble bed nuclear reactors, aeroplanes, engines and turbines, robots and biomedical systems. Areas of specialisation include product design and manufacturing (such as design, testing and improvement of mechanical, electrical, pneumatic and hydraulic systems), marine engineering and naval architecture, biomedical engineering, air-conditioning and refrigeration, aerospace systems and aircraft/missile engineering, vehicle engineering, maintenance engineering and energy management (gas and steam turbines, nuclear power reactors, petrol engines, cooling towers and renewable energy systems).							
BEng (Metallurgical Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Metallurgical engineers unlock the riches of deposits of metal ores, coal and diamonds and optimise the manufacture of metal components. They work in plants where valuable minerals are recovered from ore, where metals are produced out of the minerals and where the metals are converted into useful materials, such as steel or aluminium. Careers include production engineers, plant managers, consultants and researchers.							
BEng (Mining Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Mining engineers have a wide range of opportunities, namely mining (mine management, technical management of ventilation, rock mechanics, rock breaking, mineral resources), financial evaluation and management (mine design, mine financial evaluation, mine feasibility studies, mine environmental impact studies), mining and drilling contracting (mining, tunnelling, shaft sinking, mine development, ore evaluation), mining research, mining equipment design and manufacture, mining marketing and mining administration at national, provincial or international level.							
BEng (Computer Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	**35**
Careers: Computer engineers are active in all fields of the information superhighway and the information and communication technology (ICT) world, which include computer systems, software engineering, computer and communications networks, wireless sensor networks, embedded software, electronics, smart control systems and automation, data security, e-commerce, pattern recognition (face and speech recognition), and artificial intelligence. They specialise in combining hardware, software and communication technologies to optimise system performance.							
Engineering Augmented Degree Programme (ENGAGE) [5 years] Closing dates: SA – 30 September Non-SA – 31 August **Note:** The admission requirements on the right are relevant to prospective students who commence their studies in 2020. Candidates who do not comply with the minimum requirements mentioned above, but who do comply with these requirements, must write the NBT.	5	C	5	C	5	C	**30**

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Undergraduate programmes

Programmes	Minimum requirements for 2020						
	Achievement level*						APS
SCHOOL FOR THE BUILT ENVIRONMENT	English Home Language or English First Additional Language		Mathematics		Physical Science		
	NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
BSc (Architecture) [3 years] Closing dates: SA – 31 May Non-SA – 31 May	5	C	4	D	4	D	**27**
Will only be considered as first study choice. **Please read the notification at the bottom of this page.** Selection programme: Selection includes an interview. **Careers:** The BSc (Architecture) degree programme enables graduates to register with the South African Council for the Architectural Profession (SACAP) as candidate architectural technologists. The qualification is the first step to future registration as a candidate senior architectural technologist or a candidate architect.							
BSc (Interior Architecture) [3 years] Closing dates: SA – 31 May Non-SA – 31 May	5	C	4	D	4	D	**27**
Will only be considered as first study choice. **Please read the notification at the bottom of this page.** Selection programme: Selection includes an interview. **Careers:** The BSc (Interior Architecture) degree programme enables graduates to register with The African Institute of the Interior Design Professions (IID) as candidate interior designers. This qualification is the first step to future registration as a candidate senior interior designer or a candidate interior architect.							
BSc (Landscape Architecture) [3 years] Closing dates: SA – 31 May Non-SA – 31 May	5	C	4	D	or Geography or Life Sciences 4	D	**27**
Selection programme: Selection includes an interview. **Please read the notification at the bottom of this page.** **Careers:** The BSc (Landscape Architecture) degree programme enables graduates to register with the South African Council for the Landscape Architectural Profession (SACLAP) as candidate landscape architectural technologists. This qualification is the first step to future registration as a candidate landscape architect.							
BSc (Construction Management) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	5	C	or Accounting 4	D	**30**
Selection programme **Careers:** After completing the three-year undergraduate degree programme, graduates could enter careers, in among others, construction site management or as subcontractors. On completion of the ensuing one-year honours programme, graduates are able to register as professional construction managers and opportunities become much wider, including project management, property development, portfolio management, commercial marketing and managerial positions in the corporate environment.							
BSc (Real Estate) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	5	C	or Accounting 4	D	**30**
Selection programme **Careers:** Apart from a future in areas such as property investment, property finance and facilities and property management, further studies to obtain an honours degree in real estate can lead to registration as professional property valuers. Career opportunities encompass the whole spectrum of the property sector, whether as entrepreneurs in the private sector or as employees in the private, government or semi-government sectors.							
BSc (Quantity Surveying) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	5	C	or Accounting 4	D	**30**
Selection programme **Careers:** Quantity surveying is the science that delivers specialised financial and contractual services and advice to clients in the building and construction industry, as well as related industries. The three-year undergraduate degree is the first step towards registration as quantity surveyors. The ensuing one-year honours programme leads to registration as candidate professional quantity surveyors. Career opportunities, apart from those in the private, government or semi-government sectors, also exist in the property, banking, mining and manufacturing industries.							
BTRP – Bachelor of Town and Regional Planning [4 years] SA – 30 September Non-SA – 31 August	5	C	4	D	-		**27**
Selection programme **Careers:** Town and regional planners, development practitioners, urban managers, real estate analysts and researchers. While many town and regional planners act as private consultants to the public and private sector, most are employed by government, research agencies such as the Council for Scientific and for Industrial Research (CSIR) and the Human Sciences Research Council (HSRC), non-governmental organisations, community-based organisations, major financial institutions and property development groups. The qualification will enable graduates to register as professional town and regional planners with the South African Council for Planners.							

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Notification: If the Faculty receives an insufficient number of applications for BSc (Interior Architecture) and/or BSc (Landscape Architecture) these programmes might not be offered in 2020. Should one or both of these programmes not be offered, those applicants that met the requirements and would have been selected for these programmes will then be accommodated in BSc (Architecture).

Undergraduate programmes

Programmes	Minimum requirements for 2020				
	Achievement level*				APS
SCHOOL OF INFORMATION TECHNOLOGY	English Home Language or English First Additional Language		Mathematics		
	NSC/IEB	AS Level	NSC/IEB	AS Level	
BIT – Bachelor of Information Technology [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	5	C	**30 (26–29 admission based on the NBT)**
Should a candidate obtain an APS of 26 to 29, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached. **Careers:** Information technologists, programmers, system analysts, computer consultants, and buyers of hardware and software. This programme provides knowledge and understanding of the theory and practice of programming and software engineering; theory and the practice of the adoption and use of information systems in business organisations; aspects of collecting, retrieving, organising, managing and using information; philosophy, language and mathematics.					
BIT (Information Systems) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	4	C	**30 (26–29 admission based on the NBT)**
Careers: Data scientist, IT auditor, geographical information specialist, IT entrepreneur, IT tax specialist, e-business consultant, programmer, business analyst, project manager, CIO, CTO, knowledge manager.					
BSc (Computer Science) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	5	C	**30 (26–29 admission based on the NBT)**
Should a candidate obtain an APS of 26 to 29, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached. **Careers:** Programmers, systems analysts, systems architects, consultants, database administrators, network analysts and researchers.					
BIS (Multimedia) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	4	D	5	C	**30 (26–29 admission based on the NBT)**
Should a candidate obtain an APS of 26 to 29, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached. **Careers:** Programmers, web designers, animation specialists, video editors, electronic artists. The programme prepares candidates for positions at any of the following content producers: paper publications, television, radio, phone technologies and the web. Graduates can become coders and work for programming companies. They can develop skills in their particular areas of interest, such as digital music or video programming; or graphic, games or web development.					
BSc (Information and Knowledge Systems) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	4	D	5	C	**30 (26–29 admission based on the NBT)**
Should a candidate obtain an APS of 26 to 29, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached. **Careers:** Graduates will differentiate themselves in an application environment by choosing one of the following options: data science, genetics, geographical information systems, IT and enterprises, IT and law, IT and music or software development.					
BIS (Information Science) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	4	D	-		**28 (25–27 admission based on the NBT)**
Should a candidate obtain an APS of 25 to 27, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached. If informatics is selected at first-year level, an achievement level of 5 is required in Mathematics. **Careers:** Information and knowledge managers (manage information and knowledge resources), information or e-commerce specialists (organise, retrieve and add value to information), consultants on information products (services and systems), information brokers (act as infopreneurs and buy and sell information products and services), and system specialists/analysts/technologists (develop information systems).					
BIS (Publishing) [3 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	-		**28 (25–27 admission based on the NBT)**
Should a candidate obtain an APS of 25 to 27, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached. **Careers:** Entry-level job opportunities include assisting specific role-players in the publishing value chain (such as MDs of publishing houses, commissioning editors, editors, and production or marketing managers), market or picture research, copyright negotiations, copy-editing and proofreading, marketing and promotion, distribution and delivery.					
BCom (Informatics) Focus area: Information Systems [3 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	4	D	**30**
This programme is administered by the Faculty of Economic and Management Sciences.					

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

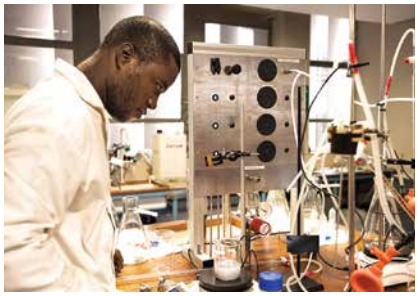
School of Engineering

School of Engineering: Highlights

Programmes within the School of Engineering have all been granted accreditation by the Engineering Council of South Africa. The School is one of the largest of its kind in the country in terms of student numbers, graduates and research contributions and offers programmes in all the major engineering disciplines, with many specialisations also offered at undergraduate and postgraduate level.

Through its innovative and relevant research across seven departments, the School of Engineering at the University of Pretoria provides its students with the necessary training to make a considerable contribution to engineering in South Africa and abroad. The departments are: Chemical Engineering; Civil Engineering; Electrical, Electronic and Computer Engineering; Industrial and Systems Engineering; Materials Science and Metallurgical Engineering; Mechanical and Aeronautical Engineering, and Mining Engineering.

The School has close ties with industry through a number of research chairs across all departments. These include chairs in **Maintenance Engineering, Pyro metallurgy, Fluoro-material Science** and **Process Integration, Carbon Technology and Materials, Reaction Engineering, Tribology and Environmental Engineering, Railway Engineering and Broadband Multimedia Communications**. It also has a number of research centres, such as the Hub for Energy Efficiency and Demand-side Management, the Advanced Engineering Centre of Excellence, the Industrial Metals and Minerals Research Institute, the Centre for Telecommunications Engineering for the Information Society, the Centre for Asset Integrity Management, and the Carl and Emily Fuchs Institute for Microelectronics to name but a few. Each department excels in its own research, but the consolidation of research activities is encouraged and several sustainable research groups have been formed to make an impact world-wide.



EBIT weeks

Grade 10–12 learners are invited to register for one of the EBIT Faculty Weeks:

Week one	24 to 27 March 2019 (Engineering and Built Environment Week)
Week two	30 June to 3 July 2019 (Engineering and Information Technology Week)
	(Dates are subject to change. Please consult the website below for the most recent information)
Website	www.up.ac.za/ebitweek

School of Engineering

Department of Chemical Engineering

BEng (Chemical Engineering)

What does the programme entail?

Chemical engineering involves all aspects of the industrial processes that, in the widest sense, convert raw materials into higher-value products by means of combinations of physical, chemical, thermal, biochemical and mechanical changes. The programme provides you with the necessary foundation, so that once you graduate, you will be able to make creative contributions to the world's ever-increasing needs to:

- Convert natural resources into efficient and useable forms of energy
- Develop more durable, lighter and renewable materials
- Design more efficient, environmentally-friendly processing plants
- Apply biotechnology to convert raw materials into products in a sustainable way
- Design processes to ensure that limited natural resources, like water, can be re-used
- Leave a clean and sustainable environment behind for future generations

A solid foundation in chemistry, physics, mathematics and biology is combined with the principles of the conservation of mass, energy and momentum, followed by the application of economic principles to the design of equipment leading to profitable processes that contribute to economic and industrial growth.

The programme is aimed at producing graduates who can develop new and innovative processes ensuring continued growth to satisfy the needs stated above.

Career opportunities

Chemical engineers are increasingly making their unique abilities available in areas as diverse as the automotive industry and the biomedical field, in addition to the traditional areas where their unique approach and understanding of the relevant principles lead to growth in the petroleum, minerals, paper and food and textile industries. These industries are collectively referred to as the 'process industries' — that is why chemical engineers are often called process engineers. Water purification and water treatment, the design and operation of such processes and the protection of the environment from pollution are further areas where chemical engineers make invaluable contributions.

One of the characteristic qualities of chemical engineers is their ability to examine an engineering problem at different levels, from the detailed knowledge needed to manipulate the behaviour of molecules under very specific conditions to the knowledge needed to study and explain the effect of large chemical plants on a country's economy and also on its environment. Apart from the opportunity to be part of a team that successfully plans, designs and operates large processing plants, chemical engineers can also specialise in the development and application of advanced computer-based methods to design, control and optimise processes.

A chemical engineer may be involved in any of the stages of a typical project, from the inception of the idea to the sale of the final product, as indicated below:

- research and development
- techno-economic evaluation
- modelling, design and optimisation
- plant construction and commissioning
- plant operation and management
- problem-solving in manufacturing or in product applications
- manufacturing and marketing of equipment and products

Chemical Engineering at UP

In addition to our sought-after graduates in chemical engineering, our research efforts have led to world-class contributions in water utilisation and environmental engineering, advanced materials development and applications, bio reaction engineering, as well as process systems design, control and optimisation.

People with widely divergent interests and temperaments can find themselves in interesting and challenging careers in chemical engineering. Many projects require teamwork, where the ability to act as a team member and as a team leader is important. This discipline is exceptionally suited to women, and the number of females in our student complement is continuously growing. In the past three years, 40% of the Department's graduates were female.

Contact information
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Website www.up.ac.za/chemeng

First year	
First semester	**Second semester**
▪ Graphical communication ▪ Calculus ▪ Physics ▪ General chemistry ▪ Chemical engineering ▪ Humanities and social sciences 1	▪ Mathematics ▪ Electricity and electronics ▪ Mechanics ▪ General chemistry ▪ Chemical engineering ▪ Humanities and social sciences 2 ▪ Workshop practice

Second year	
First semester	**Second semester**
▪ Calculus ▪ Differential equations ▪ Chemistry ▪ Programming and information technology ▪ Strength of materials ▪ Chemical engineering ▪ Chemical engineering materials ▪ Community-based project	▪ Mathematics ▪ Numerical methods ▪ Chemistry ▪ Electrical engineering ▪ Engineering statistics ▪ Thermodynamics ▪ Community-based project

Third year	
First semester	**Second semester**
▪ Engineering management ▪ Transfer processes ▪ Biochemical engineering ▪ Mass transfer ▪ Chemical engineering ▪ Professional and technical communication ▪ Practical training	▪ Engineering activity and group work ▪ Process dynamics ▪ Kinetics ▪ Laboratory ▪ Chemical engineering design

Fourth year	
First semester	**Second semester**
▪ Particle technology ▪ Process synthesis ▪ Process control ▪ Reactor design ▪ Research project ▪ Practical training	▪ Design project ▪ Process analysis ▪ Research project ▪ Specialisation ▪ Chemical engineering practice

School of Engineering

Department of Civil Engineering

BEng (Civil Engineering)

Civil engineers create facilities that improve the quality of peoples' lives and the environment. This process entails research into the proposed facility, the planning, design and construction of the facility, as well as its continued maintenance. Civil engineers design, build and maintain constructions such as tower blocks and skyscrapers, dams, canals and pipelines, roads, bridges, tunnels, railway lines, airports, power stations, towers, waterworks and outfall installations. These facilities have a long lifespan, with a direct impact on man and the environment. Hence, civil engineers are trained to deal not only with the analytical aspects of design, but also to liaise and consult directly with communities and individuals in order to design, build and maintain such facilities cost-effectively to the benefit of humankind. Facilities designed by civil engineers form the infrastructure for wealth and job creation in other industries, such as factories and housing.

The nature of civil engineering has changed drastically with information technology and computer software making mathematical modelling and designs more effective. This enables the civil engineer to concentrate on the more fundamental aspects of developmental work and design. The worldwide trend towards environmental awareness has a growing impact on the civil engineer's working methods. Information technology, and environmental engineering and management increasingly form a greater part of training, so that a civil engineer can still be provided with a broad-based qualification that offers challenging, fulfilling and highly adjustable career opportunities throughout an entire career lifespan of 40 to 50 years.

Contact information
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First year	
First semester	**Second semester**
▪ Graphical communication ▪ Calculus ▪ General chemistry ▪ Materials science ▪ Humanities and social sciences 1	▪ Mathematics ▪ Physics ▪ Mechanics ▪ Electricity and electronics ▪ Humanities and social sciences 2 ▪ Workshop practice

Second year	
First semester	**Second semester**
▪ Calculus ▪ Differential equations ▪ Strength of materials ▪ Geology for engineering ▪ Strengths of materials I ▪ Community-based project	▪ Mathematics ▪ Numerical methods ▪ Structural analysis ▪ Pavement materials and design ▪ Engineering statistics ▪ Community-based project

Third year	
First semester	**Second semester**
▪ Professional and technical communication ▪ Strengths of materials I ▪ Hydraulics ▪ Structural analysis ▪ Civil engineering economics ▪ Programming and information technology ▪ Soil mechanics ▪ Timber design ▪ Civil engineering measurement techniques	▪ Hydraulics ▪ Geotechnical engineering ▪ Civil building materials ▪ Structural concrete ▪ Transportation engineering

Fourth year	
First semester	**Second semester**
▪ Hydraulics ▪ Research project ▪ Steel design ▪ Reinforced concrete design ▪ Infrastructure planning ▪ Engineering professionalism ▪ Practical training	▪ Civil environmental management ▪ Civil engineering ▪ Construction management ▪ Computer applications in civil engineering ▪ Detailed design

School of Engineering

Department of Electrical, Electronic and Computer Engineering

BEng (Computer Engineering)

What does the programme entail?

Computer engineering is one of the three internationally accepted and closely related sub disciplines of the traditional field of electrical engineering (electrical engineering, electronic engineering and computer engineering). Computer engineering is the most dynamic and rapidly growing engineering discipline in the vast and constantly expanding field of information and communication technology (ICT). There is hardly a technological system in the world that does not rely on computer engineering. It involves a combination of electronics, computer systems (hardware and software) and communication systems. A computer engineer is someone with a talent for optimising electronic systems with dedicated computing systems and control software. This includes computer and communication networks of all sizes—from a couple of microcontrollers to the worldwide web. It is essential to know what this career entails before enrolling for the programme.

A computer engineer has a good understanding of the basic sciences and a sound education in the theoretical and practical aspects (including design methodology) of electronics, digital systems, computer systems and control software. With the dramatic increase in computing and storage capabilities, as well as a decrease in size and cost, most technological systems include components of computer engineering.

The computer engineering degree at the University of Pretoria was developed in 1998 to deliver graduates able to undertake the most demanding challenges of the ICT world in all its forms. Examples of computer engineering include cell phone technology, car control computers for engine management, entertainment systems, security systems, air-conditioning, active suspension and the anti-lock braking system (ABS). These all use the principles of sensing, computing and actuation under optimised software control. This is the fastest growing new discipline in engineering with job opportunities all over the world.

Computer engineering is used in the following fields in particular: telecommunications, computer networking, cell phone operations, computer system companies, military technologies (avionics, night vision, electronic warfare, drones), transport technologies, internet banking, security systems, consumer equipment, modems, hand-held scanners, voting, medical systems (portable and remote diagnostic recorders), robotics, entertainment equipment, global positioning system (GPS) navigation, measurement and control software, and fibre-optic networks (self-healing networks).

A computer engineer has to be innovative and stay abreast of new technologies and developments in software and hardware. Some computer engineers move very quickly into management, where their analytical, synthetical, managerial and leadership skills are used to reach the highest levels of corporate management.

The aim of computer engineering is to integrate electronic, computing and control systems in the best way possible to ensure fast, small and powerful systems. Typical subsystems include sophisticated software for artificial intelligence, biometrics, radio frequency (RF) subsystems and real-time applications, software engineering, human language technologies, e-commerce, m-commerce, billing software, data security and various networking applications, such as storage area networks.

Career opportunities

Computer engineering graduates have a wide range of job opportunities. These include working for a company (large or small) anywhere in the world as an employee, being an entrepreneur or being self-employed. Research and development opportunities are available in communication, computer systems, networking, peace-keeping operations, medical, transportation, software and electronics companies in South Africa and all over the world. This provides the opportunity to innovate: thinking of a problem to be solved, and coming up with a solution, even possibly patenting the idea. The academic programme at the University of Pretoria prepares students to be leaders in the field of computer engineering—with excellent financial rewards and professional satisfaction.

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School of Engineering

First year	
First semester	**Second semester**
▪ Physics ▪ Calculus ▪ Electricity and electronics ▪ Imperative programming ▪ Humanities and social sciences 1 **Recess Training:** ▪ Information technology practice	▪ Mathematics ▪ Mechanics ▪ Program design: Introduction ▪ Humanities and social sciences 2 ▪ Operating systems

Second year	
First semester	**Second semester**
▪ Calculus ▪ Differential equations ▪ Data structures and algorithms ▪ Electrical engineering ▪ Materials science ▪ Professional and technical communication ▪ Community-based project **Recess Training:** ▪ Introduction to programming and computer simulations ▪ Information technology practice	▪ Mathematics ▪ Numerical methods ▪ Linear systems ▪ Digital systems ▪ Engineering statistics ▪ Community-based project

Third year	
First semester	**Second semester**
▪ Engineering management ▪ Microprocessors ▪ Analogue electronics ▪ Intelligent systems ▪ Electromagnetic compatibility **Recess Training:** ▪ Information technology practice	▪ Engineering activity and group work ▪ Computer engineering design ▪ Software engineering ▪ Control systems ▪ Digital communications

Fourth year	
First semester	**Second semester**
▪ Project ▪ Engineering professionalism ▪ DSP Programming and application ▪ Computer engineering: architecture and systems ▪ e-Business and network security **Recess Training:** ▪ Practical training and report	▪ Project ▪ Research project

Twin triumph

Identical twins sisters Monique Pienaar and Ciara Blaauw were both awarded doctorates in Electronic Engineering. They started their undergraduate studies in the Faculty in 2011 and their postgraduate studies in 2015. By that time, they had already presented research papers at international conferences and published articles in peer-reviewed journals.

The twins are grateful for the support received from their supervisor, Prof JW Odendaal, and their co-supervisor, Prof JW Joubert. Monique's thesis was titled 'A study on bistatic RCS simulations, measurements and calibration' and Ciara's research topic was 'RCS simulations and measurements of electrically large complex airframes and dielectric structures'. They are both currently working as radar signal and systems analysts at the Unit for Defence, Peace, Safety and Security at the Council for Scientific and Industrial Research (CSIR).

Dr Monique Pienaar and Dr Ciara Blaauw

They are excited about what the future holds and are passionate about making positive contributions in the field of engineering.

School of Engineering

BEng (Electronic Engineering)

What does the programme entail?

Electronic engineering is one of the three internationally accepted and closely related sub disciplines in the traditional field of electrical engineering (electrical engineering, electronic engineering and computer engineering). Electronic engineering entails the vast and constantly expanding field of the 'electronic world and era'. There is hardly a technological system in the world that does not rely on electronics and electronic engineering. An electronic engineer is someone with a talent for introducing new technologies and upgrading old technologies.

An electronic engineer has a good understanding of the basic sciences and a good education in the theoretical and practical aspects (including design methodology) of electronics and electronic engineering systems. With the drastic increase in the development of new electronic systems all over the world, it is essential to be well prepared for the work of an electronic engineer.

The electronic engineering degree at the University of Pretoria was developed over many years to provide exactly what the industry expects from such an engineer. This is an exciting world, with the 'half-life' of microelectronics and photonics being approximately two-and-a-half years. There are constant improvements and developments.

Electronic engineering is used in almost all information, communication and technology (ICT) application fields, especially those of telecommunications (cell phones, broadcasting, internet service providers (ISPs), telecommunications companies (Telcos), global positioning systems (GPSs), transport (aeroplanes, ships, trains, motor cars), consumer equipment (iPods, induction stoves, fridges, microwaves, televisions), peace-keeping operations (avionics, night vision, electronic warfare, drones), medicine (bioengineering, diagnostic systems, rehabilitation engineering, intensive care units, laser surgery), robotics (mechatronics, mine robots, spacecraft), entertainment (video games, shows, casinos), mining, manufacturing, navigation, communication, satellite surveillance (day and night), access control (face recognition) and photonics (lasers, optical fibres, networking).

Electronic engineers have to be innovative and ensure that they stay abreast of new technologies. Some electronic engineers move very quickly into management, where their analytical, synthesis, managerial and leadership skills are used to reach the highest levels of corporate management. A number of graduates of this Department have sold their ideas (patents) for hundreds of millions of rands.

The aim of electronic engineering is to do things faster, cheaper, in smaller sizes and with much more control and artificial intelligence. Typical subsystems that form part of larger electronic systems are amplifiers, transmitters, receivers, control systems, sensor systems, power supplies, radio frequency (RF) subsystems, micro- and Nano electronics and microprocessors, digital signal processors (DSPs) and field-programmable gate arrays (FPGAs). Most electronic systems use a standard process of measurement (sensing), calculate/compare/store information and controlled outputs (actuators) with extensive computing and communication power.

Career opportunities

Electronic engineering graduates have a wide range of job opportunities. These include working for companies (large or small) anywhere in the world as employees, or being entrepreneurs or self-employed. Research and development opportunities are available at electronics and microelectronics companies in South Africa, research institutes (such as the CSIR) and universities all over the world. It thus provides graduates with the opportunity to innovate: that is to identify real-life problems and to come up with solutions, and possibly even patenting their ideas. The academic programme at the University of Pretoria prepares students to be leaders in the field of electronic engineering—with excellent financial rewards and professional satisfaction.

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First year

First semester	Second semester
▪ Graphical communication ▪ Calculus ▪ General chemistry ▪ Materials science ▪ Humanities and social sciences 1	▪ Mathematics ▪ Physics ▪ Mechanics ▪ Electricity and electronics ▪ Humanities and social sciences 2

Second year

First semester	Second semester
▪ Calculus ▪ Differential equations ▪ Dynamics ▪ Electrical engineering ▪ Imperative programming ▪ Professional and technical communication ▪ Community-based project **Recess Training:** ▪ Introduction to programming and computer simulations	▪ Mathematics ▪ Numerical methods ▪ Engineering statistics ▪ Linear systems ▪ Digital systems ▪ Community-based project

Third year

First semester	Second semester
▪ Engineering management ▪ Electromagnetism ▪ Analogue electronics ▪ Microprocessors ▪ Modulation systems	▪ Engineering activity and group work ▪ Microwaves and antennas ▪ Stochastic communication systems ▪ Control systems ▪ Electronic engineering design

Fourth year

First semester	Second semester
▪ Project ▪ Engineering professionalism ▪ DSP Programming and application ▪ Advanced electronics ▪ Automation **Recess Training:** ▪ Practical training and report	▪ Project ▪ Research project

School of Engineering

BEng (Electrical Engineering)

What does the programme entail?

Electrical engineering is one of the three internationally accepted and closely related sub disciplines in the traditional field of electrical engineering (electrical engineering, electronic engineering and computer engineering). Electrical engineering entails the vast and constantly expanding field of the 'electrical energy world'. There is hardly a technological system in the world that does not rely on electrical power as a source of energy. An electrical engineer is someone with a talent for introducing alternative and renewable sources of electrical energy into everyday life.

Huge challenges exist for utilising and storing electrical energy from such sources as the sun (solar energy), wind, biomass, water (hydro-energy) and even nuclear energy. In South Africa, pumped storage systems are extensively used and new systems are under construction. The next steps in the chain from generating to utilising electrical energy are the transmission and distribution systems. The most cost-effective way of saving electrical energy is to spend a great deal of research and development time and money on sustainable energy-efficient equipment, from electrical machines to geysers and lighting.

An electrical engineer has a good understanding of basic sciences and a good education in the theoretical and practical aspects (including design, installation and maintenance methodology) of electrical engineering. In the midst of the worldwide crisis of the environmentally friendly generation of power and energy; there is a shortage of qualified electrical engineers all over the world.

The electrical engineering degree at the University of Pretoria was developed over many years to provide exactly what the industry expects from such an engineer. There are extremely exciting opportunities worldwide for electrical (high-current) engineers capable of taking the lead with sustainable and environmentally friendly electrical energy generation, transmission and utilisation. Most car manufacturers have already introduced electrical cars (including series and parallel hybrid vehicles) and there are many new entrants to the market.

Electrical engineering is prevalent in almost all application fields and technologies where electrical energy is consumed. Every known piece of equipment requires a source of energy—powered by mains, batteries or photovoltaic (PV) cells—and needs the skill of an electrical engineer. The transport and manufacturing industries are excellent examples of electrical engineering, where electrical engineers use their excellent skills in designing, developing and maintaining the electrical machines (motors and generators) with control systems for optimal performance. Most ships and trains are electrically powered.

Other applications of electrical engineering include power reticulation in cities, townships, shopping malls and factories. The lighting of indoor and outdoor areas forms the basis of our daily activities and includes sport stadiums, street lighting, safety and security lighting, task and ambient lighting, as well as lighting for offices, entertainment and many other specialist applications. Whether it is medicine, the military, entertainment, sport, education or any other field of technology, electrical engineers will be there to provide the energy and control required by these systems. An electrical engineer has to be innovative and stay abreast of new technologies. Many electrical engineers move into management very quickly, where their analysis, synthesis, managerial and leadership skills are used to reach the highest levels of corporate management.

The aim of electrical engineering is to change the world with respect to generating, transmitting, distributing and utilising electrical energy in an environmentally friendly and sustainable way. Typical subsystems that may form part of larger electrical systems are electrical machines of all sizes and shapes, power electronics, control systems, power system components, power quality and network stability, lamps and lighting, power supplies, photovoltaic (PV) cells, solar geysers, space systems, robotics and energy management systems.

Career opportunities

Electrical engineering graduates have a wide range of job opportunities. These include working for electricity utility companies, mining houses, municipalities, consulting engineers, transportation (rail and sea) companies and research organisations, locally and elsewhere in the world. The advances in electrical energy generation and distribution creates tremendous opportunities for entrepreneurs in South Africa and abroad. Research and development opportunities are available at institutions such as Denel, Eskom, the Council for Scientific and Industrial Research (CSIR) and Transnet.

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School of Engineering

First year	
First semester	**Second semester**
▪ Graphical communication ▪ Calculus ▪ General chemistry ▪ Materials science ▪ Humanities and social sciences 1	▪ Mathematics ▪ Physics ▪ Mechanics ▪ Electricity and electronics ▪ Humanities and social sciences 2

Second year	
First semester	**Second semester**
▪ Calculus ▪ Differential equations ▪ Dynamics ▪ Electrical engineering ▪ Imperative programming ▪ Professional and technical communication ▪ Community-based project **Recess Training:** ▪ Introduction to programming and computer simulations ▪ Practical wiring	▪ Mathematics ▪ Numerical methods ▪ Engineering statistics ▪ Linear systems ▪ Digital systems ▪ Community-based project

Third year	
First semester	**Second semester**
▪ Engineering management ▪ Electromagnetism ▪ Microprocessors ▪ Analogue electronics ▪ Electrical machines **Recess Training:** ▪ DSP Programming	▪ Power system components ▪ Engineering activity and group work ▪ Control systems ▪ Power electronics ▪ Electrical engineering design

Fourth year	
First semester	**Second semester**
▪ Project ▪ Engineering professionalism ▪ Electrical drives ▪ Power system analysis ▪ Automation **Recess Training:** ▪ Practical training and report	▪ Project ▪ Research project

School of Engineering

Hermann Rolfes

Student Hermann Rolfes is an all-rounder cricketer and aspiring Industrial Engineer

Hermann Rolfes completed his schooling at the Afrikaanse Hoër Seunskool in Pretoria and is currently a first year BEng (Industrial Engineering) student. He fell in love with cricket at the age of four and is still pursuing his passion for this sport, in which he excels. He plays for UP's first cricket team. Coach Kruger van Wyk is helping them to reach for the stars and beyond.

On 20 January 2018, Herman played in the u/19 World Cup team in Maungunui, where he celebrated his first century during the New Zealand v South Africa A game.

'The adrenaline rush and the sense of achievement I experience on a cricket field forms part of my drive to experience life to the full and to never give up.'

Hermann is an all-rounder. He knows that tenacity is a precious characteristic—both on and off the field. 'The boundary you are aiming for can turn into a six and the wicket you so desperately need can only tumble when you push through the obvious challenges to embrace victory.'

Although Hermann is passionate about his cricket, his studies are his first priority. His father is a mechanical engineer and CEO of Wespeco Aluminium. Hermann always achieved good marks in Mathematics and Natural Science and enjoys problem-solving techniques. When he shadowed a female industrial engineer, he discovered that this field, in which being a team player is very important, excited him very much.

'In cricket it's important to accept responsibility, to motivate team members throughout the whole match, no matter what the scoreboard says. Even when as an individual player you fail to reach the goals you had set for yourself, you still have to contribute to the performance of the team. The team is your responsibility—you have to see the whole picture and the detail in it in order to understand your role as a team player.'

'The industrial engineer,' he explained, 'does the same—his relationships have to be in good standing and he must be aware of every team member's contribution and how his/her role affects the bottom line of the company. If you want to change processes in order to improve performance, you have to know when to run, when to stay at the stumps and when to change the defence on the field. You have to be aware of the gaps and try and position your team players in such a way that you use the competition's weak points to your own advantage.'

The Faculty of Engineering, Built Environment and Information Technology wishes Hermann success in his studies and his cricket career. May your dream to share a cricket pitch with AB de Villiers become a reality when you are included in the Proteas!

Hermann's motto in life is: 'Back yourself.' He explains it as follows: 'There are times in your life that you need to believe in yourself more than other people do. You have to be strong enough to follow your dreams and make the necessary compromises. Follow your gut feeling. You know your limitations and you know how far you can push yourself. Life is out there waiting for you to hit the winners, to take chances and to fall down, only to stand up stronger and more determined.'

School of Engineering

Department of Industrial and Systems Engineering

BEng (Industrial Engineering)

What does the programme entail?

Industrial engineers are generally responsible for the analysis, design, planning, implementation, operation, management and maintenance of integrated systems. These systems consist of people, capital, material, equipment, information and energy. Their aim is to increase the productivity of the organisation and to create wealth.

Career opportunities

Since almost any organisation could benefit from the services of industrial engineers, they are employed in a wide variety of organisations in the industrial, business and service sectors.

Typical activities comprise the following:

- design, implementation and management of production processes and equipment
- design and improvement of plant layout
- design and improvement of business processes
- functional design and implementation of information systems
- development and implementation of performance criteria and standards
- provision of decision support
- scheduling of activities
- analysis of systems with the aid of mathematical and simulation models
- economic evaluation of alternatives
- integration of new systems in an existing environment

Is engineering a profession intended mainly for men? As far as industrial engineering is concerned, the answer to this question is a resounding 'No'. Women who have completed their industrial engineering degrees at the University of Pretoria have come into their own in this profession and are counted among the top achievers, both as academics and as practising engineers.

This Department is the largest of its kind in South Africa and currently has more than 500 students. Academic staff are specialists in their respective fields. Alumni of the Department have made major contributions in several spheres of society and occupy important positions in organisations throughout South Africa. Others are employed overseas. Currently, the demand for industrial engineers exceeds the supply and young graduates are virtually assured of employment.

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First year	
First semester	**Second semester**
▪ Graphical communication ▪ Physics ▪ Calculus ▪ Humanities and social sciences 1 ▪ Electricity and electronics	▪ Mathematics ▪ General chemistry ▪ Mechanics ▪ Materials science ▪ Humanities and social sciences 2 ▪ Workshop practice

Second year	
First semester	**Second semester**
▪ Calculus ▪ Differential equations ▪ Dynamics ▪ Programming and information technology ▪ Manufacturing and design ▪ Professional and technical communication ▪ Community-based project	▪ Mathematics ▪ Numerical methods ▪ Engineering statistics ▪ Productivity ▪ Thermodynamics ▪ Community-based project

Third year	
First semester	**Second semester**
▪ Engineering management ▪ Manufacturing systems ▪ Operational management ▪ Operations research ▪ Financial management ▪ Industrial analysis ▪ Practical training	▪ Engineering activity and group work ▪ Industrial logistics ▪ Information systems design ▪ Simulation modelling ▪ Facilities planning ▪ Business engineering

Fourth year	
First semester	**Second semester**
▪ Operations research ▪ Quality assurance ▪ Management accounting ▪ Engineering professionalism ▪ Business law ▪ Project ▪ Practical training	▪ Project ▪ Labour relations ▪ Systems engineering ▪ Engineering economics

School of Engineering

Department of Materials Science and Metallurgical Engineering

BEng (Metallurgical Engineering)

What does the programme entail?

South Africa is blessed with the world's largest mineral deposits of gold, chromium, platinum, vanadium and manganese. This country also has large reserves of iron, lead, zinc, copper, nickel, coal and diamonds. The minerals industry contributes some 50% of South Africa's exports and is one of the largest employers in the country. The metallurgical engineer plays a key role in the production of minerals and metals. Metallurgical engineers help to process metals into final products with added value. In this way, maximum income is generated in international markets. Components made from metals and other materials are used in all aspects of modern life.

Career opportunities

The metallurgical engineer plays a key role in the process of extracting wealth from the resources of South Africa and can be involved in three major fields of specialisation in metallurgical engineering:

- **Minerals processing.** Processing the ore to release and concentrate the valuable minerals from the minerals resource.
- **Extractive metallurgy.** The processing of mineral concentrates to metals through pyrometallury, for example, smelting or hydrometallurgy as recovery steps.
- **Materials production, performance and integrity.** The development of new alloys, the production of useful materials from raw metals, forming through casting, 3D printing and joining through welding, are examples of metallurgical applications. The forensic investigation of failures is also of great importance.

Graduates in metallurgical engineering are responsible for process/component design and optimisation, commissioning, marketing, business analysis and research. There is a place for everyone in metallurgical engineering!

Behind the scenes

The Department of Materials Science and Metallurgical Engineering is currently the leading metallurgical engineering department in South Africa. It therefore plays a leading role in the education of metallurgical engineers for the South African metallurgical and mining industries, and its graduate students are sought after. In addition, many graduate engineers from other disciplines take postgraduate programmes in the Department to enhance their skills in the rich minerals industry (in South Africa and abroad).

Unconditional accreditation by the Engineering Council of South Africa (ECSA) is a confirmation of the quality of undergraduate teaching in the Department. Furthermore, the degree currently enjoys international recognition. Its staff consults with and performs research for industry and maintain close contact with local metallurgical industries to ensure that teaching and research are in line with industry needs. Sophisticated research equipment is available in the Department, as well as in the Industrial Metals and Minerals Institute (IMMRI), which is situated in the Department. Bursaries for metallurgical engineering are also available from various industry partners (see the website for additional information: www.up.ac.za/metal).

Students are supported in several ways by the Department. A member of staff is appointed as mentor for each year group to help students overcome problems. For first-year students in particular, there is an intensive mentorship programme. The normal programme runs over four years, but there is also a five-year programme (ENGAGE) for students who require additional support and mentoring. Social and sports functions are organised by the Metallurgical Student Association.

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First year	
First semester	**Second semester**
▪ Graphical communication ▪ General chemistry ▪ Materials science ▪ Calculus ▪ Humanities and social sciences 1	▪ Mathematics ▪ Electricity and electronics ▪ Mechanics ▪ Physics ▪ Humanities and social sciences 2 ▪ Workshop practice

Second year	
First semester	**Second semester**
▪ Calculus ▪ Differential equations ▪ Dynamics ▪ Programming and information technology ▪ Mineralogy ▪ Professional and technical communication ▪ Community-based project	▪ Mathematics ▪ Numerical methods ▪ Electrical engineering ▪ Materials science ▪ Process thermodynamics ▪ Engineering statistics

Third year	
First semester	**Second semester**
▪ Materials science ▪ Minerals processing ▪ Engineering management ▪ Thermoflow ▪ Electrochemistry ▪ Practical training	▪ Hydrometallurgy ▪ Pyrometallurgy ▪ Refractory materials ▪ Mechanical metallurgy ▪ Engineering activity and group work ▪ Excursions

Fourth year	
First semester	**Second semester**
▪ Process metallurgy and control ▪ Literature survey ▪ Hydrometallurgy ▪ Minerals processing ▪ Metals processing ▪ Engineering professionalism ▪ Practical training	▪ Project ▪ Process design

School of Engineering

Department of Mechanical and Aeronautical Engineering

BEng (Mechanical Engineering)

What does the programme entail?

Mechanical and aeronautical engineering entails the application of science to design, manufacture, operate and maintain mechanical and aeronautical equipment and processes. The undergraduate course focuses on the establishment of a broad knowledge of engineering and includes subjects such as dynamics, strength of materials, thermodynamics, fluid mechanics and design. The outputs of mechanical and aeronautical engineers include products and services that add value to the economy of the country. Mechanical and aeronautical expertise are instrumental in the design and manufacture of products and services, for example, the provision of electricity and water, transport (road, railway and air), mining activities, mechatronics and air-conditioning. As a result of the broad technical background, mechanical and aeronautical engineers either pursue technical careers in these fields or often develop into very successful senior managers in these industries.

Behind the scenes

In the Department of Mechanical and Aeronautical Engineering, prospective students may rest assured that they will receive first-class education, comparable to the best in the world as attested by the international accreditation of the graduate programme by the Engineering Council of South Africa (ECSA). The lecturers in the department are all actively involved in the industry, either as consultants or as researchers. The Department has already received eight design awards from the South African Bureau of Standards. It has modern and fully equipped laboratories and computer facilities and is the largest of its kind in South Africa. At undergraduate level, about 20% of students are female, reflecting the diversity of our student body. Alumni of the Department have made great contributions in several spheres of society and occupy important positions in organisations throughout South Africa. Others are employed overseas.

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The curriculum is summarised in the following tables (students specialising in aeronautical engineering perform their final year research and design projects on aeronautical topics):

First year	
First semester	**Second semester**
▪ Graphical communication ▪ Calculus ▪ Physics ▪ Electricity and electronics ▪ Humanities and social sciences 1	▪ Mathematics ▪ Mechanics ▪ Materials science ▪ Humanities and social sciences 2 ▪ General chemistry ▪ Workshop practice

Second year	
First semester	**Second semester**
▪ Manufacturing and design ▪ Programming and information technology ▪ Dynamics ▪ Calculus ▪ Differential equations ▪ Professional and technical communication ▪ Community-based project	▪ Structural design ▪ Thermodynamics ▪ Mathematics ▪ Numerical methods ▪ Engineering statistics ▪ Community-based project

Third year	
First semester	**Second semester**
▪ Structural mechanics ▪ Thermodynamics ▪ Engineering management ▪ Machine design ▪ Thermoflow ▪ Practical training	▪ Vibration and noise ▪ Solid mechanics ▪ Engineering activity and group work ▪ Simulation-based design ▪ Electrical engineering

Fourth year	
First semester	**Second semester**
▪ Computational fluid Dynamics ▪ Thermoflow ▪ Engineering professionalism ▪ Practical training ▪ Design project ▪ Research project	▪ Research project ▪ Thermal and fluid machines ▪ Control systems **Electives:** ▪ Aeronautics ▪ Maintenance engineering ▪ Nuclear engineering ▪ Vehicle engineering ▪ Mechatronics ▪ Heat and mass transfer ▪ Optimum design

School of Engineering

Department of Mining Engineering

BEng (Mining Engineering)

What does the programme entail?

The profession of mining engineering encompasses a wide spectrum of engineering work—from mine evaluation to industrial control. For instance, mining engineers may undertake the evaluation of a new mining project as soon as the discovery and geological confirmation of a mineral deposit have been completed. If such a mineral deposit is found to be viable, mining engineers will design the mine to exploit the mineral deposit. Where the mineral deposit is close to the surface, an opencast mine will be preferred, but for deeper deposits, an underground mine will be planned. Mining engineers will coordinate the construction of such a mine and bring it to the stage where it starts producing.

A typical mine has a lifespan of 15 to perhaps 100 years. The design of the mining excavations, with their equipment and services, the planning of all the activities and the management of the operation at all levels is the responsibility of the mining engineer. This professional will also provide expert advice on rock breaking, blasting, materials transport systems, mine planning and scheduling, mechanical tunnel development, mine climate control, rock mechanics, support of excavations, devising mining methods, as well as the design and development of equipment.

Career opportunities

In addition to operational management, mining engineers are often involved in the planning and execution of research and development work. In order to maintain the proud position of the South African mining industry as a world leader, it is necessary to accept the challenges of technological development through extensive research and development programmes. Mining engineers fulfil the role of expert consulting engineers in various mining groups, as well as in private practice. Universities, government departments and financial institutions also employ mining engineers.

The mining industry is one of the largest industries in the country and certainly one of the most important. It supplies raw materials to a large variety of domestic industries, as well as energy minerals. On the other hand, precious metals, non-precious minerals, energy minerals and diamonds are exported to earn foreign exchange. More than 70 different minerals are currently produced in South Africa. They contribute directly to the gross domestic product. The mining industry provides job opportunities to more than 400 000 people. Among these, there are obviously many employment opportunities for professionals.

Behind the scenes

Although the number of students in the Department has increased in recent years, classes are still relatively small. It is therefore possible for staff to give intensive attention to individual students. A great number of technical visits offer students the opportunity to get acquainted with every aspect of the mining industry.

A characteristic of the mining engineering programme is the close group cohesion, which develops among students and continues long after graduation.

Take note: Prospective mining engineering students are advised to verify if they are medically compliant with the government requirements to work on a mine. More information can be found on this link: http://www.dmr.gov.za/guidance-notes-for-medical-practitioners/summary/20-mine-health-and-safety/359-minimum-standard-of-fitness-to-perform-work-at-a-mine.html

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First year	
First semester	**Second semester**
▪ Graphical communication ▪ General chemistry ▪ Materials science ▪ Calculus ▪ Humanities and social sciences 1	▪ Mathematics ▪ Electricity and electronics ▪ Mechanics ▪ Physics ▪ Humanities and social sciences 2 ▪ Workshop practice

Second year	
First semester	**Second semester**
▪ Dynamics ▪ Programming and information technology ▪ Calculus ▪ Differential equations ▪ Strength of materials ▪ Geology for engineering ▪ Professional and technical communication ▪ Community-based project	▪ Surveying ▪ Numerical methods ▪ Engineering statistics ▪ Thermodynamics ▪ Mathematics ▪ Experiential training ▪ Community-based project ▪ Introduction to mining

Third year	
First semester	**Second semester**
▪ Surface mining and geotechnics ▪ Thermofluids ▪ Minerals processing ▪ Engineering management ▪ Experiential training ▪ Industrial excursions	▪ Explosive engineering ▪ Mineral economics ▪ Engineering activity and group work ▪ Mining ▪ Introduction to project ▪ Historical geology

Fourth year	
First semester	**Second semester**
▪ Mine ventilation engineering ▪ Mine operational risk management ▪ Engineering professionalism ▪ Strata control ▪ Structural geology ▪ Mining	▪ Mine design ▪ Geodynamics ore formation ▪ Industrial excursions ▪ Project

School of Engineering

The Engineering Augmented Degree Programme (ENGAGE)

An engineering degree is very demanding. The workload is high, the pace is fast and the modules are academically challenging. Many students also face challenges regarding background knowledge in Mathematics and Physical Science, academic literacy and information technology, and may not have the study skills to cope with the mainstream four-year programme. In addition, many students struggle with the transition to university life, due to the very large first-year classes, freedom from strict discipline, and many social activities, even if they attended high-performing schools.

This is why the School of Engineering offers a five-year programme, called the Engineering Augmented Degree Programme (ENGAGE). ENGAGE is available in all the engineering disciplines. It provides a carefully structured curriculum that helps students adjust to university life and cope with the academic demands of engineering studies. In ENGAGE, the volume of work is gradually increased while the support provided is gradually decreased over a period of three years. However, the workload—the time students must spend on their studies—is high from the very beginning, so ENGAGE is not for students who do not want to work!

Structure of the programme

In ENGAGE, students take all of the same first-year modules as the four-year degree programme students, and attend the same classes as the other students, but these modules are spread out over a two-year period. In addition, for every 16-credit 100-level (first-year) module, students also take an eight credit augmented/additional module. For example, in the first year students take the same mathematics modules (16 credits) as the four-year degree programme students, as well as additional mathematics modules (8 credits). In additional modules, students are divided into groups of about 50 and work on strengthening problem-solving and other cognitive skills, developing conceptual understanding and acquiring the background knowledge needed for both the additional module and the corresponding four-year mathematics module.

In the first year of study, ENGAGE students take the basic sciences modules that form the foundation of engineering, namely chemistry, physics and mathematics. However, computer engineering students take mechanics instead of chemistry. ENGAGE students also take Professional Orientation, which provides an introduction to information technology skills and develops students' academic skills and communication skills. In addition first-year engineering students are required to take a module in humanities and social sciences—the HAS module.

In the second year, ENGAGE students take the introductory (100-level) engineering modules. For each engineering module, they also take a compulsory additional module. Second-year students also take one 200-level mathematics module per semester. In the third year, students take the remaining 200-level modules, but since they have already taken two 200-level mathematics modules, they have a slightly lighter workload than the four-year programme students do. ENGAGE students follow exactly the same programme as the four-year programme students for the last two years of their studies.

All the prescribed components of ENGAGE are compulsory. Attendance of all lectures and discussion classes in the modules are also compulsory.

Four-year programme modules	Foundation modules
First and second years	
▪ 100-level Science modules ▪ 100-level Engineering modules ▪ 200-level Mathematics modules	▪ Additional module for each Science and Engineering module
Third year	
▪ 200-level Engineering modules	▪ None
Fourth year	
▪ 300-level Engineering modules	▪ None
Fifth year	
▪ 400-level Engineering modules	▪ None

Who may register for ENGAGE?

Students may apply for ENGAGE if:

- their marks in the National Senior Certificate meet the minimum admission requirements for the four-year programme, but they would like more support; **or**
- their marks in the National Senior Certificate do not meet the minimum requirements for entry into the four-year programme, but do meet the minimum requirements for the five-year programme. These students will be required to write the National Benchmark Test (NBT).
- Please refer to the table on page 2 for the 2020 admission requirements.

Contact information

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School for the Built Environment

School for the Built Environment: Highlights

The School for the Built Environment offers the entire spectrum of programmes in the built environment (degrees in architecture, quantity surveying, construction management, real estate and town and regional planning).

The Department of Architecture presents programmes in the disciplines of architecture, landscape architecture and interior architecture. Graduates of the professional programmes are able to register with the relevant professional or statutory bodies, namely the South African Council for the Architectural Profession (SACAP), The African Institute of the Interior Design Professions (IID) and the South African Council for the Landscape Architectural Profession (SACLAP). The Department also offers research studies on honours, master's and doctoral degree levels. The programme in landscape architecture is the only undergraduate degree of its kind offered at a university in South Africa.

The BSc (Quantity Surveying), BScHons (Quantity Surveying), BSc (Construction Management), BScHons (Construction Management), BSc (Real Estate), BScHons (Real Estate) and MSc (Real Estate) programmes are accredited at various national and international Professional Councils. Graduates who have obtained a BScHons (Quantity Surveying) may, after submitting proof of prescribed professional practical experience and successful completion of an assessment of professional competence, register with the South African Council for the Quantity Surveying Profession. Graduates who have obtained a BScHons (Construction Management) degree may, after submitting proof of prescribed professional practical experience and successful completion of an assessment of professional competence, register with the South African Council for the Project and Construction Management Profession.

An honours degree in Real Estate can lead to registration as a professional property valuer. The property sector forms an appreciable part of the South African economy—in fact, real estate comprises about 40% to 50% of the world's total assets.

Graduates with a Bachelor of Town and Regional Planning can register as professional town and regional planners with the South African Council for Town and Regional Planners, which is an official body established in terms of an act of Parliament. The degree is internationally recognised.

Department of Architecture

The Department of Architecture presents programmes in architecture, interior architecture and landscape architecture. These programmes focus on the design and realisation of meaningful environments for users across varying scales, and as such complement and support one another. Students in the Department are exposed to all three disciplines during their studies—a unique academic offering in South Africa.

Through commitment to innovation and internationally recognised programmes, the Department maintains professional qualifications of a high standard. The curriculum integrates knowledge from the humanities and the natural sciences to develop students' spatial design skills and aims to instil a culture of lifelong learning in graduates. As a result, the graduates of this Department are highly regarded both locally and abroad.

Important notification:

If the Faculty receives an insufficient number of applications for BSc (Interior Architecture) and/or BSc (Landscape Architecture) these programmes might not be offered in 2020. Should one or both of these programmes not be offered, those applicants that met the requirements and would have been selected for these programmes will then be accommodated in BSc (Architecture).

Please consult www.up.ac.za/ebit for the most recent information.

BSc (Architecture)

Undergraduate (by coursework)	**Minimum duration**	**Outcome (registration with SACAP)**
BSc (Architecture)	Three years (full-time, studio-based)	Candidate senior architectural technologist
At least one year of work or travel recommended before postgraduate studies are undertaken.		
Postgraduate (by coursework)	**Minimum duration**	**Outcome**
Bachelor of Architecture Honours	One year (full-time, studio-based)	Candidate senior architectural technologist
Master of Architecture	One year (full-time, studio-based)	Candidate architect

Architects design spaces and buildings to satisfy our daily needs and improve the environment in which we live. They need abilities and skills that range from the practical to the artistic and from the technical to the theoretical. As professionals they conceptualise, design and document building projects and oversee quality control during construction. Architects are ethically and legally bound through institutes and a government controlled council, which protects the interests of the public. Architects may manage their own practices or work for other, often, multidisciplinary firms, or can make contributions to the government sector and education.

School for the Built Environment

BSc (Interior Architecture)

Undergraduate (by coursework)	Minimum duration	Outcome (registration with IID)
BSc (Interior Architecture)	Three years (full-time, studio-based)	Candidate interior designer
At least one year of work or travel recommended before postgraduate studies are undertaken.		
Postgraduate (by coursework)	**Minimum duration**	**Outcome**
Bachelor of Interior Architecture Honours	One year (full-time, studio-based)	Candidate senior interior designer
Master of Interior Architecture	One year (full-time, studio-based)	Candidate interior architect

The degree programme in interior architecture empowers students to design sustainable, meaningful and beautiful places within the context of architectural space. Graduates possess the theoretical and technical knowledge to engage critically with proposed or existing structures. Designers of interior environments shape the relationship between space, object and user. They follow a human-centred approach and perform spatial design and research services across various scales and building types. Graduates work as designers in the built environment and related fields such as exhibition, lighting, product and stage design. The programme offers students the opportunity to become specialists in interior design within an interdisciplinary learning environment.

Notification: If the Faculty receives an insufficient number of applications for BSc (Interior Architecture) and/or BSc (Landscape Architecture) these programmes might not be offered in 2020. Should one or both of these programmes not be offered, those applicants that met the requirements and would have been selected for these programmes will then be accommodated in BSc (Architecture).

BSc (Landscape Architecture)

Undergraduate (by coursework)	Minimum duration	Outcome (registration with SACLAP)
BSc (Landscape Architecture)	Three years (full-time, studio-based)	Candidate senior landscape architectural technologist
At least one year of work or travel recommended before postgraduate studies are undertaken.		
Postgraduate (by coursework)	**Minimum duration**	**Outcome**
Bachelor of Landscape Architecture Honours	One year (full-time, studio-based)	Candidate landscape architectural technologist
Master of Landscape Architecture	One year (full-time, studio-based)	Candidate landscape architect

Landscapes express the dynamic interaction between the activities of societies and the physical environment. Landscape architecture is a profession and academic discipline concerned with the design of rural and urban outside spaces across various scales informed by this interaction. It considers change over time and mediates art and science, artefact and nature, city and region, and private and public interests. Landscape architects therefore synthesise knowledge from the humanities and the natural sciences to design sustainable, meaningful and beautiful places that are grounded in material and immaterial culture, and the ecology of their local contexts.

Admission by selection

A limited number of students are admitted to the Department annually. Admission to the Department is by selection. Please refer to www.up.ac.za/architecture for information on the selection requirements and processes.

National Benchmark Test (NBT)

Although the Department of Architecture does not require of applicants to write the National Benchmark Test (NBT), applicants are advised to do so. In certain cases, especially where an applicant's final Grade 12 results are disputed, the NBT results may be considered. In special cases the Admissions Officer will inform candidates should the NBT be an additional requirement. If you plan to also apply at other departments or institutions, you are advised to enquire if these tests are a requirement for admission.

Important dates

Applications open on 1 March annually and close on 31 May. Applicants can visit the Department's webpage for other important dates.

Contact information

The Department of Architecture does not deal with the administrative aspects of student affairs, such as applications, tuition fees, bursaries, and registration, study permits for international students or accommodation. Prospective students should address queries in this regard, as well as their applications for admission, to the Department of Enrolment and Student Administration at ssc@up.ac.za.

Academic enquiries: Prospective students
Email arch@up.ac.za
Website www.up.ac.za/architecture

Notification: If the Faculty receives an insufficient number of applications for BSc (Interior Architecture) and/or BSc (Landscape Architecture) these programmes might not be offered in 2020. Should one or both of these programmes not be offered, those applicants that met the requirements and would have been selected for these programmes will then be accommodated in BSc (Architecture).

School for the Built Environment

Department of Construction Economics

BSc (Construction Management)

What does the programme entail?

Construction managers are business people who work as contractors, project managers and/or property experts in the built environment and can add value to almost any building-related activity. The programme focuses on the technical, financial and managerial aspects of construction. In the three-year programme the main focus is on the technical aspects.

Career opportunities

During the one-year honours degree following the BSc degree, students receive further training in aspects such as financial management, project management and strategic management. On successful completion of the three-year programme, students can enter a career in construction management or subcontract and main contract work. On successful completion of the one-year honours degree, opportunities become far wider, with project management, property development, portfolio management, commercial marketing and managerial positions in the corporate environment as some possibilities.

Duration of programme

- **BSc (Construction Management):** The three-year programme will qualify BSc (Construction Management) graduates to support professionals in the construction industry with all types of construction work.
- **BScHons (Construction Management):** The one-year BScHons (Construction Management) programme qualifies graduates to start a professional construction management career in the construction industry and related industries. After submitting proof of prescribed professional practical experience and the successful completion of an assessment of professional competence, graduates may register with the South African Council for the Project and Construction Management Profession (SACPCMP). The honours degree requires students to work part-time at approved construction companies/firms for at least 240 hours in order to supplement their theoretical studies with hands-on practical experience. It will be expected of students to keep and submit a logbook on the prescribed template.

Selection process

Only a limited number of candidates can be accommodated and admission is subject to selection.

Behind the scenes

The BScHons (Construction Management): The three-year BSc (Construction Management) and BScHons (Construction Management) programmes are accredited nationally by the SACPCMP and internationally by the Chartered Instituted of Building (CIOB) in the UK. The CIOB has a world-wide footprint providing our Construction Management degrees with international recognition.

The Department also offers a master's and a doctoral degree that can be obtained by submitting a thesis and passing an oral examination.

Contact information
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First year	
First semester	**Second semester**
▪ Building drawings ▪ Building science ▪ Academic information management ▪ Academic literacy ▪ Building services ▪ Quantities ▪ Introduction to structures ▪ Economics ▪ Mathematics	▪ Building organisation ▪ Building drawings ▪ Building science ▪ Building services ▪ Quantities ▪ History of the environment ▪ Structures ▪ Economics

Second year	
First semester	**Second semester**
▪ Labour law ▪ Building science ▪ Statistics ▪ Financial management ▪ Building services ▪ Construction quantities ▪ Reinforced concrete structures ▪ Site surveying	▪ Building science ▪ Statistics ▪ Building services ▪ Construction quantities ▪ Civil engineering services ▪ Financial management

Third year	
First semester	**Second semester**
▪ Business law ▪ Building science ▪ Building services ▪ Construction management ▪ Financial management ▪ Construction quantities ▪ Community-based project	▪ Housing ▪ Building science ▪ Introduction to property law ▪ Sustainable construction ▪ Construction management ▪ Research methodology ▪ Construction quantities ▪ Financial management ▪ Community-based project

BSc (Quantity Surveying)

What does the programme entail?

Quantity surveyors are independent, professional consultants who provide specialised financial and contractual services and advice to clients in the construction industry and act in cooperation with, among others, architects, consulting engineers and contractors to promote the interests of the building client.

Career opportunities

There are various job opportunities in the construction industry. Most quantity surveyors find their way to the private sector, where they are employed at quantity surveying practices.

School for the Built Environment

After registration with the South African Council for the Quantity Surveying Profession (SACQSP), quantity surveyors may become partners or directors or they could start their own professional practices. Quantity surveyors also act as project managers and valuers provided that they register with the relevant Councils. Various government departments employ quantity surveyors, and opportunities in the property sector, banking, engineering and manufacturing industries are further career options. A number of quantity surveyors also work for construction firms or establish their own building enterprises and construction companies.

Duration of the programme

- **BSc (Quantity Surveying):** The three-year programme will qualify BSc (Quantity Surveying) graduates to support professional quantity surveyors with all types of construction work, particularly buildings and infrastructure.
- **BScHons (Quantity Surveying):** The one-year BScHons (Quantity Surveying) programme qualifies graduates to start a professional quantity surveying career in the construction industry and related industries. After submitting proof of prescribed professional practical experience and the successful completion of an assessment of professional competence, graduates may register with the South African Council for the Quantity Surveying Profession (SACQSP). The honours degree requires students to work part-time at approved quantity surveying firms for at least 240 hours in order to supplement their theoretical studies with hands-on practical experience. It will be expected of students to keep and submit a logbook on the prescribed template.

Selection process

Only a limited number of candidates can be accommodated and admission is subject to selection.

Behind the scenes

The BScHons (Quantity Surveying): The three-year BSc (Quantity Surveying) and BScHons (Quantity Surveying) programmes are accredited nationally by the SACQSP and internationally by the Royal Institution of Chartered Surveyors (RICS). The RICS has a worldwide footprint providing our Quantity Surveying degrees with international recognition. The Department also offers a master's and a doctoral degree that can be obtained by submitting a thesis and passing an oral examination.

Contact information
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Website www.up.ac.za/construction-economics

First year	
First semester	**Second semester**
▪ Building drawings ▪ Building science ▪ Academic information management ▪ Academic literacy ▪ Building services ▪ Quantities ▪ Introduction to structures ▪ Economics ▪ Mathematics	▪ Building organisation ▪ Building drawings ▪ Building science ▪ Building services ▪ Quantities ▪ History of the environment ▪ Structures ▪ Economics

Second year	
First semester	**Second semester**
▪ Building science ▪ Statistics ▪ Financial management ▪ Building services ▪ Quantities ▪ Site surveying ▪ Reinforced concrete structures	▪ Building science ▪ Statistics ▪ Building services ▪ Quantities ▪ Civil engineering services ▪ Financial management

Third year	
First semester	**Second semester**
▪ Business law ▪ Quantity surveying practice ▪ Building science ▪ Building services ▪ Quantities ▪ Financial management ▪ Community-based project	▪ Housing ▪ Quantity surveying practice ▪ Building science ▪ Introduction to property law ▪ Sustainable construction ▪ Quantities ▪ Research methodology ▪ Financial management ▪ Community-based project

Top student in the Department of Construction Economics

The Department of Construction Economics' annual prize-giving event, which this year was held on 18 May, offers an opportunity to recognise the hard work of top-performing students from the undergraduate to honours levels.

One of these students was Qabilah Abramjee, who completed her BSc (Quantity Surveying) with distinction and is currently registered for an honours degree. At the function, mention was also made of her other achievements during her three years of study.

She had received:

- the Lafarge Prize for the Best Student in Building Science 310/320;
- the ASAQS Prize for the best third-year BSc (Quantity Surveying) student;
- the Prof Thys Siglé Prize for the best BSc (Quantity Surveying) undergraduate student in Quantities 100/200/300;
- the ASAQS Gauteng Branch Prize for the best BSc (Quantity Surveying) student in Quantities 300 (HVH300); and
- the Bell-John Prize for the best BSc (Quantity Surveying) achievement in any year of study.

Qabilah Abramjee

School for the Built Environment

BSc (Real Estate)

What does the programme entail?
Real estate is the study of fixed property and related aspects such as property economics, development, management, valuation, financing, investment and marketing.

Career opportunities
Apart from a future in areas such as property investment, property finance and facilities management, further studies to obtain an honours degree in real estate can lead to registration as a professional property valuer. Career opportunities encompass the whole spectrum of the property sector, whether as entrepreneurs in the private sector or as employees in the private, government or semi-governmental sectors.

Duration of the programme
The BSc (Real Estate) programme takes three years to complete, and the honours degree a further year. During the honours degree, students are expected to work at approved property developers or related businesses for at least 240 hours part-time in order to supplement their theoretical studies with hands-on practical experience. It will be expected of students to keep and submit a logbook on the prescribed template.

Selection process
Only a limited number of candidates can be accommodated and admission is subject to selection.

Behind the scenes
Real estate (or property studies) has developed into a specialised field requiring unique expertise. The contribution of professionally trained property practitioners is important to achieve the present socio-political development priorities in South Africa (privatisation of government assets and outsourcing of management functions, redistribution of land and development of low-cost housing). The programme also offers ample opportunity for community service and research.

The property sector forms an appreciable part of the South African economy—in fact, real estate comprises between 40% and 50% of the world's total assets. The number of persons working in the various components of the property industry in South Africa runs into tens of thousands.

The Department also offers master's degree programmes by coursework while a master's degree can also be obtained by way of a treatise and an oral examination. A doctorate can be obtained by submitting a thesis and passing an oral examination.

Contact information
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First year	
First semester	**Second semester**
▪ Building drawings ▪ Building science ▪ Academic information management ▪ Academic literacy ▪ Building services ▪ Quantities ▪ Economics ▪ Real estate ▪ Mathematics	▪ Building organisation ▪ Building drawings ▪ Building science ▪ Building services ▪ Quantities ▪ History of the environment ▪ Economics ▪ Real estate

Second year	
First semester	**Second semester**
▪ Building science ▪ Statistics ▪ Financial management ▪ Building services ▪ Property valuation ▪ Real estate	▪ Building science ▪ Statistics ▪ Financial management ▪ Building services ▪ Civil engineering services ▪ Real estate ▪ Property valuation

Third year	
First semester	**Second semester**
▪ Business law ▪ Building science ▪ Building services ▪ Property valuation ▪ Real estate ▪ Financial management ▪ Community-based project	▪ Housing ▪ Building science ▪ Introduction to property law ▪ Sustainable construction ▪ Property valuation ▪ Real estate ▪ Financial management ▪ Research methodology ▪ Community-based project

School for the Built Environment

Department of Town and Regional Planning

BTRP – Bachelor of Town and Regional Planning

What does the profession entail?

Town and regional planning is a profession that promotes and manages societal transformation and progressive change through the planning, design, implementation and management of interventions in the development and use of land. These interventions range from site to supranational level and have as their aim widening of choice, promotion of equity, ensuring sustainable human settlements and improving the quality of people's lives. The guiding motive of the profession is the pursuit of innovative, sustainable and affordable alternatives to existing settlement types. At the current juncture in South Africa's history, Town and Regional Planning is a crucial profession in the correction of the many spatial and other imbalances in both urban and rural areas, as well as the improvement of inefficient, unjust and underperforming human settlements. The challenge for planning lies in the fact that different interests and expectations for the future are often contradictory and conflict-ridden. A professional approach that combines (1) sensitivity, empathy and care, and (2) analytical and strategic skills, is required to manage the various political, social, environmental and economic issues at stake. The ideal town and regional planner is a creative person who is able to put forward innovative solutions to complex problems, a mediator who is able to reconcile diverse points of view, a strategic thinker, a people's person, and a good manager. Given the enormous backlogs in the areas of housing and social services, and the deep levels of poverty, marginalisation and despair in the country, planners also need a strongly developed sense of social and environmental justice and should be committed to human and community development.

Career opportunities

While most town and regional planners are employed in the three spheres of government, or act as private consultants to the public and the private sectors, they are also employed by research agencies such as the Council for Scientific and Industrial Research and the Human Sciences Research Council, non-governmental and development organisations, community-based organisations, major financial institutions and property development groups. The professional BTRP qualification enables graduates to register as professional town and regional planners with the South African Council for Planners, which is an official body established in terms of an Act of Parliament. The degree is internationally recognised.

Duration of the programme

The minimum period of study is four years' full-time study.

Selection process

Only a limited number of candidates can be accommodated and admission is subject to selection.

Behind the scenes

Practice and theory are integrated in the course. Lectures, project and studio work focus on stimulating critical thought, engaging students in discussion, and applying theory to real world situations by means of practical problem-solving exercises. Instruction is student-centred and the progress of each student is monitored and attended to. One of the trademarks of the Department is a desire to take on new challenges, and the Department is involved in and committed to community development in South Africa. The latter takes place mainly through research and contract work for a range of clients in all three spheres of government.

The programme

The programme in Town and Regional Planning equips the planner with the necessary knowledge and skills to present interventions to manifold problems in settlements and regions by focusing on the following themes: planning theory and history, land-use management and land development; settlement planning and design; strategic and integrated development planning; urban and rural regeneration; and planning methods and techniques. A number of modules in related fields are also prescribed to ensure that students acquire (1) a multidisciplinary perspective and (2) the knowledge base required to provide innovative, affordable and appropriate solutions to complex urban and rural problems. For a list of all modules, please see: www.up.ac.za/en/town-and-regional-planning/article/50045/undergraduate.

Contact information
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First year	
First semester	**Second semester**
▪ Planning and settlement histories before the Industrial Revolution ▪ Site analysis and assessment ▪ Introduction to planning ▪ Academic literacy for Town and Regional Planning ▪ Academic information management ▪ Economics ▪ Statistics ▪ Sociology	▪ Planning and settlement histories since the Industrial Revolution ▪ Settlement analysis and assessment ▪ Principles of settlement design ▪ Economics ▪ Statistics ▪ Sociology

Second year	
First semester	**Second semester**
▪ Settlement design concepts ▪ Introduction to development planning ▪ Plan and policy analysis and assessment ▪ Theory and practise of land-use management ▪ Sociology or economics ▪ Community-based project	▪ Settlement establishment, planning and housing delivery ▪ Municipal development planning ▪ Land-use management practice ▪ Urban land development economics ▪ Sociology or economics ▪ Community-based project

Third year	
First semester	**Second semester**
▪ Regional development planning ▪ Institutional and legal structures for planning ▪ Spatial concepts ▪ Sociology or economics	▪ Rural development planning ▪ Planning prospects ▪ Transport planning ▪ Municipal services provision ▪ Sociology or economics

Fourth year	
First semester	**Second semester**
▪ Planning interventions: ▪ peri-urban and rural scales ▪ Planning interventions: supranational, national and regional scale ▪ Research methodology ▪ Professional practice	▪ Planning interventions: Metropolitan scale ▪ Planning interventions: precinct scale ▪ Research report

School of Information Technology

School of Information Technology: Highlights

The School of Information Technology (SIT) is unique and the first of its kind in South Africa where students have the advantage of an integrated approach to IT with programmes and modern laboratories in Computer Science, Informatics and Information Science. The School offers cross-disciplinary degrees such as MIT and PhD (IT) and each of the departments also has its own selection of undergraduate and postgraduate degrees. Staff members collaborate with industry and academic partners from the African continent and the rest of the world on a variety of research projects.

The Department of Information Science offers a two year coursework master's degree in information technology (MIT degree). The Department also hosts the African Centre of Excellence for Information Ethics (ACEIE). The Centre produces research on Information Ethics. Partnering with the Department of Telecommunications and Postal Services and UNESCO, the ACEIE hosts awareness-raising workshops across Africa.

The Department of Informatics is involved in several research projects including two South-African EU projects MOSAIC2B (http://mobile-empowerment.org/) and InnXchange (www.nwo.nl/en/research-and-results/programmes/erafrica/research+projects/project+summary+innxchange). MOSAIC 2B is a South-African European research project aiming to develop a new framework that uses cloud-based applications, innovative low-cost internet delivery mechanisms to unlock new mobile business opportunities. InnXchange is a capacity building project aimed at strengthening entrepreneurial training and encouraging entrepreneurial thinking through the development of partnerships between academic institutions and commercial research organisations from Africa and Europe.

The Department of Computer Science is internationally recognised for its research in Artificial Intelligence, and hosts the South African Initiative Chair in Artificial Intelligence. The Department is also well-known for its strong research in Digital Forensics and Computer and Information Security. According to the Essential Sciences Indicators, the Department has been recognised as one of the top one percent internationally for the impact of its research outputs produced.

Department of Informatics

BIT – Bachelor of Information Technology

This exciting programme is the first of its kind in South Africa and integrates, in a four-year programme, the different disciplines related to information technology. Many people have a desire to be professionally prepared for a career in the IT industry as a whole, rather than becoming an expert in a particular field of study. The School therefore designed the programme with the explicit aim of ensuring that students have grounding in all aspects deemed to be a necessary part of the background in the IT profession. The fourth study year includes a six-month learnership with participating organisations where students are employed as trainees.

Due to its nature, the curriculum is tightly prescribed, with relatively few options open to students. This ensures that the group of BIT students has a cohesive team spirit, and a shared ideal and vision. The curriculum is not for the faint-hearted and requires hard work and dedication. On successful completion, BIT graduates can continue with the part-time MIT programme or any other master's degree in the School of Information Technology to complete their professional training.

What does the programme entail?

The programme prepares students to understand the use of IT in organisations. In particular, skills are developed to program on both a small and large scale, and to design and implement IT solutions for organisations in a professional manner. Students learn about the use of information in organisations, and how to organise and retrieve information optimally. Sound communication skills and general problem-solving skills are developed throughout the programme. This is underpinned by language and quantitative mathematical studies and the development of penetrating thinking abilities through a course in philosophy. The final-year learnership introduces students to the working world, and ensures their smooth transition to a professional work life after graduation.

Duration of the programme

The BIT programme takes a minimum of four years to complete.

Contact information
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Website www.up.ac.za/informatics

BIT (Information Systems)

BIT (Information Systems) studies the application and use of the computer and information systems in the organisation. The use of information technology by organisations is growing exponentially and new, more complex and challenging applications are explored and developed on a daily basis. It has the benefit that, in addition to the obvious fact that the work environment of the informatics specialist is particularly interesting, there is also the advantage that many job opportunities are available to well-qualified informatics specialists. The superiority of students in this field lies in their specialist stream, which may be computer auditing, information science, entrepreneurship, e-Business, geography, or e-Taxation.

What does the programme entail?

The use of information technology by organisations is growing exponentially and new, more complex and challenging applications are explored and developed on a daily basis.

School of Information Technology

It has the benefit that, in addition to the obvious fact that the work environment of the informatics specialist is particularly interesting, there is also the advantage that many job opportunities are available to well-qualified informatics specialists. The superiority of students in this field lies in their specialist stream, which may be computer auditing, information science, entrepreneurship, e-Business, geography, data science management or e-Taxation.

Contact information
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First year	
First semester and second semester	
Compulsory modules ▪ Academic information management ▪ Academic literacy for information technology ▪ Informatics ▪ Business management	**Elective module** ▪ Computer Auditing ▪ Information Science ▪ Entrepreneurship ▪ e-Business ▪ Geography ▪ Data Science Management ▪ e-Taxation

Second year	
First semester and second semester	
Compulsory modules ▪ Informatics ▪ Business ethics ▪ Community-based project	**Elective modules (Choose one stream)** ▪ Computer Auditing ▪ Information Science ▪ Entrepreneurship ▪ e-Business ▪ Geography ▪ Data Science Management ▪ e-Taxation

Third year	
First semester and second semester	
Compulsory module ▪ Informatics	**Elective modules (Choose one stream)** ▪ Computer Auditing ▪ Information Science ▪ Entrepreneurship ▪ e-Business ▪ Geography ▪ Data Science Management ▪ e-Taxation

BCom (Informatics) Focus area: Information Systems

What does the programme entail?

BCom (Informatics) Focus area: Information Systems studies the application and use of the computer and information systems in the organisation. The superiority of students in this field lies in their broad background in the field of economic and management sciences, which implies that the world of business is not strange to them. The use of information technology by organisations is growing exponentially and new, more complex and challenging applications are explored and developed on a daily basis. It has the benefit that, in addition to the obvious fact that the work environment of the informatics specialist is particularly interesting, there is also the advantage that many job opportunities are available to well-qualified informatics specialists.

Informatics specialists have the knowledge to analyse the information needs of organisations, be it businesses, government departments, non-profit organisations or any other organisation where information is crucial. They not only analyse the needs, but also address those needs by designing and implementing information systems. Information systems nowadays refer to computer-based systems (including mobile applications) that store and manipulate data so that people can understand, use, interpret and make decisions based on the information.

The BCom (Informatics) Focus area: Information Systems degree offered by the University of Pretoria is the only degree in Africa that is internationally accredited by the Accreditation Board for Engineering and Technology (ABET) of the USA.

Contact information
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Website www.up.ac.za/informatics

First year	
First semester and second semester	
Compulsory modules ▪ Computer and information literacy ▪ Academic literacy levels ▪ Informatics ▪ Financial accounting ▪ Economics ▪ Statistics ▪ Communication management ▪ English ▪ Business management ▪ Discrete structures	**Elective module** ▪ Marketing management Elective module that needs to be taken only if chosen as an elective at second- and third-year level.

Second year	
First semester and second semester	
Compulsory modules ▪ Business ethics ▪ Informatics ▪ Business law ▪ Community-based project	**Elective modules (Choose one)** ▪ Business management ▪ Financial accounting ▪ Taxation ▪ Statistics ▪ Internal auditing ▪ Marketing management ▪ Community-based project

Third year	
First semester and second semester	
Compulsory module ▪ Informatics	**Elective modules (Choose one)** ▪ Business management ▪ Financial accounting ▪ Statistics ▪ Internal auditing ▪ Marketing management ▪ Taxation

School of Information Technology

Exciting new degree offered from 2020:
BIT (Information Systems)

Since ICT skills are still scarce skills in South Africa, skilled information and communications technology (ICT) professionals are in high demand. This skills shortage will be addressed by the new Bachelor of Information Technology degree with specialisation in Information Systems, BIT (Information Systems).

Core modules from first to third year

- Systems analysis and design
- Programming
- Critical thinking skills
- Database design and implementation
- Network infrastructure
- Project management
- Human-computer interaction
- Trends in IT

Elective modules

Students can choose from seven streams:

- The computer auditing stream
- The Information Science stream
- The Entrepreneurship stream
- The e-Business stream
- The Geography stream
- The Data Science Management stream
- The e-Taxation stream

1. The computer auditing stream

An information technology (IT) audit involves the analysis of an organisation's information technology structure, operations and software programs. An IT auditor may identify ways in which an organisation's computer systems can better meet its needs, configure hardware and software programs to design new systems, and test systems to ensure that they are working properly.

The majority of IT auditors work in an office setting, primarily with computer systems. Depending on the employer, some auditors may be required to travel in order to evaluate their clients' systems. Although auditors generally work independently, larger projects may require some collaboration. In this stream you will take Accounting, Statistics and Auditing together with Information Systems.

2. The Information Science stream

Information scientists are responsible for managing the acquisition, supply and distribution of information within an organisation or a section of an organisation, and for making that information accessible to users. A combination of Information Science and Information Systems will equip students to become data scientists, knowledge managers, competitive intelligence analysts, information architects, web-content managers, etc.

3. The Entrepreneurship stream

Entrepreneurial careers transcend specific job titles, career paths and industries. While entrepreneurship can involve starting a new business, entrepreneurial careers can be found (or created) in just about every field, industry and organisation. Entrepreneurs create products, services, companies and even industries. Some work for themselves or in family businesses, while others work in traditional companies. Those with entrepreneurial aspirations typically pursue one of the following career paths:

New venture creation: Launching a company, buying a business or franchise, starting a new venture in a family enterprise, or commercialising a technology.

Careers in existing entrepreneurial ventures: Working for a start-up venture, small business, corporate entrepreneur or strategic entrepreneurial unit, or in another area such as education, research, public policy and accelerators. In this stream Accounting, Statistics and Entrepreneurship modules are combined with Information Systems.

School of Information Technology

4. The e-Business stream

E-business (electronic business) managers oversee sales for businesses that use the internet to market their products directly to consumers. E-business has seen rapid growth in recent years, and continued growth is predicted due to the ongoing expansion of the internet. Entry-level positions require at least a bachelor's degree. In this stream Accounting, Statistics, Communication Management and Business Management will give you the business knowledge needed, whilst Information Systems will give you the necessary ICT knowledge.

5. The Geography stream

Organisations across the globe are increasingly relying on location intelligence to make better decisions; therefore there is an increasing demand for careers in Geographical Information Systems (GIS). GIS professionals are equipped with data visualisation and spatial analysis skills, and qualify for occupations in countless fields. A combination of Information Systems and Geography modules will qualify you for a career in GIS.

6. The Data Science Management stream

Statisticians are responsible for planning, collecting, processing and analysing information (data) in order to make informed decisions. They are involved in producing reliable data, analysing data in order to form a clear picture, and drawing practical conclusions based on the available data.

A combination of Information Systems and Statistics will be useful if you are interested in a career as a data scientist, data mining specialist or data analyst in an organisation.

7. The e-Taxation stream

Employees with a background in Accounting, Statistics, Taxation and Information Systems are in high demand in financial institutions such as banks and audit firms.

Minimum admission requirements for 2020

Programme	Minimum requirements for 2020				
	Achievement level*				APS
SCHOOL OF INFORMATION TECHNOLOGY	English Home Language or English First Additional Language		Mathematics		
	NSC/IEB	AS Level	NSC/IEB	AS Level	
BIT (Information Systems) **[3 years]** Closing dates: SA – 30 September Non-SA – 31 August	5	C	4	D	**30 (26–29 admission based on the NBT)**
Should a candidate obtain an APS of between 26 and 29, consideration for admission will be based on the results of the NBT, provided that the student number quotas have not yet been reached. **Careers:** Graduates will differentiate themselves in an application environment by choosing one of the following options: Computer Auditing, Information Science, Entrepreneurship, e-Business, Geography, Data Science Management or e-Taxation.					

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

What does the BIT (Information Systems) programme entail?

BIT (Information Systems) is the study of the application and use of computer and information systems in an organisation. Due to the increasing use of information technology by organisations, more complex and challenging applications are constantly being explored and developed.

In addition to the obvious fact that the work environment of the informatics specialist is particularly interesting, this constant development also means that many new job opportunities become available to well-qualified informatics specialists. The superiority of students in this field lies in their specialist stream, which can be Computer Auditing, Information Science, Entrepreneurship, e-Business, Geography, Data Science Management or e-Taxation.

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School of Information Technology

Department of Computer Science

BSc (Computer Science)

BSc (Computer Science) is the ideal programme for students who are curious about how computers work, enjoy building things in a careful and systematic fashion, have a logical mind, are good at reasoning in a step-by-step way, find it fun to design things that others can use, are able to pay attention to detail, recognise good style when they see it and keep working at a task until they succeed.

A BSc (Computer Science) degree from the University of Pretoria provides breadth and depth in computing skills. It equips students with problem-solving abilities, and gives them a foundation for continued learning in an IT career and for producing high-quality software.

What does the programme entail?

The BSc (Computer Science) degree can be completed in a minimum of three years. The curriculum conforms to the highest international standards and will give students a foundation in all the important areas of computer science. Students will study a rich variety of computer science modules that emphasise the most up-to-date ways of developing software to be used in the IT industry.

In addition, this programme includes a significant number of modules in mathematics and the natural sciences. These modules strengthen the kind of thinking done when one develops software and enhances problem-solving abilities. It also provides a basis for research in computer science, which often relies on a certain level of mathematical skill and maturity.

Career possibilities

This programme includes a significant number of modules in mathematics, statistics and the natural sciences. These modules strengthen the kind of thinking done when on develops software and enhances problem-solving abilities. It also provides a basis for research in computer science, which often relies on a certain level of mathematical skill and maturity.

Other than following a research career, graduates follow careers as programmers, system analysts, system architects, consultants, database administrators and network analysts.

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Dr Linda Marshall (Programme coordinator)
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First year

First semester and second semester

- Academic information management
- Academic literacy for IT

Computer Science
- Program design
- Computers and algorithms
- Operating systems

Mathematics
- Mathematics
- Discrete structures
- Dynamical processes or Mathematical modelling

Specified courses from:
- Statistics
- Science

Second year

First semester and second semester

Computer Science
- Computer organisation and architecture
- Data structures and algorithms
- Netcentric computer systems
- Theoretical computer science
- Introduction to database systems
- Concurrent systems
- Software modelling

Mathematics
- Discrete structures

Community-based Project

Specified courses from:
- Chemistry
- Mathematics
- Mathematical statistics or statistics
- Physics

Third year

First semester and second semester

Computer Science
- Software engineering
- Computer security and ethics
- Computer networks
- Programming languages
- Compiler construction

Specified courses from:
- Computer science
- Data A Science
- Information science
- Mathematics
- Mathematical statistics or statistics
- Physics
- Chemistry

School of Information Technology

BSc (Information and Knowledge Systems)

BSc (Information and Knowledge Systems) is the ideal programme for students who are interested in computer science, as well as in one of the following areas of specialisation: data science, genetics, geographical information systems, IT and enterprises, law, music and software development.

What does the programme entail?

The BSc (Information and Knowledge Systems) programme can be completed in a minimum of three years. It aims to prepare students for pursuing a career in the IT industry. By enabling students to take a second major other than computer science, students are provided with a wider background. Computer science has a multidisciplinary application domain and the purpose of the programme is reflected in the composition of the curriculum by combining the field of computer science with other fields of study.

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First year

First semester and second semester

Computer Science
- Academic information management
- Academic literacy for IT
- Program design
- Computers and algorithms
- Operating systems

Mathematics
- Calculus
- Discrete structures

Second year

First semester and second semester

Computer Science
- Computer organisation and architecture
- Data structures and algorithms
- Computer systems
- Concurrent systems
- Theoretical computer science
- Software modelling
- Introduction to database systems

Community-based Project

Mathematics
- Discrete structures

Community-based Project

Third year

First semester and second semester

Computer Science
- Software engineering
- Computer security and ethics
- Computer networks
- Programming languages

Information Science
- Multimedia: Human-computer interaction

Additional modules as needed for the application environment options at first-, second- and third-year levels from one of the following fields:
- Data science
- Genetics
- Geographical information systems
- IT and enterprises
- IT and law
- IT and music
- Software development

School of Information Technology

Department of Information Science

BIS (Multimedia)

BIS (Multimedia) is the ideal programme for students who like to work with computers, like programming for multiple platforms, are interested in creating computer games, want to do web design and development, and want to learn how to do animation and image, audio and video editing.

What does the programme entail?

Information can be communicated through various media, such as printed text, text with images, photographs, video, sound and animation. Such information can be delivered in many different ways: from a network-based technology (such as the web and its many devices, ranging from personal computers to mobile devices). Information can thus be delivered in many different (read: 'multi') media. The goal of the multimedia degree is to provide students with the theoretical and technical know-how to build information products that use a variety of media and delivery systems.

Career possibilities

With the advent of all kinds of new devices that enable connection with information sources such as the web, there is a global shortage of content producers. The BIS (Multimedia) programme prepares graduates to get jobs with any of these dynamic content producers. They could also become hard-core coders and work for programming companies, or become skilled in their particular areas of interest: digital music or video, programming, graphic development, games development or web development. They could work at any institution that communicates information in multimedia.

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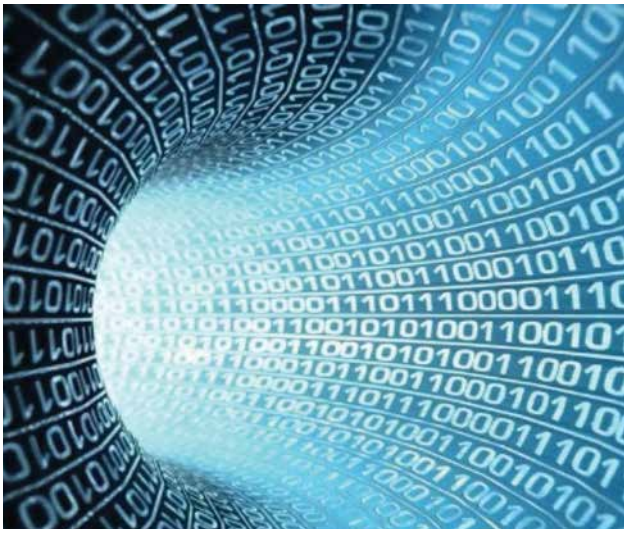
First year	
First semester	**Second semester**
Fundamental modules ▪ Academic information management ▪ Academic literacy levels	**Fundamental module** ▪ Academic literacy levels
Core modules ▪ Information science ▪ Introduction to information science	**Core modules** ▪ Information science ▪ Organisation and representation of information ▪ Information and communication technology
Multimedia ▪ Mark-up languages	**Multimedia** ▪ Multimedia for the web
Computer Science ▪ Imperative programming ▪ Introduction to computer science	**Computer Science** ▪ Introduction to program design ▪ Operating systems
Other compulsory module ▪ Visual design	**Other compulsory modules** ▪ Visual design ▪ Computer architecture

Second year	
First semester	**Second semester**
Fundamental module ▪ Community-based project	**Fundamental module** ▪ Community-based project
Core modules ▪ Multimedia ▪ Advanced mark-up languages I ▪ Multimedia and hypermedia theory	**Core modules** ▪ Multimedia ▪ Advanced mark-up languages II
Publishing ▪ Copy-editing	
Computer Science ▪ Data structures and algorithms ▪ Netcentric computer systems	**Computer Science** ▪ Software modelling ▪ Concurrent systems
Other compulsory module ▪ Visual design	**Other compulsory module** ▪ Visual design

Third year	
First semester	**Second semester**
Core modules ▪ Multimedia ▪ Multimedia project ▪ Human-computer interaction	**Core modules** ▪ Multimedia ▪ Multimedia project ▪ Trends
Computer Science* Select at least two of the following semester modules: ▪ Software engineering ▪ Artificial intelligence ▪ Computer networks ▪ Programming languages ▪ Compiler construction ▪ Computer security and ethics ▪ Computer graphics ▪ Database systems	

* The semester in which the modules are offered may vary from year to year.



School of Information Technology

BIS (Information Science)

BIS (Information Science) is the ideal programme for students who want to participate and contribute to the international information society, buy and sell information, develop information systems, and manage information products and services.

What does the programme entail?

The increasing amount of information available and growing information needs have necessitated the training of information specialists and intermediaries to facilitate the effective bringing together of users and the information they require. This programme focuses on the use of information technology and the processing of information products, and is designed to train students in the management, retrieval and organisation of information, as well as to teach them to package and distribute and add value to information. Students will also have the opportunity to develop knowledge and skills in the management of one of the most important resources of enterprises: information and knowledge.

Career opportunities

- information managers (manage information and knowledge resources)
- information specialists (organise, retrieve and add value to information)
- information consultants (consult on information products, services and systems)
- information brokers (become an infopreneur and buy and sell information products and services)
- systems specialists (analyse and develop information systems)

Duration of the programme

The BIS (Information Science) programme takes a minimum of three years to complete.

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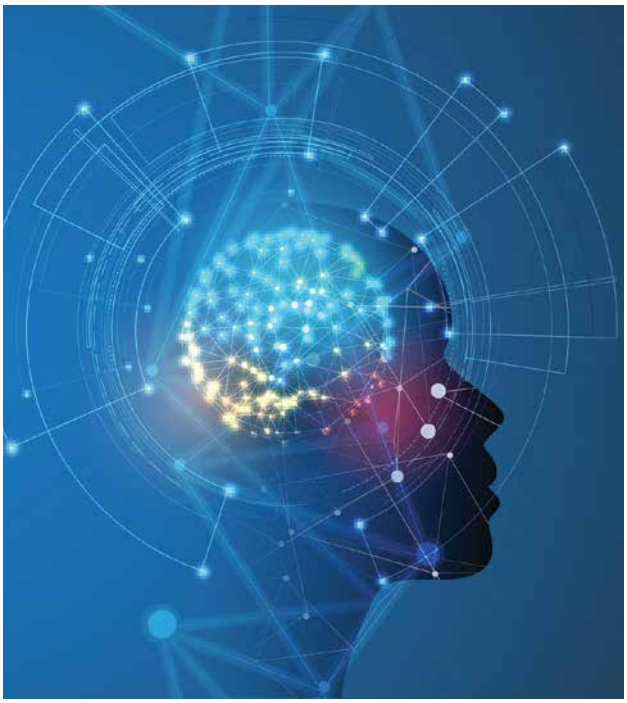
First year	
First semester	**Second semester**
Fundamental modules ▪ Academic information management ▪ Academic literacy levels	**Fundamental module** ▪ Academic literacy levels
Core modules Information science ▪ Introduction to information science ▪ Personal information management Business management	**Core modules** Information science ▪ Organisation and representation of information ▪ Information and communication technology Business management
Elective modules ▪ Group A: *Informatics or ▪ Group B: Any subject(s) at first-year level	**Elective modules** ▪ Group A: *Informatics or ▪ Group B: Any subject(s) at first-year level

* If Informatics is selected as a subject at first-year level, a minimum achievement level of 5 (60–69%) must be obtained for Mathematics.



Second year	
First semester	**Second semester**
Fundamental module ▪ Community-based project	**Fundamental module** ▪ Community-based project
Core modules Information science ▪ Information seeking and retrieval ▪ Social and ethical impact Business management	**Core modules** Information science ▪ Representation and organisation Business management
Elective modules ▪ Group A: *Informatics or ▪ Group B: Information science	**Elective modules** ▪ Group A: *Informatics or ▪ Group B: Information science

* If Informatics is selected as a subject at first-year level, a minimum achievement level of 5 (60–69%) must be obtained for Mathematics.

Third year	
First semester	**Second semester**
Core modules Information science ▪ Information organisation ▪ Experimental learning project	**Core modules** Information science ▪ Information and knowledge management ▪ Experimental learning project
Elective modules ▪ Group A: *Informatics and Business management or ▪ Group B: Information science or ▪ Group C: *Informatics and Information science	**Elective modules** ▪ Group A: *Informatics and Business management or ▪ Group B: Information science or ▪ Group C: *Informatics and Information science

* If Informatics is selected as a subject at first-year level, a minimum achievement level of 5 (60–69%) must be obtained for Mathematics.

School of Information Technology

BIS (Publishing)

This programme focuses on the theory and practice of book and corporate publishing.

What does the programme entail?

This programme aims to do the following:

- Provide students with knowledge of the publishing process and role-players, as well as trends and initiatives in the local and international publishing industry.
- Provide students with the skills needed to perform specific tasks related to the publishing process.
- Assist students in becoming responsible information intermediaries and in adding value to the production and dissemination of content.
- Make students aware of the social, ethical and legal responsibilities involved in the publishing process.

Career possibilities

A variety of career opportunities are available in the book publishing industry, the book retail industry and the corporate publishing environment. Content production for media houses, including magazines and other content creators is also possible. Goal-orientated candidates can become part of this highly competitive environment at entrance level. On-the-job experience will be needed for subsequent career development.

Some entrance-level career opportunities include the following:

- assisting specific role-players in the publishing value chain (for example, the managing director of a media house, commissioning editor; or the editorial, production or marketing manager)
- market or picture research
- copyright negotiations
- copy-editing and proofreading
- marketing and promotion
- distribution and delivery

These career opportunities are available at the following places:

- local and international book publishing houses
- bookshops and e-commerce vendors, journals, newspapers or magazines
- the media and publicity industries
- national and local government departments
- the corporate and business environment
- civil society
- community-based publication initiatives
- self-publishing and consultancy

Duration of the programme

The BIS (Publishing) takes a minimum of three years to complete.

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First year	
First semester	**Second semester**
Fundamental modules ▪ Academic information management ▪ Academic literacy levels ▪ Visual culture studies	**Fundamental modules** ▪ Academic literacy levels ▪ English for specific purposes
Core modules Information science ▪ Introduction to information science ▪ Personal information management ▪ Publishing: Introduction to publishing Marketing	**Core modules** Information science ▪ Information and communication technology Publishing ▪ The book publishing environment ▪ Visual culture studies Marketing
Elective modules Select a modern language of your choice in consultation with the package organiser.	**Elective modules** Select a modern language of your choice in consultation with the package organiser.

Second year	
First semester	**Second semester**
Fundamental module ▪ Community-based project	**Fundamental module** ▪ Community-based project
Core modules Information science ▪ Social and ethical impact Publishing ▪ Copy-editing Type, image and applications	**Core modules** Publishing ▪ The visual and production dimensions of publishing Text design
Elective modules Continue with the same language as selected previously and select modules in consultation with the package organiser.	**Elective modules** Continue with the same language as selected previously and select modules in consultation with the package organiser

Third year	
First semester	**Second semester**
Core modules Publishing ▪ Publishing in the digital environment ▪ Commissioning	**Core modules** Publishing ▪ Management in the publishing environment ▪ Publishing in the magazine and corporate environment
Elective modules Continue with the same language as selected previously and select one semester module in consultation with the package organiser. It can be a first- or second-semester module.	

Community-based Project Module

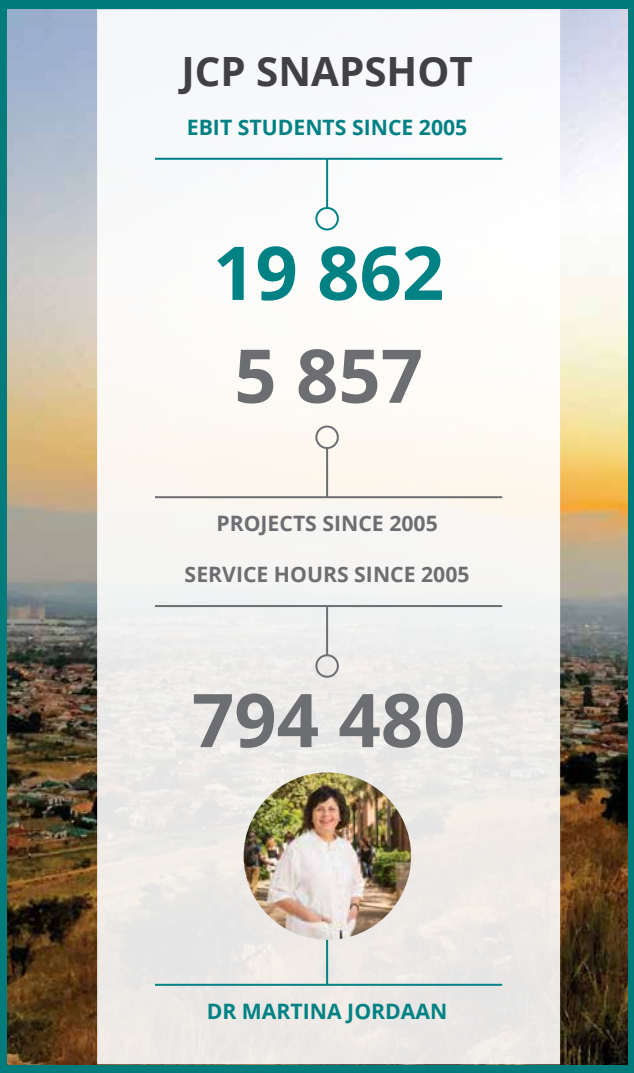
EBIT Community Engagement

The ability of EBIT students to operate in a complex and multicultural environment is strengthened by their participation in the compulsory undergraduate Community-based Project Module (JCP). The establishment of this module in February 2005 was a milestone for the Faculty. The aim of the module is to initiate community projects that make a positive impact on society.

JCP

The JCP module is an essential part of the curriculum of all undergraduate programmes in the Faculty, as it accommodates the need for community service and service-learning projects in a higher education environment. Through this module, students engage with a section of society that is different from their own social backgrounds. The goal is for students to develop an awareness of personal, social and cultural values, as well as multidisciplinary and life skills, like communication, interpersonal and leadership skills. The module requires students to dedicate 40 hours of their time to a project that they plan and execute, after which they make a YouTube video of the project. JCP students and alumni also collaborate with the UP Chapter of Engineers Without Boarders (EWB-UP) on a range of community projects. The JCP module is headed by Dr Martina Jordaan, and has won numerous awards for excellence in service learning.

Community Based
Project



Urban citizenship

In 2017, EBIT's Department of Architecture managed to align all year groups to an investigation into a group of early childhood development centres in Mamelodi, in collaboration with students involved in the Foundation Programme on UP's Mamelodi Campus. This inter-faculty collaboration supports the ethos of urban citizenship in both EBIT students and the communities they serve. The Department has proposed the establishment of a Unit for Urban Citizenship as a vehicle through which collaborative community engagement work can be developed and researched.

Infographic

Faculty of Engineering, Built Environment and Information Technology

TOP 0.5% worldwide

Top 0.5%
EBIT ranks in the top 0.5% of Engineering Schools worldwide according to the 2018 ISI Essential Science Indicator.

3
EBIT has three National Research Foundation (NRF) A-rated researchers.

28%
Twenty-eight percent of South African Engineers have graduated from our Faculty at the University of Pretoria

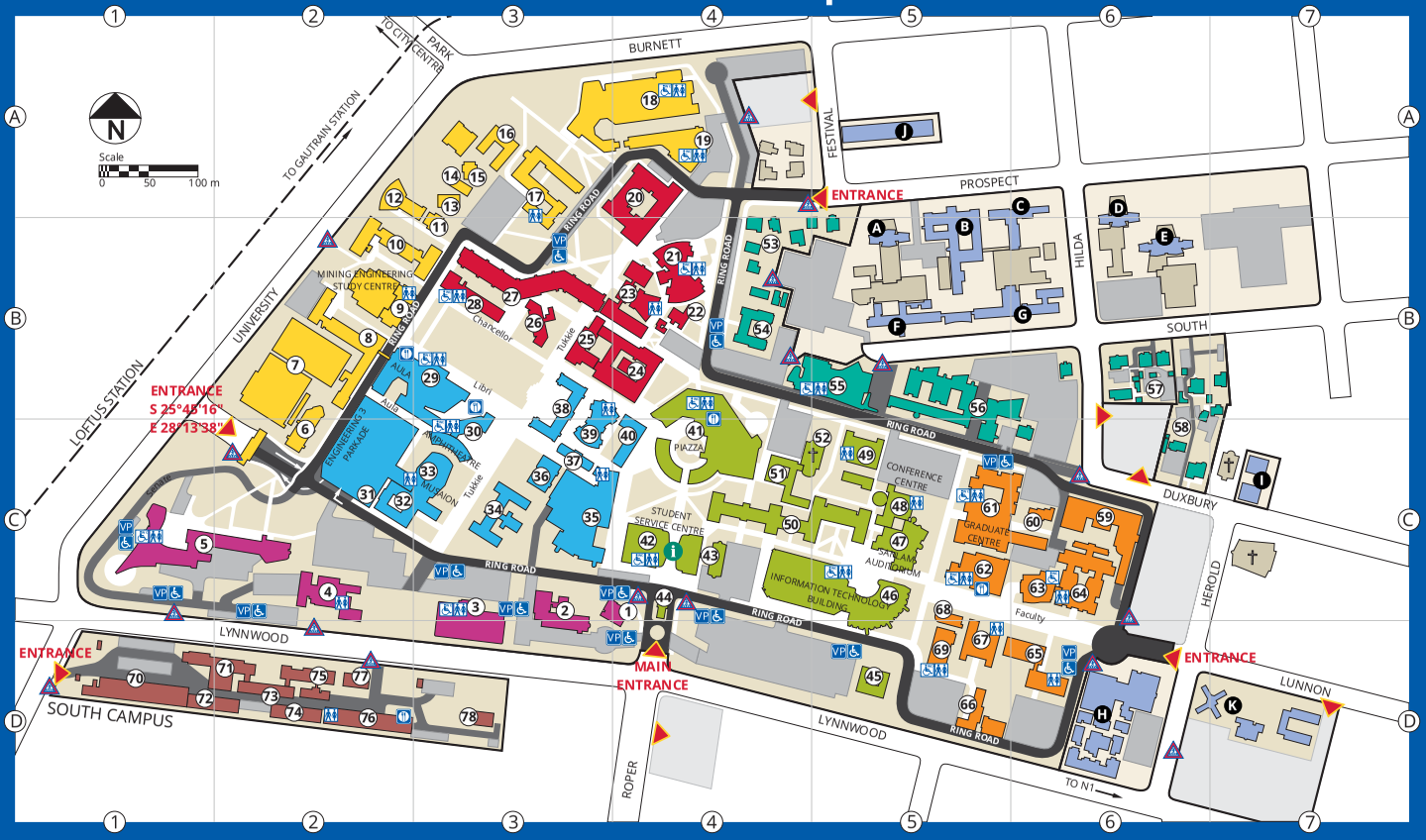
30
EBIT has 30 cutting edge research chairs and entities such as the Chair for Artificial Intelligence, the Chair for Machine Learning and the Chair for Data Science.

Top 200
In the 2018 QS global rankings, the Department of Architecture and the School for the Built Environment rank in the top 200 globally.

Top 375
In the 2018 QS global rankings, EBIT ranks in the top 375.

Class of 2018
1990 EBIT students graduated in April 2018

Hatfield Campus - S 25° 45' 22" E 28° 13' 52"



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

- UP Buildings
- UP Residences / Accommodation
- Other Buildings
- Ring Road
- Walkways
- Roads
- Parking
- Visitors' Parking
- Parking for Disabled Persons
- Student Parking
- Vehicle Access
- Pedestrian Entry
- UP Information Desk
- Public Toilets
- Toilets for Disabled Persons
- Retail and Dining Facilities

BUILDINGS																			
60	67 Duxbury Road	C6	76	Building 7 (South Campus)	D2	8	Engineering 2 Building	B2	39	Louw Lecture Hall (Chancellor's Building)	C3	38	Old Arts Building	B3	53	Student Organisations	B4	RESIDENCES	
5	Administration Building	C1	77	Building 8 (South Campus)	D2	31	Engineering 3 Building	C2	37	Marketing Services Building	C3	26	Old College House	B3	42	Student Service Centre	C4	A	Erika B5
12	AE du Toit Auditorium and Annexe	A2	78	Building 9 (South Campus)	D3	64	FABI 1	C6	40	Old Chemistry Building	C4	43	Student Service Centre Building	C4	B	Vergeet-my-nie B5			
67	Agriculture Annexe	D5	3	Building Sciences Building	C3	63	FABI 2	C6	69	Masker Theatre	D5	36	Old Merensky Library	C3	18	Technical Services Building	A4	C	Asterhof A6
65	Agricultural Sciences Building	D6	6	CEFIM Building	A3	25	Geography Building	B3	17	Mathematics Building	A3	59	Plant Sciences Complex	C6	39	Te Water Lecture Hall		D	Madelief A6
33	Amphitheatre and Musaion	C3	55	Centenary Building	B5	61	Graduate Centre	C5	10	Mineral Sciences Building	B2	58	Residence Affairs & Accommodation	C6		(Chancellor's Building)	C3	E	Magrietjie B6
29	Aula and Rautenbach Hall	B3	39	Chancellor's Building	C3	7	Heavy Machinery Laboratories	B2	35	Merensky 2 Library	C3	34	Theology Building	C3	F	Klaradyn B5			
15	Bateman Building	A3	52	Chapel	C5	62	Huis en Haard	C5	49	Monastery Hall	C5	21	Thuto Building	B4	G	Jasmyn B6			
16	Botany Building	A3	23	Chemistry Building	C2	42	Humanities Building	C4	39	Muller Lecture Hall (Chancellor's Building)	C3	51	Tukkiewerf	C4	H	Nerina D6			
70	Building 1 (South Campus)	D1	30	Club Hall	C3	46	Information Technology Building	C5	47	Sanlam Auditorium (Lecture Halls E&MS)	C5	54	Roosmaryn	B4	I	Protea C7			
71	Building 2 (South Campus)	D2	2	Communication Pathology Building	C3	68	JJ Theron Lecture Hall	C5	39	Van der Bijl Lecture Hall (Chancellor's Building)	C3	J	Jakaranda A5						
72	Building 3 (South Campus)	D1	48	Conference Centre	C5	1	Kya Rosa	C4	33	Musaion and Amphitheatre	C3	19	Sci-Enza Centre	A4	11	Van der Graaf Accelerator	B3	K	Xyata D7
73	Building 4 (South Campus)	D2	45	Drama Building	D5	32	Music Building	C2	27	Natural Sciences 1 Building	B3	23	South Hall (Chemistry Building)	B4	14	Vetman Building	A3		
74	Building 5 (South Campus)	D2	50	Economic and Management Sciences Building	C4	56	Law Building	B5	28	Natural Sciences 2 Building	B3	13	Stoneman Building	A3	44	Visitors' Reception	C4		
75	Building 6 (South Campus)	D2	9	Engineering 1 Building	B2	57	Law Clinic	B6	23	North Hall (Chemistry Building)	B4	41	Student Centre Building	C4	4	Visual Arts Building	C2		
						47	Lecture Halls (EMS)	C5	20	Old Agriculture Building	A4	22	Student Health Services	B4	24	Zoology Building	B4		
						66	Lier Theatre	D5											

UP EMERGENCY NUMBER
012 420 2310 /
0800 0064 28

Map updated July 2018

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