Faculty of Engineering, Built Environment and Information Technology

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

www.up.ac.za/ebit

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Note: The minimum admission requirements reflected in this brochure are subject to changes in regulations relating to COVID-19. Amendments will reflect in the digital version of this brochure, which can be downloaded from **www.up.ac.za/programmes > Undergraduate > Faculty brochures**.

2023

UNDERGRADUATE FACULTY BROCHURE

Make today matter

Message from the Dean

Get ready for a dynamic digital future. As we take our place on the front line of innovation, the Faculty of Engineering, Built Environment and Information Technology (EBIT) at the University of Pretoria is preparing to tackle the challenges of the future with a generation of problem-solvers and innovators who are ready to change the world.

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

Our slogan, *Innovating our Tomorrow*, amplifies our thought leadership to stay relevant, to be globally competitive, to re-invent ourselves and to deliver graduates who will be ready to embrace the disruptive unknown with an awakened mind. By encouraging students to embrace disruptive technologies, we are preparing them for a new world beyond university; one that has been shaped by the principles of a post-pandemic way of life, work and education.

To ensure that we remain globally competitive in the Fourth Industrial Revolution (4IR), while maintaining our place as an innovation leader, we actively collaborate with international universities, government departments and industry. Our focus is on producing high-quality research to make UP a leading research-intensive university.

EBIT has more than 30 research chairs and entities, which attracts high-quality students and researchers. Our work relates to fields such as artificial intelligence (AI), big data science, robotics, machine learning, green buildings planning and construction, urban citizenship, information and communications technology (ICT), technology innovation, water and environmental engineering, green energy, minerals and materials beneficiation, smart cities and intelligent transportation.

Our Faculty is one of the few in Africa to feature among the top 500 in the world in six subject areas in the 2021 QS World University Rankings by Subject, and our School of Engineering is ranked 356th out of more than 10 000 engineering schools in the field of engineering and technology. Our programmes in electrical and electronic engineering continue to feature at the top of all South African universities. We are also particularly proud of the recognition received by our programmes in mineral and mining engineering, which have been ranked among the top 50 world-wide. In addition, the Minerals Education Trust Fund (METF) has named our programme in metallurgical engineering as the best in the country.

Through our close ties with industry partners, we continuously search for collaboration opportunities to enhance the relevance of our academic programmes and enable our students to acquire scarce and highly specialised skills. This is why our graduates are in high demand.

Our students can now also start their own businesses on campus through the high-tech business incubator, TuksNovation.

We also continuously improve our teaching and learning activities to help our students to succeed in their studies. Our academic staff go to great lengths to bring the world of work to the lecture room. EBIT offers 23 undergraduate degree programmes, and our degrees are accredited by national and international statutory and professional bodies. We follow a hybrid teaching model and we have superb laboratory facilities. Learning is facilitated by a motivated team consisting of dedicated academics, supported by highly competent administrative staff and student advisors.

The Faculty strives to accommodate as many students as possible who meet the admission criteria. Since places are limited, we recommend that learners who excel in their studies apply early. Prospective students are also encouraged to visit our website for further information and to submit their online applications without delay. We look forward to receiving your application to join one of our degree programmes for an enriching and rewarding experience in EBIT. I will be delighted to welcome you in 2023!

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

Congratulations to Prof Eloff who is the Acting Dean for the Faculty of Engineering, Built Environment and Information Technology. Prof Maharaj is currently the Acting Vice-Principal: Research and Postgraduate Studies.

Email linda.king@up.ac.za

Read more here: www.linkedin.com/showcase/69770752/admin

Content

Information systems   Uwaiza Abdool Sattar

The thrill of knowledge

'Looking at the mesmerising world and listening to the voices of the people around me made me wonder where I will eventually fit in and what my contribution will be. I have come a long way since mumbling my first few words, forcefully crawling towards my most wanted toy and taking my first steps. The life cycle starts slowly, but with effort great heights can be achieved.

After completing school, I enrolled at the University of Pretoria to study information technology. Suddenly, I was surrounded by career-driven students walking haphazardly into lecture rooms, voices echoing in hallways, and students anxiously searching for information in the libraries.

I AM a final-year BIT (Information Systems) student. This degree offers exciting opportunities in the new digital economy. I want to pursue my dream of becoming a systems analyst and driving the development and design of different systems that will improve the productivity of various businesses and organisations. The programme is constantly changing as a result of continuous innovation, and the consequent availability of new tools, resources and techniques.

As an EBIT student, I have been granted the opportunity to take on various leadership roles. In my second year, I had the privilege of serving as the Secretary of the JuniorTukkie Student Ambassadors Society and of EBIT House. This year, I am the Chairperson of EBIT House and the SRC Academics Representative. These roles have taught me the value of good human relations, team-building skills and the fostering of potential.
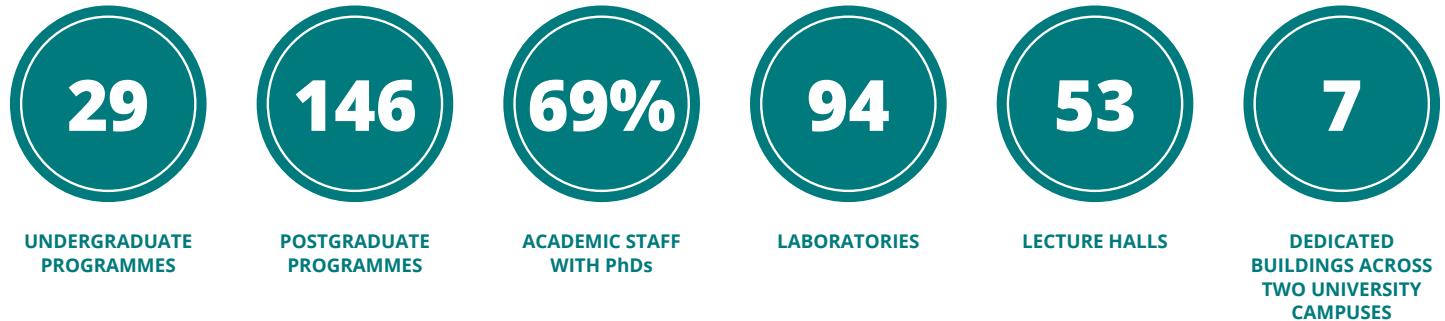
IAMEBIT

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The Science Technology Engineering and Mathematics (STEM) programme promotes creativity and encourages leaders to take risks in applying their knowledge. This will assist in developing problem-solving analysis and encourage adaptation to different scenarios. Programmes like these increase students' confidence and encourage them to tackle problems with determination to become next-generation innovators.

Innovation is the gift that keeps on giving and is revolutionising the world. It is the result of continuous inspiring ideas, processes and developments and keeps everyone on the edge of their seats. My dream for Africa is that its people should feel valued and proud, standing hand-in-hand in unity despite their differences. We should accept our flaws, celebrate our successes and bring forth a remarkable generation. Africa has a rich cultural and ethnic diversity, a unique heritage and much more. I would like to contribute to ensuring a better life for all and the dissemination of knowledge that will equip people to make remarkable contributions.Everyone has the potential to make a difference, and today is the day to take the first step!'

29	**146**	**69%**	**94**	**53**	**7**
UNDERGRADUATE PROGRAMMES	POSTGRADUATE PROGRAMMES	ACADEMIC STAFF WITH PhDs	LABORATORIES	LECTURE HALLS	DEDICATED BUILDINGS ACROSS TWO UNIVERSITY CAMPUSES

Undergraduate programmes

Important information for all prospective students for 2023

- The admission requirements and general information in this brochure apply to students who apply for admission to the University of Pretoria with a National Senior Certificate (NSC) and Independent Examination Board (IEB) qualifications.
- Applicants with qualifications other than the abovementioned should refer to:
  - **Brochure:** *Undergraduate Programme Information 2023: Qualifications other than the NSC and IEB*, available at www.up.ac.za/programmes > Undergraduate > Admission information.
  - **Brochure:** *Newcomers Guide 2022*, available at www.up.ac.za/programmes > Undergraduate > Admission information.
  - **Website:** www.up.ac.za/international-cooperation-division.
- **School of Tomorrow (SOT) and Accelerated Christian Education (ACE):** The University of Pretoria no longer accepts qualifications awarded by these institutions.
- **General Education Development (GED):** South African GED graduates who graduated up to 2019 may be considered for admission provided they qualify for an exemption certificate issued by USAf and comply with university admission requirements, as well as faculty subject requirements. South African GED graduates who graduated after 2019 cannot be considered for admission to UP as the diploma is not accredited by USAf and will not be considered for exemption. Applicants from the USA who completed the GED may apply for a Foreign Conditional Exemption Certificate issued by USAf accompanied by their SAT/TOEFL/IELTS results.
- **National Certificate (Vocational) (NCV) Level 4:** The University of Pretoria may consider NCV candidates, provided they meet the exemption for bachelor's status criteria and the programme requirements.

Important faculty-specific information on undergraduate programmes for 2023

The closing date for all selection programmes is **30 June 2022**. The University of Pretoria has decided not to set a specific closing date for applications to non-selection programmes for 2023. Applications will close when the available study spaces are filled (**close on availability of space**). Once the available number of study places for a specific programme are filled, no further applications for that particular programme will be considered. All applicants are therefore strongly advised and encouraged to submit their applications as soon as possible after 1 April 2022 and to check the application site (UP Student Portal) regularly.

- The following persons will be considered for admission: Candidates who have a certificate that is deemed by the University to be equivalent to the required National Senior Certificate (NSC) 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 for the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out in the table below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is guaranteed only if a prospective student complies with ALL the requirements as indicated in the undergraduate minimum admission requirements table on page 2.
- Admission to ENGAGE in the School of Engineering will be determined by the NSC results, achievement levels of 5 for Mathematics, Physical Sciences and English, and an APS OF 30.
- Students may apply directly to be considered for the ENGAGE programme.
- All modules will be presented in English, as English is the language of tuition, communication and correspondence.

Second-choice programme: Should your Admission Point Score (APS) adhere to our entrance requirements for our engineering programmes, and you are not accepted for your first-choice programme, then please consider an alternative engineering programme as your second-choice programme. If your APS does not meet the entrance requirements, then consider the second-choice programme indicated in the tables on pages 2-5.

Accreditation: The various programmes in the School of Engineering are accredited by the Engineering Council of South Africa (ECSA), and our degrees meet the requirements for professional engineers in South Africa. All our programmes in the School for the Built Environment are internationally recognised and accredited by their respective statutory councils, allowing students to register as members of their chosen professions. All the degree offerings in the School of Information Technology (SIT) are highly sought after in the IT industry with a focus on industry-related trends. The curriculum conforms to the highest international standards. We are very proud to be a member of the iSchools Organisation. We are the only IT School in South Africa with Accreditation Board for Engineering & Technology (ABET) rating.

Undergraduate programmes

University of Pretoria website   www.up.ac.za/ebit

Programmes	Minimum requirements for NSC and IEB for 2023			
	Achievement level			
SCHOOL OF ENGINEERING	English Home Language or English First Additional Language	Mathematics	Physical Sciences	APS
BEng (Industrial Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Industrial Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
Careers: Industrial engineers design, test, implement and manage a wide range of man/machine systems for production and the delivery of 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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Chemical Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
Careers: Chemical engineers are involved in industrial processes that convert raw materials to products with a higher economic value. This is achieved using 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, and environmental engineering activities, including air pollution control. Like those in 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, and the marketing and distribution of the final products.				
BEng (Civil Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Civil Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
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, waterworks 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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Electrical Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
Careers: Electrical engineers are active in the generation, storage, transmission, distribution and utilisation of electrical energy. There is a bright 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 all fall within the scope of electrical engineering.				
BEng (Electronic Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Electronic Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
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 (EEGs), electrocardiograms (ECGs), rehabilitation engineering and biokinetics), integrated circuit design, bioengineering, military equipment design (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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Mechanical Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
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 the 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).				

Undergraduate programmes

Programmes	Minimum requirements for NSC and IEB for 2023			
	Achievement level			
SCHOOL OF ENGINEERING	**English Home Language or English First Additional Language**	**Mathematics**	**Physical Sciences**	**APS**
BEng (Metallurgical Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Metallurgical Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
Careers: Metallurgical engineers unlock the riches of deposits of metal ores and minerals and optimise the manufacture and performance of metallic components. You'll find metallurgical engineers where valuable minerals are recovered from ore, where metals are produced from the minerals and where the metals are converted into useful materials as well as into high-performance products. Areas of specialisation include minerals processing, extractive metallurgy, materials engineering and performance, advanced manufacturing processes, including laser-assisted additive manufacturing and welding, as well as failure analysis and forensic engineering.				
BEng (Mining Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Mining Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
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, financial evaluation of mines, 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 and international levels.				
BEng (Computer Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Computer Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics) if your APS and subject requirements of your first-choice programme are not obtained.				
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) ENGAGE is a supporting programme for Engineering disciplines [5 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	5	**30**
For advice on a second-choice programme, please consult a Student Advisor. To make an appointment, send an email to carol.bosch@up.ac.za.				

Note: The admission requirements above are relevant to prospective students who will commence their studies in 2023.
Admission to ENGAGE in the School of Engineering will be determined by the NSC results, achievement levels of 5 for Mathematics, Physical Sciences and English, and an APS OF 30.
2022 entries, will be determined by NSC results, achievement levels of 5 for Mathematics, Physical Sciences and English, and an APS of minimum 30.
The National Benchmark Test (NBT) is no longer a requirement for any undergraduate programme in 2023.

Undergraduate programmes

Programmes	Minimum requirements for NSC and IEB for 2023			
	Achievement level			**APS**
SCHOOL FOR THE BUILT ENVIRONMENT	**English Home Language or English First Additional Language**	**Mathematics**	**Physical Sciences**	
BSc (Architecture) [3 years] **Closing date:** 30 June	5	4	4	**27**
For advice on a second-choice programme, please consult a Student Advisor. To make an appointment, send an email to carol.bosch@up.ac.za.				
Will only be considered as first study choice. 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 (Construction Management) [3 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	or Accounting / 4	**30**
The suggested second-choice programme for BSc (Construction Management) is BSc (Real Estate).				
Careers: After completing the three-year undergraduate degree programme, graduates could enter careers in, among others, construction site management or subcontracting. On completion of the ensuing one-year honours programme, graduates can 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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	or Accounting / 4	**30**
The suggested second-choice programme for BSc (Real Estate) is BCom (Investment Management).				
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 entire 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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	or Accounting / 4	**30**
The suggested second-choice programmes for BSc (Quantity Surveying) are BSc (Construction Management) and BSc (Real Estate).				
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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	4	-	**27**
For advice on a second-choice programme, please consult a Student Advisor. To make an appointment, send an email to carol.bosch@up.ac.za.				
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 sectors, the majority are employed by government, research agencies (such as the Council for Scientific and 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.				

Undergraduate programmes

Programmes	Minimum requirements for NSC and IEB for 2023		
	Achievement level		
SCHOOL OF INFORMATION TECHNOLOGY	**English Home Language or English First Additional Language**	**Mathematics**	**APS**
BIT (Information Systems) [3 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	**30**
The suggested second-choice programme for BIT (Information Systems) is BIS (Information Science).			
This programme is administered by the Faculty of Engineering, Built Environment and Information Technology. **Careers:** Data scientist, IT auditor, IT entrepreneur, IT tax specialist, e-business consultant, programmer, business analyst, project manager, CIO, CTO and knowledge manager			
BSc (Computer Science) [3 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	**30**
The suggested second-choice programmes for BSc (Computer Science) are BSc (Information and Knowledge Systems) and BCom (Informatics).			
Careers: Programmers, systems analysts, systems architects, consultants, database administrators, network analysts and researchers			
BIS (Multimedia) [3 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	4	5	**30**
The suggested second-choice programmes for BIS (Multimedia) are BIS (Information Science), BIS (Publishing), BSc (Information and Knowledge Systems) and BCom (Informatics).			
Careers: Programmers, web designers, animation specialists, video editors and 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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	4	5	**30**
The suggested second-choice programme for BSc (Information and Knowledge Systems) is BSc (Computer Science).			
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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	4	-	**28**
The suggested second-choice programmes for BIS (Information Science) are BIS (Publishing), BCom (Informatics) and BA.			
If informatics is selected as a subject at the 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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	-	**28**
The suggested second-choice programmes for BIS (Publishing) are BIS (Information Science), BA (Languages) and BA.			
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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	**30**
This programme is administered by the Faculty of Economic and Management Sciences.			
Careers: Data scientist, IT auditor, IT entrepreneur, IT tax specialist, e-business consultant, programmer, business analyst, project manager, CIO, CTO and knowledge manager			

Undergraduate programmes

Information Technology

Mathopatona Paballo Matabane

'I AM a BIT student at the University of Pretoria. I come from Lebowakgomo in Limpopo, and only knew IT as programming games or websites. However, studying in this field has exposed me to different IT disciplines, such as informatics, information science and computer science. I was triggered by the flexibility of the BIT degree, because one can pursue any career in the IT industry, from becoming a programmer to becoming an analyst of data, businesses or systems. The industry-based learning programming in your third year really prepares you for the challenges and complexities you will face in industry.

I can now apply my IT skills in any business or industrial environment. My studies have taught me to integrate IT in the business sector, and my final-year project has taught me to approach companies to develop feasible systems. By joining various student structures on campus and within the Faculty, I have also developed leadership skills. EBIT has provided me with the support structure and the stability I needed to focus on my studies.'

IAM**EBIT**

#ChooseUP

MULTIMEDIA

Student life

Although the Faculty expects total commitment from its students with regard to their academic work, it encourages them to actively participate in university student life. This supports the development of well-rounded future leaders.

The University hosts a wide range of student life activities through campus organisations like the Student Representative Council (SRC), Student Culture (STUKU), the Student Sport Committee (SSC) and RAG.

EBIT HOUSE

All the Faculty's students automatically become part of EBIT House, which represents students and acts as a communication channel between the Faculty and its students. Within EBIT House, students can find a variety of discipline-specific sub-houses through which to become involved in more specialised student activities.

f EBIT House

Online application process for studies in 2023

Please read through all the steps below to determine which actions are relevant for your application to study at the University of Pretoria in 2023. Citizens from countries other than South Africa* should also take note of the steps below with specific reference to the important information above the tables in the brochure: Undergraduate programme information for National Senior Certificate (NSC) and Independent Examination Board (IEB) available at www.up.ac.za/programmes > Undergraduate > Admission information.

1 Choose a programme

Read about all undergraduate programmes offered at UP in the brochure:
Undergraduate programme information for National Senior Certificate (NSC) and Independent Examination Board (IEB) available at www.up.ac.za/programmes > Undergraduate > Admission information.

- It is important to indicate a first- as well as a second-choice programme on your Online Application. The Online Application Form only makes provision for two study choices. If you want to add a third choice, or if you want to change your study choice after you have already submitted your online application, please forward your request to ssc@up.ac.za.
- Your second-choice programme will automatically be considered should your application for your first-choice programme be unsuccessful or if your first choice is a selection programme.
More information is available at www.up.ac.za/programmes > Undergraduate > Admission information.

- Ensure that your first- and second-choice programmes meet the minimum admission requirements as well as the faculty's selection guidelines.
- Please note that certain programmes will not be considered if indicated as your second choice. Refer to the faculty tables in the abovementioned brochure available at www.up.ac.za/programmes > Undergraduate > Admission information.
- For study advice, make an appointment with a Student Advisor via Ms Carol Bosch at carol.bosch@up.ac.za.

2 Tuition and residence fees

For more information on tuition and residence fees, go to www.up.ac.za/article/2749200/fees-and-funding.

- **Fee quotation:** Please go to www.up.ac.za/student-fees to get an estimation of the study fees for the programme/s that you are interested in.
- **Family discount:** When two or more dependent children of the same family are registered simultaneously at the University of Pretoria, they may apply for a rebate on tuition fees.
- **The 2.5% discount:** If the student account is paid in full (ie 100%) by 30 April, a 2.5% discount is applicable.
- **Initial payment:** This payment is not an additional amount payable, but the first payment towards the tuition fees.
- **Residence reservation fee:** This fee will be payable within 30 days after

placement in a UP residence. For residence room fees, go to www.up.ac.za/accommodation.
- **Fees paid by bursaries:** Students must submit written proof from the sponsor of the bursary awarded to them prior to registration, otherwise they are responsible for the initial payment. The final decision regarding the acceptance of a bursary letter rests with the University.
- **How and where to pay:** We encourage you to make EFT or Credit card payments. Please allow at least 5 working days for the payment to reflect on your student account.
- **UP banking details:** Refer to www.up.ac.za/student-fees/article/2735940/up-bank-details.
More information is available at www.up.ac.za/student-fees.

3 Apply to study at UP in 2023

Apply ONLINE at www.up.ac.za/apply from 1 April in the year preceding studies.

- The closing date for all selection programmes is **30 June 2022**. The University of Pretoria has decided not to set a specific closing date for applications to non-selection programmes for 2023. Applications will close when the available study spaces are filled (**close on availability of space**). Once the available number of study places for a specific programme are filled, no further applications for that particular programme will be considered. All applicants are therefore strongly advised and encouraged to submit their applications as soon as possible after 1 April 2022 and to check the application site (UP Student Portal) regularly.
- Before you start to complete the Online Application, please watch an online application demonstration at www.up.ac.za/juniortukkie > Study at UP.

- Ensure that the email address that you indicate on your Online Application is correct as your temporary password and T-number will be sent to this email address.
- Ensure that you apply before the closing dates of both your first- and second-choice programmes. The closing dates are indicated in the faculty tables or go to www.up.ac.za/online-application > Closing dates.
- You will receive your student number within 10 working days after you have submitted your Online Application.
- On receipt of your student number, you will be able to track your application status on the UP Student Portal. Refer to Step 7 for instructions on how to gain access to your UP Student Portal.

4 Apply for residence placement

The Online Application has a section to be completed if you are interested in residence placement.

- Residence placement is based on academic merit and date of application.
- The demand for accommodation by far exceeds the available spaces. Applications open on 1 April 2022. The earlier you apply the better your chances.
- Preference is given to students with an academic average of 70% and above.
More information is available at www.up.ac.za/accommodation.

- Academic achievers will receive guaranteed residence placement if they meet the following criteria:
  – applied before 1 May in the year preceding studies;
  – obtained a minimum average of 85% in the examination with which the student applies to study at UP; and
  – received conditional admission to a study programme.

5 Apply for bursaries and loans

Visit the relevant website for closing dates.

UP bursaries and loans
- Applications must be submitted via the UP Student Portal or www.up.ac.za/fees-and-funding. No late applications will be accepted.
- UP sports bursaries: www.up.ac.za/sport

National Student Financial Aid Scheme (NSFAS)
- For applications and comprehensive information, visit www.nsfas.org.za.

Fundi (previously known as Eduloan)
As a registered credit provider, Fundi covers a wide range of student-related necessities such as books, accessories, laptops, university and private accommodation, as well as study tuition with a fixed monthly instalment. Anyone can apply for a loan (students, parents or guardians), provided that the applicant is in full-time employment or has a registered business. For more information, visit www.fundi.co.za.

Other bursary options
- Bursaries according to field of study: www.gostudy.mobi
- The Bursary Register: Contact rlevin@mweb.co.za or +27 (0)11 672 6559

*Applicants who are not South African citizens.

Online application process for studies in 2023

6 National Benchmark Test (NBT)

The National Benchmark Test (NBT) is not required for any undergraduate programme in 2023.

7 How to access the UP Student Portal

Go to www.up.ac.za and click on My UP Login.

Note: A T-number is a temporary number and NOT a student number. This T-number is issued to the applicant at the beginning of the Online Application process. An applicant will receive a UP student number within 10 working days after his/her application has been submitted successfully.

Applicants will only be able to access the UP Student Portal once they have received a UP student number, eg u23123456.

Please watch a video demonstration on: 'How to access the UP Student Portal' at https://youtu.be/Yd4pWr8IvNk.

Go to www1.up.ac.za and click on the "New user" link.
- Type in your Username (u followed by your student number) and your National ID or Passport number. Click the "Proceed" button.

- Set up your new password and confirm the password in the second block. Click the "Proceed" button.
- A message is displayed to inform the user that the password was set successfully. Click the "OK" button.
- A list of challenge questions appears. Select any three of these challenge questions and then click on the "Submit" button. Enter your answer on the three challenge questions you chose and click on the "Save" button.
- A message will be displayed to inform you that your challenge questions have been set up. Click the "OK" button.
- You are now ready to access the UP Student Portal.
- Sign in again with your username and password.

8 Veterinary Science Value-added Form (VSVAF) and Veterinary Nurse Value-added Form (VNVAF)

- These documents will be made available on the UP Student Portal, only for prospective students in the Faculty of Veterinary Science, who meet the minimum admission requirements. Visit the UP Student Portal regularly for notices in this regard.
- For detailed information about the VSVAF and VNVAF, please refer to the Faculty of Veterinary Science undergraduate brochure at www.up.ac.za/programmes > Undergraduate > Faculty brochures.

- Be sure to complete and submit the relevant document before the due date. The Faculty will communicate the due date to applicants on the UP Student Portal under "Communications".
- **Enquiries may be directed to ssc@up.ac.za.**

9 UP Student Contract

Before a student will be able to register, a contract needs to be concluded between the student and the University of Pretoria.

- Students must access the contract online on the UP Student Portal at www.up.ac.za > My UP Login.
- The contract should be completed online, and then printed and signed.
- Due to COVID-19 restrictions, clients are not allowed onto campus yet.
  - We however have a contract drop-off box at Security at the following entrances to the Hatfield Campus: Prospect Street, Roper Street, University Road, where your completed and signed original contract can be dropped off.

- You can also post your contract to the Student Service Centre, University of Pretoria, Private Bag X20, Hatfield, 0028.
- Or you can courier your contract to University of Pretoria (Contracts), University Road entrance, Hatfield, Pretoria, 0083.
- The University of Pretoria does not accept faxed, scanned or emailed contracts.
- Before you start to complete the UP Student Contract, please watch a video demonstration on 'How to complete the UP Student Contract' at www.up.ac.za/juniortukkie > Study at UP.

10 Orientation and Registration for new first-year students

- The Orientation Programme will be available on www.up.ac.za/orientation by the end of December 2022.

- Online Registration information will be available on www.up.ac.za/online-registration by the end of December 2022.

11 Special package offer to academic achievers

The special package offer to new first-year students is based on the academic average percentage obtained in the final school year end examination.

The special package offer includes:
- Guaranteed achievement awards (FLY@UP Assist First-year awards) to students who qualify.
- Guaranteed admission to first- or second-choice non-selection programmes for prospective students with an academic average percentage of between 85% and 100%, if the application is received no later than 1 May of the year preceding commencement of studies.

- Guaranteed placement in a UP residence to prospective students with an academic average percentage of between 85% and 100% if:
  - your application is received no later than 1 May of the year preceding commencement of studies; and
  - you have been conditionally admitted to a programme.

More information is available at www.up.ac.za/student-funding > Fly@UP Assist 1st Year Awards.

School of Engineering

School of Engineering: Highlights

The Engineering Council of South Africa has granted all programmes offered by the School of Engineering at the University of Pretoria accreditation. The School is one of the largest of its kind in the country in terms of student numbers, graduates and research contributions. It offers programmes in all the major engineering disciplines. Many specialisations are also offered at both the undergraduate and postgraduate levels.

Through the innovative and relevant research undertaken in its seven departments, the School of Engineering provides its students with the necessary training to enable them 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 maintains close ties with industry through several research chairs in all its departments. These include chairs in **Maintenance Engineering, Pyrometallurgy, Fluoro-material Science and Process Integration, Carbon Technology and Materials, Reaction Engineering, Water Utilisation and Environmental Engineering, Railway Engineering, Industry Leadership 4.0 and Broadband Multimedia Communications.** It also has a number of research centres and institutes, 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, the SAIW Centre for Welding Engineering 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 worldwide.

School of Engineering

Department of Chemical Engineering

BEng (Chemical Engineering)

What does the programme entail?

The American Institution of Chemical Engineers (AICHE) defines chemical engineering as a branch of engineering that is concerned with the application of physical and natural sciences that is gained through study, experience, and practice with good judgment to develop economic ways of using materials and energy for the benefit of humankind. Thus the discipline involves all aspects of the industrial processes that, in the broadest sense, convert raw materials into higher-value products using combinations of physical, chemical, thermal, biochemical and mechanical changes.

The programme provides you with the necessary foundation to ensure that once you graduate, you will be able to make creative contributions to the world's ever-increasing needs by:

- converting natural resources into efficient and useable forms of energy;
- developing more durable, lighter and renewable materials;
- designing more efficient, environmentally friendly processing plants;
- applying biotechnology to convert raw materials into products in a sustainable way;
- designing processes to ensure that limited natural resources, such as water, can be reused; and
- leaving 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 the economic tenets when designing equipment so as to ensure lucrative processes that will 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 abovementioned needs.

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 development in the petroleum, minerals, paper, food and textile industries. These industries are collectively referred to as the process industries, which is why chemical engineers are often called process engineers. Water purification and water treatment, biorefinery/waste valorisation, the design and operation of such processes and the protection of the environment from pollution are further areas in which 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 using their detailed knowledge to manipulate the behaviour of molecules under very specific conditions applying their expertise to study and explain the effect of large chemical plants on a country's economy and 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, which are:

- 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; and
- manufacturing and marketing of equipment and products.

Chemical Engineering at UP

In addition to producing sought-after graduates in chemical engineering, we conduct research that has led to world-class contributions in water utilisation and environmental engineering, advanced materials development and applications, bioreaction engineering and 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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First year	
First semester	**Second semester**
- Graphical communication - Calculus - Physics - General chemistry - Chemical engineering - Humanities and social sciences 1	- Mathematics - Electricity and electronics - Statics - 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 people's lives and environments. This process entails research into the proposed facility, followed by 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.

Since these facilities have a long lifespan and a direct impact on the community and environment, 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 to design, build and maintain such facilities cost-effectively and to the benefit of humankind. Facilities designed by civil engineers form the infrastructure for wealth and job creation, for instance, in the manufacturing and housing industries.

The development of information technology and computer software that make continuous data collection, mathematical modelling and designs more effective has drastically changed the nature of civil engineering in that it enables civil engineers to concentrate on the more fundamental aspects of developmental work and design. Continuous evaluation of infrastructure health supports the extension of the functional life of infrastructure through its inputs into maintenance engineering. The worldwide trend towards environmental awareness increasingly impacts on the civil engineer's working

methods. Information technology, and environmental engineering and management, increasingly form a greater part of the 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 a career lifespan of from 40 to 50 years.

In 2020, the Department inaugurated its new Engineering 4.0 facility, which includes state-of-the-art laboratories and training facilities to support the training and education of the engineers of the future.

Contact information
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Website www.up.ac.za/civil-engineering

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

Second year	
First semester	**Second semester**
▪ Calculus ▪ Differential equations ▪ Strength of materials I ▪ Geology for engineering ▪ Programming and information technology ▪ Strength of materials II ▪ 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 ▪ Hydraulics ▪ Structural analysis ▪ Civil engineering economics ▪ Soil mechanics ▪ Timber design ▪ Civil engineering measurement techniques	▪ Hydraulics ▪ Geotechnical engineering ▪ Civil building materials ▪ Reinforced concrete design ▪ Transportation engineering ▪ Steel design

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 subdisciplines 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 systems, active suspension and anti-lock braking systems (ABSs), which all use the principles of sensing, computing and actuation under optimised software control. This is the fastest-growing new discipline in engineering, and job opportunities for graduates exist 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 (self-healing) networks.

A computer engineer has to be innovative and must keep abreast of new technologies and developments in both software and hardware. Some computer engineers move very quickly into management, where their analytical, synthetic, managerial and leadership skills enable them to reach the highest levels of corporate management.

The aim of computer engineering is to integrate electronics, 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 access to 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 the fields of communication, computer systems, networking and peace-keeping operations, and in medical, transportation, software and electronics companies in South Africa and all over the world. This provides opportunities for innovation: thinking of a problem to be solved and coming up with a solution and even possibly patenting the idea. The academic programme at the University of Pretoria prepares students to become 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 ▪ Statics ▪ 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

Electronic engineering

Armand Steyn

'**I AM** a BEng Electronic Engineering student at the University of Pretoria. My fascination in innovation and technology fuels my desire to constantly seek knowledge and expand my mind. EBIT not only enables, but also encourages this.

The manipulation of electricity to create technology is captivating and I've been able to experience this in action at the Department of Electrical, Electronic and Computer Engineering (EECE). The Faculty prioritises the overall development of its students. The academic staff members continually encourage us to strive beyond our limits. The Faculty is also incredibly interactive and hosts numerous events such as career exhibitions, health and fitness gatherings, and community outreaches.

My department offers world-class facilities to aid in our learning experience. One event I especially enjoyed was the highly anticipated annual robot race day, where I was a track official. Bearing witness to the knowledge acquired by the students to produce fully functioning microcontroller-based autonomous robotic vehicles was awe-inspiring. From my experience, the Faculty truly cares about and supports its students' progress in their studies.

I enjoy my course and look forward to my future learning experience. My dream is to bring innovative technology to the world and to further my knowledge in bioengineering technology in order to make a career out of it. EBIT is undoubtedly the best platform to bring this dream to fruition.'

IAMEBIT

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OF ENGINEERING SCHOOLS IN THE WORLD IN THE 2019 CLARIVATE ANALYTICS ESSENTIAL SCIENCE INDICATORS

School of Engineering

BEng (Electronic Engineering)

What does the programme entail?

Electronic engineering is one of the three internationally accepted and closely related subdisciplines in the traditional field of electrical engineering (electrical engineering, electronic engineering and computer engineering). Electronic engineering entails the vast and continuously 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 and upgrading old technologies.

An electronic engineer has a good understanding of the basic sciences and a sound education in the theoretical and practical aspects (including design methodology) of electronics and electronic engineering systems. The drastic increase in the development of new electronic systems globally makes it essential for electronic engineers to be well prepared for the work.

Our electronic engineering degree programme was developed over many years to provide exactly what the industry expects from such an engineer. This is an exciting world, and since the 'half-life' of microelectronics and photonics is only 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, television sets), 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 need to be innovative and have to ensure that they keep 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. Several of this Department's graduates have sold their ideas (patents) for vast sums.

Electronic engineering aims 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 nanoelectronics and microprocessors, digital signal processors (DSPs) and field-programmable gate arrays (FPGAs). Most electronic systems use a standard process of measurement (sensing) and calculate/compare/store information and controlled outputs (actuators) with extensive computing and communication power.

Career opportunities

Electronic engineering graduates have access to a wide range of job opportunities, which 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 South African electronics and microelectronics companies and research institutes (such as the CSIR), and at universities all over the world. Graduates in electronic engineering have the opportunity

to be innovative, ie to identify real-life problems and to come up with solutions, which they might be able to patent. The academic programme at the University of Pretoria prepares students to become 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 - Statics - 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

Infographic

Electrical, Electronic and Computer Engineering (EECE)

This is the largest department of its kind at a university in South Africa and we have the largest number of specialisation fields in electrical, electronic and computer engineering.

Electrical Engineering

Electrical Engineering focuses on the generation, distribution, conversion and efficient utilisation of electrical energy to the electrical grid; for industrial, commercial and residential applications; power line communications as well as coal-fired, hydro and nuclear power stations.

Electronic Engineering

Electronic Engineering deals with applications of electronics and this includes:
- Telecommunications (television, radio, cellular)
- Bioengineering
- Signal processing
- Optics
- Power electronics
- Electromagnetism
- Control systems
- Microelectronics
- Electronic design
- Embedded systems

Computer Engineering

Computer Engineering focuses on hardware and software.
- Hardware includes the field of robotics, digital signal processing, optical networks and communication systems.
- Software includes artificial intelligence, e-commerce systems, network security, and the design of operating and embedded systems.

Computer Engineering focuses on the combination of hardware and software to provide optimal solutions to real-world problems.

▶ **FUN EVENT:**
Robot race car day.
Watch the video here:

https://www.up.ac.za/eece/article/2669042/annual-robot-car-race

Infographic

Industries at which you can expect to find a career:

Electrical Engineering

Applications of Electrical Engineering extend to coal-fired, hydro and nuclear power stations; power line communications and building and railway wiring. There is now also an intense focus on demand side management and energy efficiency to ensure effective and efficient use of our valuable energy resources both renewable and non-renewable.

Electronic Engineering

Electronic Engineering can be applied to telecommunications (television, radio, cellular communications, optical communication and more), industry (control systems and power electronics), military, transport and bioengineering.

Computer Engineering

In short, computer engineers design and optimise computers and computing systems for use in robots, cell phones, cars, wireless networks and cyber security.

Computer engineers specialise in combining hardware and software to produce optimal solutions to problems.

Minimum admission requirements

Programmes	Minimum requirements for NSC and IEB for 2023			
	Achievement level			
SCHOOL OF ENGINEERING	**English Home Language or English First Additional Language**	**Mathematics**	**Physical Sciences**	**APS**
BEng (Electrical Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	35
The suggested second-choice programmes for BEng (Electrical Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics).				
Careers: Electrical engineers are active in the generation, storage, transmission, distribution and utilisation of electrical energy. There is a bright 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 all fall within the scope of electrical engineering.				
BEng (Electronic Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	35
The suggested second-choice programmes for BEng (Electronic Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics).				
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 (EEGs), electrocardiograms (ECGs), rehabilitation engineering and biokinetics), integrated circuit design, bioengineering, military equipment design (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 (Computer Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	35
The suggested second-choice programmes for BEng (Computer Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics).				
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] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	5	30
For advice on a second-choice programme, please consult a Student Advisor. To make an appointment, send an email to carol.bosch@up.ac.za.				
Note: The admission requirements above are relevant to prospective students who will commence their studies in 2023. Admission to ENGAGE in the School of Engineering will be determined by the NSC results, achievement levels of 5 for Mathematics, Physical Sciences and English, and an APS OF 30. 2022 entries, will be determined by NSC results, achievement levels of 5 for Mathematics, Physical Sciences and English, and an APS of minimum 30. **The National Benchmark Test (NBT) is no longer a requirement for any undergraduate programme in 2023.**				

Note: The Engineering Council of South Africa (ECSA) accredits our programmes and our degrees meet the requirements for Professional Engineers in SA.

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School of Engineering

BEng (Electrical Engineering)

What does the programme entail?

Electrical engineering is one of the three internationally accepted and closely related subdisciplines in the traditional field of electrical engineering (electrical engineering, electronic engineering and computer engineering). This programme covers the vast and continuously expanding field of the 'electrical energy world'. Practically all technological systems in the world 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.

Enormous challenges exist for utilising and storing electrical energy derived from such sources as the sun (solar energy), wind, biomass and 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.

There is a shortage of qualified electrical engineers all over the world. An electrical engineer has a thorough understanding of the basic sciences and a good education in the theoretical and practical aspects (including design, installation and maintenance methodology) of electrical engineering. Due to the current worldwide power crisis, there is an urgent need for environmentally friendly ways to generate power and energy.

Our programme in electrical engineering was developed over many years to provide exactly what the industry expects from such an engineer. There are fascinating opportunities worldwide for electrical (high-current) engineers who are capable of taking the lead in respect of sustainable and environmentally friendly electrical energy generation, transmission and utilisation. Most car manufacturers have already introduced electric 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 industries in which electrical engineers use their superior skills to design, develop and maintain 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. It includes lighting at sports stadiums, street lighting, safety and security lighting, task and ambient lighting, as well as lighting for offices, entertainment and many other specialist applications. Regardless of whether it is medicine, the military, entertainment, sports, education or any other field of technology, electrical engineers will be there to provide the energy and control required. An electrical engineer needs to be innovative and has to keep abreast of new developments in the field of technology. Many electrical engineers move into management positions very quickly and use analytical, synthesis, managerial and leadership skills to reach the highest levels of corporate management.

Electrical engineering aims to change the world by discovering ways to generate, transmit, distribute and utilise 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 access to a wide range of job opportunities, which include working for electricity utility companies, mining houses, municipalities, consulting engineers, transportation (rail and sea) companies and research organisations, locally and abroad. The advances in electrical energy generation and distribution create tremendous opportunities for entrepreneurs in South Africa and in the rest of the world. Research and development opportunities are available locally at institutions such as Denel, Eskom, the Council for Scientific and Industrial Research (CSIR) and Transnet.

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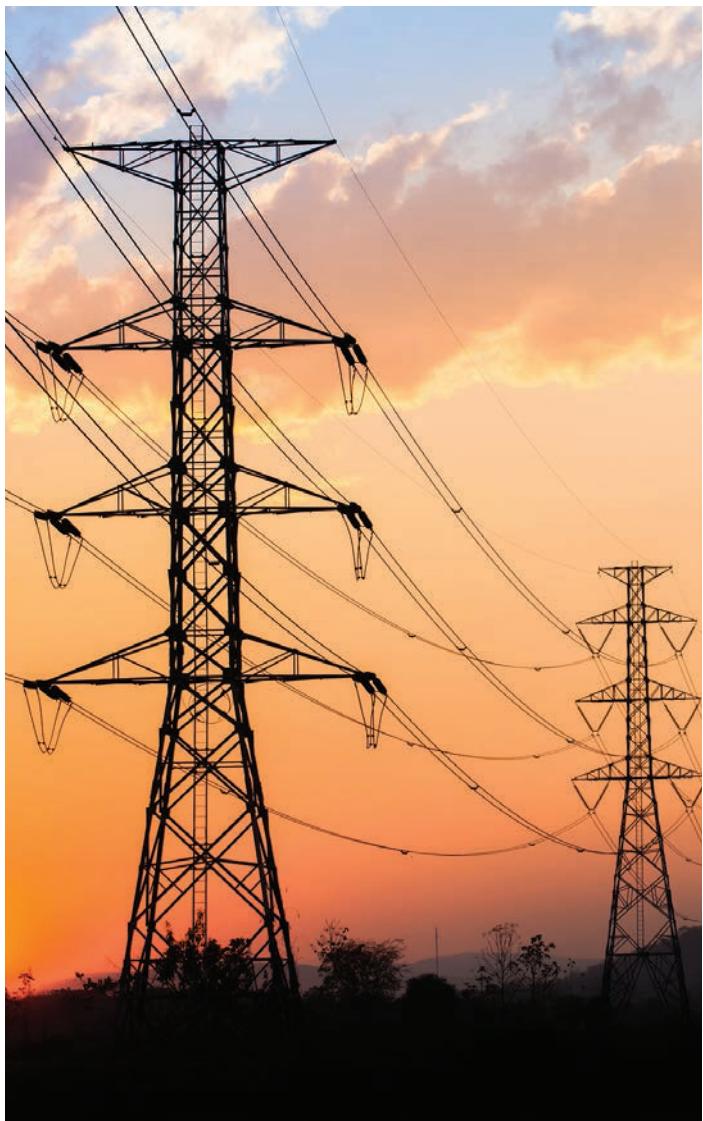
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School of Engineering

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

YOU ARE NEVER TOO LATE TO REINVENT YOURSELF, MAKE IT HAPPEN, SURPRISE EVERYONE

Dr Malika Khodja
Department of Materials Science and Metallurgical Engineering,
Faculty of Engineering, Built Environment and Information Technology,
University of Pretoria

WE OFTEN LOOK FOR PRINCIPAL CHARACTERS IN BOOKS AND FILMS, BUT THE TRUTH IS THE STRONG PROTAGONIST IS RIGHT WITHIN US.

Dineo Ramatlo
Department of Mechanical and Aeronautical Engineering,
Faculty of Engineering, Built Environment and Information Technology,
University of Pretoria

BE BOLD IN THE PURSUIT OF YOUR GOALS AND TAKE UP YOUR SEAT AT THE DECISION-MAKING TABLES.

Nozipho Mashinini-Dlamini
Mining Engineer,
Faculty of Engineering, Built Environment and Information Technology,
University of Pretoria

ALWAYS SET GOALS IN YOUR LIFE, IT GIVES YOU GUIDANCE ON WHERE YOUR PATH SHOULD LEAD.

Prof Alta van der Merwe
Deputy Dean: Teaching and Learning,
Faculty of Engineering, Built Environment and Information Technology,
University of Pretoria

DON'T LET ANYONE ROB YOU OF YOUR IMAGINATION, YOUR CREATIVITY, OR YOUR CURIOSITY. IT'S YOUR PLACE IN THE WORLD; IT'S YOUR LIFE. GO ON AND DO ALL YOU CAN WITH IT, AND MAKE IT THE LIFE YOU WANT TO LIVE. – Mae Jemison

Prof Andrie Garbers-Craig
Department of Materials Science and Metallurgical Engineering,
Faculty of Engineering, Built Environment and Information Technology,
University of Pretoria

Pursuing your passions, goals and dreams in times of challenge is an opportunity to uncover qualities of strength and perseverance within yourself.

Zakkiya Khan
Department of Architecture,
Faculty of Engineering, Built Environment and Information Technology,
University of Pretoria

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, materials, equipment, information and energy. They aim to increase the productivity of organisations 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 of an industrial engineer are:
designing, implementing and managing production processes and equipment;
- designing and improving plant layout;
- designing and improving business processes;
- functional design and implementation of information systems;
- developing and implementing performance criteria and standards;
- providing support with decision-making;
- scheduling activities;
- analysing systems with the aid of mathematical and simulation models;
- undertaking economic evaluations of alternatives; and
- integrating 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, while many 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 - Statics - Materials science - Humanities and social sciences 2 - Workshop practice
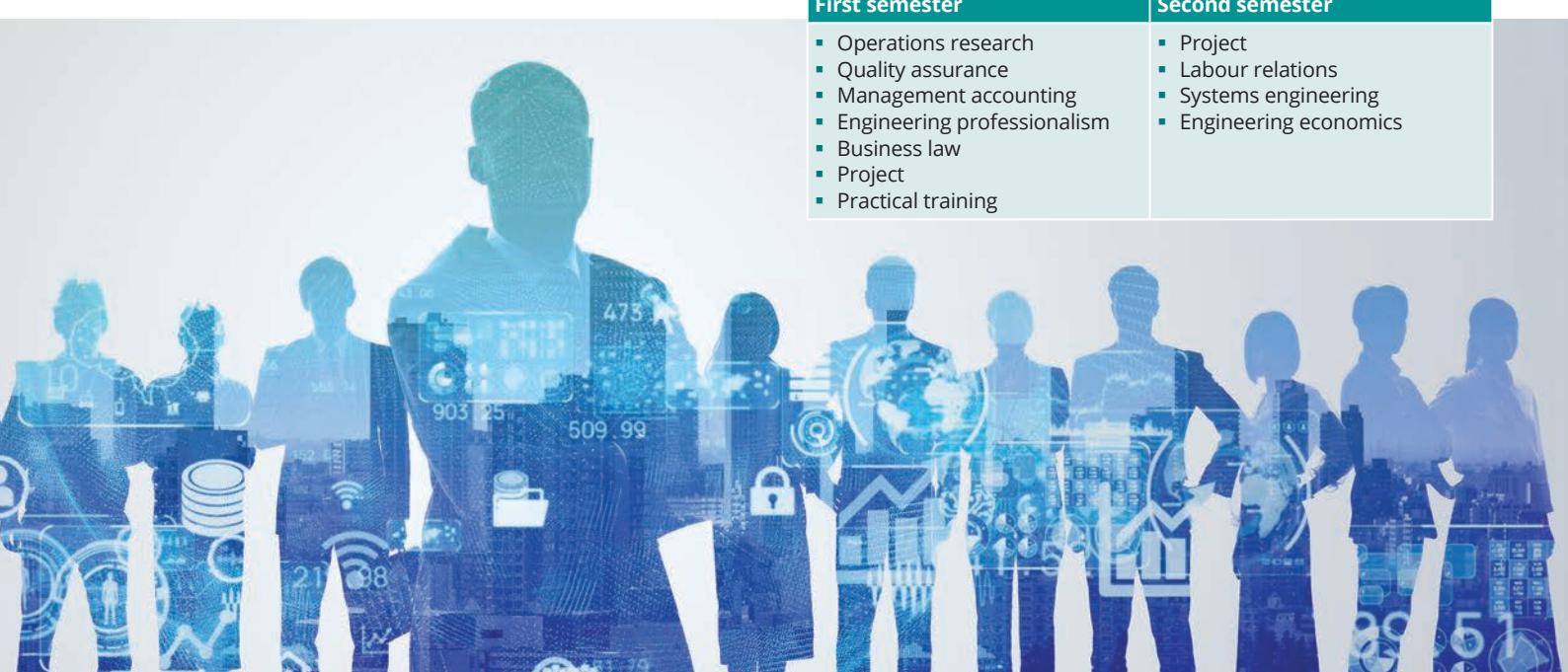
Second year	
First semester	**Second semester**
- Calculus - Differential equations - Dynamics - Programming and information technology - Manufacturing and design - Professional and technical communication - Community-based project	- Mathematics - Numerical methods - Engineering statistics - Productivity - 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 not only blessed with the world's largest deposits of gold, chromium, platinum, vanadium and manganese but also has extensive reserves of iron, lead, zinc, copper, nickel, coal and diamonds. The minerals industry contributes 50% of South Africa's exports and is one of the largest employers in the country. Metallurgical engineers play a key role in the production of minerals and metals and help to process metals into final products with added value. In this way, the maximum income is generated in local and international markets. Components made from metals and other materials are designed to perform optimally in all aspects of modern life.

Career opportunities
Metallurgical engineers play 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:
- **Minerals processing.** Processing the ore to release and concentrate the valuable minerals from the mineral resources.
- **Extractive metallurgy.** The processing of mineral concentrates to metals through pyrometallurgy 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 and laser-assisted 3D printing, as well as joining through welding are examples of metallurgical applications. The forensic investigation of failures is also of great importance as it contributes to insight into how materials function and fail.

Graduates in metallurgical engineering are responsible for process/ component design and optimisation, commissioning, marketing, business analysis and research. There is a place for everyone with the right attitude and interest in the field of metallurgical engineering!

Behind the scenes
As the leading metallurgical engineering department in South Africa, the Department of Materials Science and Metallurgical Engineering currently plays a prominent role in the education of metallurgical engineers for the South African metallurgical and mining industries, and its graduate students are in high demand. 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, and the degree currently enjoys international recognition. Staff members consult with and conduct 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 students are 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.
To help them to overcome problems, a member of staff is appointed as a mentor for each student year group. For first-year students, in particular, there is an intensive mentorship programme. The normal programme runs over four years, but we also offer a five-year programme (ENGAGE) for students who require additional support and mentoring.

The Metallurgical Student Association is elected by the student body and organises social and sports functions.

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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 - Statics - 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 - Mineral's processing - Metals processing - Engineering professionalism - Practical training	- Project - Process design

Infographic

Materials Science and Metallurgical Engineering

South Africa has the world's largest mineral deposits of gold, chromium, platinum, vanadium and manganese. We also have large reserves of iron, lead, zinc, copper, nickel, coal and diamonds. The minerals industry contributes to some 50% of South Africa's exports and is one of the largest employers in the country.

The Department of Materials Science and Metallurgical Engineering, established in 1958, offers the BEng (Metallurgical Engineering) degree programme, fully accredited by ECSA (2017-2021). Professional metallurgical engineers who graduate from this programme, take minerals from the phase of exploration into successful utilisation of high-performance products.

The three main fields of specialisation in metallurgical engineering are:

Minerals processing

Processing the ore to release and concentrate the valuable minerals contained in it.

Extractive metallurgy
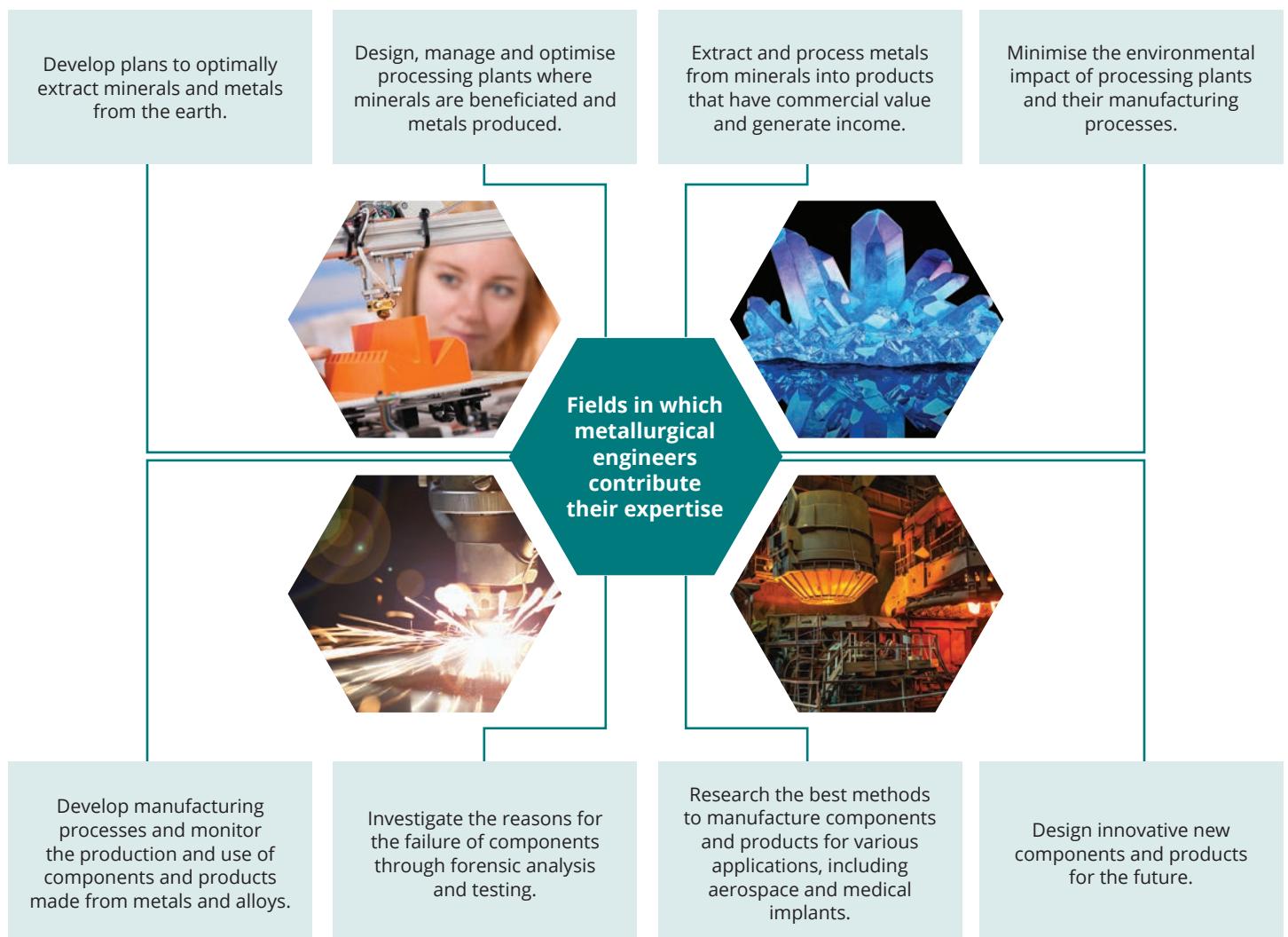
The processing of mineral concentrates to metals through pyrometallurgy (including smelting) or hydrometallurgy (including leaching) as refining steps.

Materials production, performance and integrity

This field entails the development of new alloys, the production of useful materials and products from raw metals, including forming through casting, 3D printing using lasers and joining through welding. The forensic investigation of failures is also of great importance.

Infographic

Develop plans to optimally extract minerals and metals from the earth.

Design, manage and optimise processing plants where minerals are beneficiated and metals produced.

Extract and process metals from minerals into products that have commercial value and generate income.

Minimise the environmental impact of processing plants and their manufacturing processes.

Fields in which metallurgical engineers contribute their expertise

Develop manufacturing processes and monitor the production and use of components and products made from metals and alloys.

Investigate the reasons for the failure of components through forensic analysis and testing.

Research the best methods to manufacture components and products for various applications, including aerospace and medical implants.

Design innovative new components and products for the future.

Careers:

Metallurgical engineers unlock the riches of deposits of metal ores and minerals and optimise the manufacture and performance of metallic components. You'll find metallurgical engineers where valuable minerals are recovered from ore, where metals are produced from the minerals and where the metals are converted into useful materials as well as into high-performance products. Areas of specialisation include minerals processing, extractive metallurgy, materials engineering and performance, advanced manufacturing processes, including laser-assisted additive manufacturing and welding, as well as failure analysis and forensic engineering.

Careers include production engineers, plant managers, consultants, forensic engineers and researchers.

Minimum admission requirements

Programmes	Minimum requirements for NSC and IEB for 2023			
	Achievement level			
SCHOOL OF ENGINEERING	**English Home Language or English First Additional Language**	**Mathematics**	**Physical Sciences**	**APS**
BEng (Metallurgical Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Metallurgical Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics).				

Note: The Engineering Council of South Africa (ECSA) accredits our programmes and our degrees meet the requirements for Professional Engineers in SA.

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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 programme focuses on the establishment of a broad knowledge of engineering and includes topics 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 is instrumental in the design and manufacture of products and services such as the provision of electricity and water, transport (road, rail and air), mining activities, mechatronics and air conditioning.

As a result of their broad technical background, mechanical and aeronautical engineers either pursue professional careers in these fields or become very successful senior managers in these industries.

Behind the scenes

The Department of Mechanical and Aeronautical Engineering is the largest of its kind in South Africa and has modern and fully equipped laboratories and computer facilities. Prospective students may rest assured that they will receive first-class education that is comparable to the best in the world, as attested by the international accreditation of the undergraduate programme by the Engineering Council of South Africa (ECSA). Lecturers in the Department are all actively involved in the industry, either as consultants or as researchers, and the Department has already received eight design awards from the South African Bureau of Standards.

Our student body is diverse, and at the undergraduate level, approximately 20% of the students are female. Alumni of the Department have made valuable 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 tables below (students specialising in aeronautical engineering conduct their final-year research and complete design projects on aeronautical topics):

First year	
First semester	**Second semester**
- Graphical communication - Calculus - Physics - Electricity and electronics - Humanities and social sciences 1	- Mathematics - Statics - 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 - Fluid mechanics - 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 - Heat Transfer - Engineering professionalism - Practical training - Design project - Research project	- Research project - Thermal and fluid machines - Mechatronics and Control Systems **Electives:** - Aeronautics - Maintenance engineering - Nuclear engineering - Mechatronics - Heat and mass transfer - Optimum design - Fossil-fuel power stations

School of Engineering

Music and motorsports

IAM**EBIT**

EBIT's BEng Mechanical Engineering twins are ready to take the music and motorsport worlds by storm. Justin and Darren Oates share identical interests in engineering, music and motorsport. They play the piano and have recorded music in English under the name Telepathy, and in Afrikaans under the name Alter Ego.
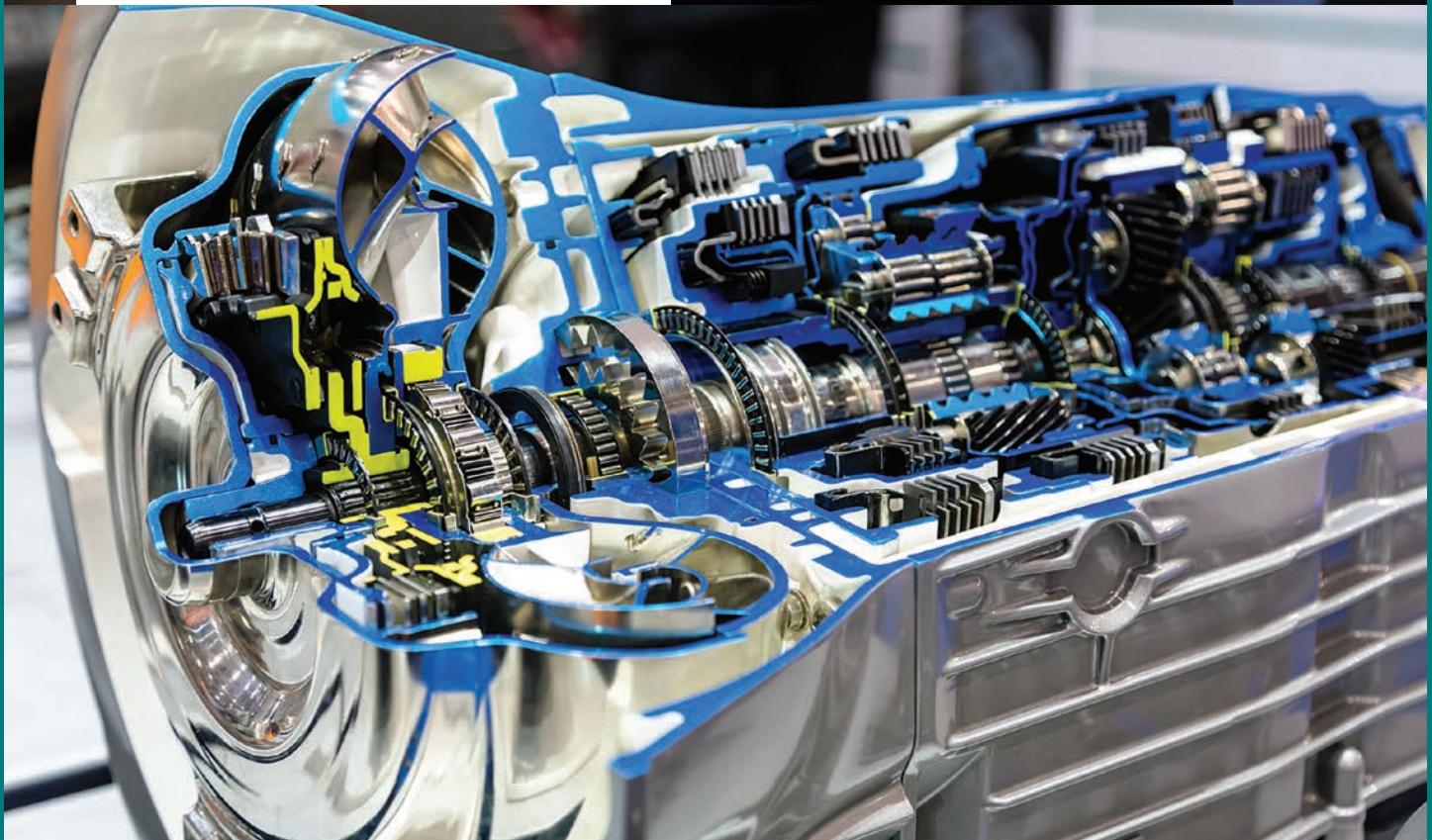
Justin and Darren specialised in motor vehicle engineering, which studies the behavioral characteristics of motor vehicles to predict or enhance specific dynamic or performance effects. Motorsport is about precision, which appeals to the brothers' calculated perfectionist personalities. They hit the main motor racing circuit in 2015, competing in the VW Polo GTI Cup Series, which is the most competitive level of racing in the country, with Total as their sponsor.

Much of our passion in motor vehicles is centred on performance: acceleration, braking, cornering and riding. With our passion for motorsport and the physics of vehicle behaviour, we finally decided that engineering was the way to go. We have always been entrepreneurial and are continuously thinking of new ideas. To our pleasant surprise, we learnt that engineering builds a solid platform for innovation and getting ideas into the real world.

Justin and Darren Oates

School of Engineering

Department of Mining Engineering

BEng (Mining Engineering)

What does the programme entail?
As a profession, mining engineering encompasses a broad spectrum of engineering work—from mine evaluation to industrial control. For instance, mining engineers may assess a new mining project as soon as the geological confirmation of a newly discovered mineral deposit has 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 is 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. 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 and energy minerals to a large variety of domestic industries, while 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 and 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
Classes are still relatively small, making it possible for staff to give individual attention to students. The many technical visits that are organised offer students the opportunity to become acquainted with every aspect of the mining industry. A characteristic of the mining engineering programme is the close group cohesion that develops among students and continues long after graduation.

Note: Prospective mining engineering students are advised to verify that they are medically compliant with the government requirements for working on a mine. More information can be found at www.dmr.gov.za.

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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 - Statics - 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 sciences, academic literacy and information technology. They may not have the study skills to cope with the mainstream four-year programme. Furthermore, many students—even some of those who attended high-performing schools—struggle with the transition to university life due to the very large first-year classes, freedom from strict discipline and many social activities.

For this reason, 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 to 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 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 the same first-year modules and attend the same classes as the four-year degree programme students, but the modules are spread out over two years. In addition, for every 16-credit 100-level (first-year) module, students also take an 8-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 approximately 50 members to work on strengthening their 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 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 practice and develops their academic and communication skills. Furthermore, 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 all the introductory (100-level) engineering modules, as well as a compulsory additional module for each. They also take one 200-level mathematics module per semester. In the third year, they take the remaining 200-level modules, but since they have already completed two 200-level mathematics modules, their workload is slightly lighter than that of the four-year degree programme students. For the last two years of their studies, ENGAGE students follow exactly the same programme as the four-year degree programme students.

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

Four-year programme modules	Foundation modules
First and second years	
▪ 100-level science modules ▪ 100-level engineering modules ▪ 200-level mathematics modules	▪ An additional module for each science and engineering module ▪ No additional module (for 200-level Mathematics modules)
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.
▪ Please refer to the table on page 3 for the 2023 admission requirements.

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Infographic

Mining Engineering

Southern Africa is abundant in platinum, gold, chrome, copper, cobalt, diamonds, coal and iron ore.

The South African mining industry is in transition and will require fresh and inspired minds to transform the industry from a labour-intensive and low productive industry to a motivated and productive industry capable of mining in excess of 4 000 metres below the surface in the gold mining sector and in excess of 2 000 metres in the platinum mining sector.

Currently, massive infrastructures advancements are taking place with new technologies being pursued. Automation and modernisation is taking place to access future ore bodies. The Department of Mining Engineering in this regard explores all potential new interventions so as to facilitate the learning experience. We also offer instructionally designed material for its mining-related subjects. This enhances the learning experience of students. The Mining Industry Study Centre, which opened its doors in October 2013, accommodates

758 students; has 252 workstations, 30 CDIO-type (conceive, design, implement and operate) venues and 296 study cubicles.

Virtual Reality applications in mining

The Department also involves students in immersive technology for mining applications. The Virtual Reality Centre in the Department allows this to be an important feature in mining engineering education.

The rewarding profession of being a mining engineer

Mining Engineering is the study and application of technological methods to effectively and safely operate a mining operation.

Mining engineers conduct mine evaluations as soon as geological confirmation of a mineral deposit, are confirmed.

Mining engineers will design the mine itself. If the mineral deposit is close to the surface, an opencast mine will be preferred, but for deeper deposits, an underground mine will be required.

Mining engineers coordinate the construction of such a mine, from the planning phase to full production phase.

Mining engineers design mining excavations; manage operations at all levels; provide expert advice on rock breaking, blasting materials, transport systems and scheduling; mechanical tunnel development, mine ventilation, rock mechanics, support of excavations, mining methods, as well as the design and development of equipment.

Mining engineers do mine planning and design. They also oversee mining projects. As consultants, they provide crucial information to decision-makers.

Infographic

The University of Pretoria provides excellent facilities to our Mining Engineering students and these include access to the:
- Kumba Mine Design Laboratory
- Kumba Virtual Reality 3D360 cylinder
- Kumba Virtual Reality 3D theatre
- ARM Laboratory
- Virtual Blasting Wall; and
- The Metallurgical, civil and mechanical engineering laboratories on the Hatfield Campus.

The aptitudes and skills of successful engineers include the following:
- Be able to visualise objects in three dimensions
- Have good health and stamina
- Have mathematical and scientific ability
- Be curious
- Be disciplined
- Be passionate about mining
- Have creativity and initiative
- Be responsible
- Have self-confidence
- Have organisational skills
- Command respect
- Maintain a cool head and take charge of a situation
- Have listening, speech and writing skills

What career opportunities exist for mining engineers?

The mining industry is one of the largest industries in South Africa, producing more than **60 different minerals in over 1 000 mines and quarries**. Mining amounts to one eighth of the gross national product.

Mining engineers are employed at a wide range of companies, both locally and internationally. They are responsible for the effective, safe and profitable operation of mining undertakings.

Mining engineering careers include that of rock engineer; mine ventilation engineer; explosives engineer; rock breaking engineer; drill and blast engineer; project engineer; mine planner and environmental engineer to mention but a few.
- Mining engineers are mining experts and they are engineers, who have a background in geology as well as in civil, mechanical and electrical engineering.
- Mining engineers research mining-related topics in order to improve safety and find better ways to extract minerals.
- Mining engineers also work in the banking sector and at the Stock Exchange, where they specialise in risk analysis and investment.
- Mining engineers are also needed for sales and marketing as well as business development of mining companies or supporting industries.

There is a shift in mining as it progresses towards mechanisation and automation through robotics. Mechanisation requires in-depth engineering skills to support and operate mobile mechanised equipment.

The Mining Engineering Leadership Academy

Our students have a sound academic foundation. To that, we add skills such as self-awareness, communication skills and the ability to work in multi-disciplinary settings and groups. The philosophy of the Leadership Academy programme is to expose final-year students to experiential situations, which teaches them intrapersonal and interpersonal skills. Psychometric assessments and real-life case studies hone well-rounded leadership habits.

Minimum admission requirements

Programmes	Minimum requirements for NSC and IEB for 2023			
	Achievement level			
SCHOOL OF ENGINEERING	**English Home Language or English First Additional Language**	**Mathematics**	**Physical Sciences**	**APS**
BEng (Mining Engineering) [4 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	6	6	**35**
The suggested second-choice programmes for BEng (Mining Engineering) are BSc (Chemistry), BSc (Mathematics) and BSc (Physics).				
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, financial evaluation of mines, 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 and international levels.				
Engineering Augmented Degree Programme (ENGAGE) [5 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	5	5	5	**30**
For advice on a second-choice programme, please consult a Student Advisor. To make an appointment, send an email to carol.bosch@up.ac.za.				

Note: The admission requirements above are relevant to prospective students who will commence their studies in 2023.
Admission to ENGAGE in the School of Engineering will be determined by the NSC results, achievement levels of 5 for Mathematics, Physical Sciences and English, and an APS OF 30. 2022 entries, will be determined by NSC results, achievement levels of 5 for Mathematics, Physical Sciences and English, and an APS of minimum 30.
The National Benchmark Test (NBT) is no longer a requirement for any undergraduate programme in 2023.

Note: The Engineering Council of South Africa (ECSA) accredits our programmes and our degrees meet the requirements for Professional Engineers in SA.

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Departmental administrator Tel +27 (0)12 420 3763 **| Email** daleen.gudmanz@up.ac.za

School for the Built Environment

School for the Built Environment: **Highlights**

The School for the Built Environment offers professional degree programmes in architecture, quantity surveying, construction management, real estate and town and regional planning. All these programmes are internationally recognised and accredited by their respective statutory councils, allowing students to register as members of their chosen professions.

As a School, we pursue the equitable and sustainable development of people through:
- accredited undergraduate and postgraduate programmes as professional qualifications;
- active and constructive involvement of students and lecturers in community development and service;
- academically rigorous and socially relevant research conducted by students and lecturers;
- contracted service provision to the local, provincial and national government as well as the private sector; and
- accredited continued professional development (CPD) opportunities for professionals.

Close relationships with industry and government expose students to regular engagements with practitioners and real-life projects and ensure curricula that are relevant to current and future challenges. These relationships also open doors to exciting research opportunities at the honours, master's and doctoral levels in fields such as environment behaviour studies; climate change adaptation; urban resilience; urban citizenship; green building; regenerative design and development; heritage and cultural landscapes; safe and sustainable housing and urban spaces; strategic development planning; construction cost databases, escalation and indices; well-being in the built environment; and contracts and property law.

School for the Built Environment

Department of Architecture

The Department of Architecture presents an undergraduate programme in architecture that explores the design of meaningful environments across varying scales, from intimate interior spaces to more significant interventions in landscapes. Specialised programmes in architecture, interior architecture and landscape architecture are introduced at the postgraduate level.

Our vision is to provide a learning environment that fosters critical and independent thinking, encourages social-ecological accountability and inspires responsive and responsible problem-solving that contributes to the improvement of society and its environment. We engage with spatial design with academic rigour that is theoretically grounded and technologically informed, and our academic programmes are locally and internationally accredited.

What does the programme entail?
The curriculum for the BSc (Architecture) programme 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. Students attend classes in the following subject streams:

Design and Applied Theory
Architecture students attain half of the credits for every year of study in the significant module of design, which is presented in tandem with architectural theory to equip students with a pertinent vocabulary and theoretical underpinning. Design is a studio-based module in which projects over a range of scales and complexities are undertaken to encourage students to develop critical and independent design thinking, the ability to evaluate design within a social, cultural and ecological framework, and to explore imaginative and appropriate solutions. In the studio, design discernment is fostered through ongoing discussion, peer learning, and formal and informal assessment. The Department promotes design that is generative rather than stylistically or iconically driven, and students are encouraged to appreciate the universal (global) while engaging with the particular (local).

Community and Practice
Students participate in collaborative community projects that are directed by our research and initiatives in urban citizenship, as well as the Faculty's community engagement module. In the third year of study, the focus turns to the management of a professional practice and the legal context of construction contract law.

Construction
The study of construction theory, materials and methods is presented as an extension of design to enable the designer to give tangible expression to built form and realisation to an architectural concept.

Design Communication
Design communication offers students the opportunity to develop skills in harnessing especially the digital tools that are essential to designers in the twenty-first century. It deals with visual communication, digital visualisation and representation, and the management of document and building information.

Earth Studies
Earth studies introduce students to ecosystemic accountability and systems thinking to guide them towards designing for well-being in the built environment from social, cultural and environmental points of view. It includes ecological themes that extend to approaches that underpin and inform inclusive, ecological, passive and responsive design.

History of the Environment
History of the environment prepares students to define their role in society and find meaning in history through the study of the self and the cultures of others. It investigates the context and meaning of cultural artefacts, including space and place, to relate form and order to the environmental, political and philosophical conditions that influenced their making. It culminates in a reading of southern Africa in the third year of study.

Theory of Structures
The theory of structures equips students with the theoretical knowledge and practical understanding required to analyse, plan and design critical structural components such as beams, columns and trusses from a structural engineering perspective, using timber, steel, concrete and other materials.

Career opportunities
The BSc (Architecture) degree is accredited by the South African Council for the Architectural Professions and allows graduates to enter professional practice as technologists. To be able to register as a candidate architect, landscape architect or interior architect, they need to complete two additional professional postgraduate programmes. Note that the Department recommends at least one year of work or travel before postgraduate studies are undertaken. Through a commitment to innovation and internationally recognised programmes, the Department maintains professional qualifications of a high standard. The graduates of the Department are highly regarded both locally and abroad, in academia as well as in practice.

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.

The majority of our graduates work in professional practice, often in multidisciplinary firms. Still, there is a wide range of other possibilities that branch out from the spatial design disciplines: from furniture to urban design, ecological planning to entrepreneurship, as well as in research and advisory positions in the public and private sector.

Admission by selection
A limited number of students are admitted to the Department annually. Admission is determined by a three-part selection process explicitly developed to level the playing field between students coming from different educational and cultural backgrounds. Please refer to www.up.ac/architecture for information on the selection requirements and process.

Important dates
Applications open on 1 April and close on 30 June.

Contact information
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Academic enquiries: Prospective students
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Website www.up.ac.za/architecture

School for the Built Environment

Undergraduate	Minimum duration	Outcome (registration with SACAP)
BSc (Architecture)	Three years (full-time, studio-based)	Candidate Architectural Technologist
At least one year of work or travel recommended before postgraduate studies are undertaken.		

Professional Postgraduate	Minimum duration	Outcome
Bachelor of Architecture Honours	One year (full-time, studio-based)	Candidate Senior Architectural Technologist
Bachelor of Landscape Architecture Honours	One year (full-time, studio-based)	Candidate Senior Landscape Architectural Technologist
Bachelor of Interior Architecture Honours	One year (full-time, studio-based)	Candidate Senior Interior Designer
Master of Architecture	One year (full-time, studio-based)	Candidate Architect
Master of Landscape Architecture	One year (full-time, studio-based)	Candidate Landscape Architect
Master of Interior Architecture	One year (full-time, studio-based)	Candidate Interior Architect

Department of Construction Economics

BSc (Construction Management)

What does the programme entail?
Construction management is the management of the physical construction process within the built environment and includes the coordination, administration and management of resources. The construction manager takes full responsibility in this process and can work as either the contractor or the project manager.

Career opportunities
Various job opportunities exist in the construction industry. On successful completion of the three-year programme, students can enter a career in construction management, or undertake subcontract and main contract work. On successful completion of the one-year honours degree, opportunities become far wider. The one-year honours degree focuses on further training in aspects such as financial, project and strategic management.

After registration with the South African Council for the Project and Construction Management Professions (SACPCMP), students will be able to become professional construction project managers.

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 to supplement their theoretical studies with hands-on practical experience. Students will be required 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 BSc (Construction Management) and BScHons (Construction Management) programmes are accredited nationally by the SACPCMP and internationally by the Chartered Institute of Building (CIOB) in the UK. The CIOB has a worldwide footprint and provides our degrees in construction management with international recognition.

The Department also offers master's and doctoral degrees, which 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	▪ Academic literacy ▪ Building organisation ▪ Building science ▪ Building services ▪ Quantities ▪ Structures ▪ Economics

Second year	
First semester	**Second semester**
▪ Building science ▪ Statistics ▪ Financial management ▪ Building services ▪ Construction quantities	▪ Property law ▪ Building science ▪ Statistics ▪ Building services ▪ Construction quantities ▪ Civil engineering services ▪ Community-based project ▪ Site surveying

Third year	
First semester	**Second semester**
▪ Business law ▪ Building science ▪ Building services ▪ Construction management ▪ Financial management ▪ Construction quantities ▪ Labour Law	▪ Housing ▪ Building science ▪ Sustainable construction ▪ Construction management ▪ Construction quantities ▪ Financial management ▪ Introduction to construction contract law

School for the Built Environment

BSc (Quantity Surveying)

What does the programme entail?

Quantity surveyors are independent, professional consultants who are responsible for the financial management of construction projects. They provide specialised financial and contractual services, as well as advice to clients in the construction industry. They act in collaboration with, among others, architects, consulting engineers and contractors to promote the interests of the building client.

Career opportunities

Various job opportunities exist in the construction industry. The majority of quantity surveyors are employed in quantity surveying practices in the private sector.

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 are registered with the relevant councils.

Various government departments employ quantity surveyors. The property sector, banking, engineering and manufacturing industries offer further career options. Quantity surveyors also work for construction firms or establish their own building enterprises and construction companies.

Duration of the programme

- **BSc (Quantity Surveying):** This three-year programme qualifies 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 the 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 to supplement their theoretical studies with hands-on practical experience. Students will be expected 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 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, which provides our degrees in quantity surveying with international recognition. The Department also offers master's and doctoral degrees, which 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 science - Building services - Quantities - Structures - Economics

Second year	
First semester	**Second semester**
- Building science - Statistics - Financial management - Building services - Quantities	- Building science - Statistics - Building services - Quantities - Civil engineering services - Property law - Community-based project - Site surveying

Third year	
First semester	**Second semester**
- Business law - Quantity surveying practice - Building science - Building services - Quantities - Financial management	- Housing - Quantity surveying practice - Building science - Sustainable construction - Quantities - Introduction to construction contract law

School for the Built Environment

BSc (Real Estate)

What does the programme entail?
The study of real estate covers all aspects relating to land and buildings, including the development of land, the management of buildings (including shopping centres), the valuation of land and buildings and decision making regarding the financing of, and investment in land and buildings. Real estate/Property practitioners are professional people who work in all spheres of the property industry—also as professional property valuers.

Career opportunities
Real estate (or property) studies has developed into a specialised field requiring unique expertise in areas where the property sector represents a significant part of the South African economy. Worldwide property/real estate comprises between 40% and 50% of the world's total assets.

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 exist in the entire spectrum of the property sector, and individuals with a qualification in real estate can work as entrepreneurs in the private sector, or as employees in the private, government or semi-governmental sectors.

Duration of the programme
- **BSc (Real Estate):** This is a three-year programme that will qualify graduates to work in the various spheres of the property industry, including management, development and marketing.
- **BScHons (Real Estate):** Students who complete this one-year programme will be qualified to start a professional career in the property industry. After submitting proof of having gained the prescribed professional practical experience, and the successful completion of a professional examination, graduates may register with the South African Council for the Property Valuers Profession (SACPVP).

The honours degree requires students to work part-time at approved property companies or related businesses for at least 240 hours to supplement their theoretical studies with hands-on practical experience. They will be expected 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 BSc (Real Estate) and BScHons (Real Estate) programmes are accredited nationally by the SACPVP and, apart from qualifying students to work in all spheres of the property industry, enable them to become professional property valuers.

The Department also offers an MSc (Real Estate) coursework degree, as well as master's and doctoral degrees, which can be obtained by submitting a thesis and passing an oral examination.

Internationally, the MSc RE Coursework degree is accredited by the Royal Institution of Chartered Surveyors (RICS). The worldwide footprint of the RICS provides our real estate degrees with international recognition.

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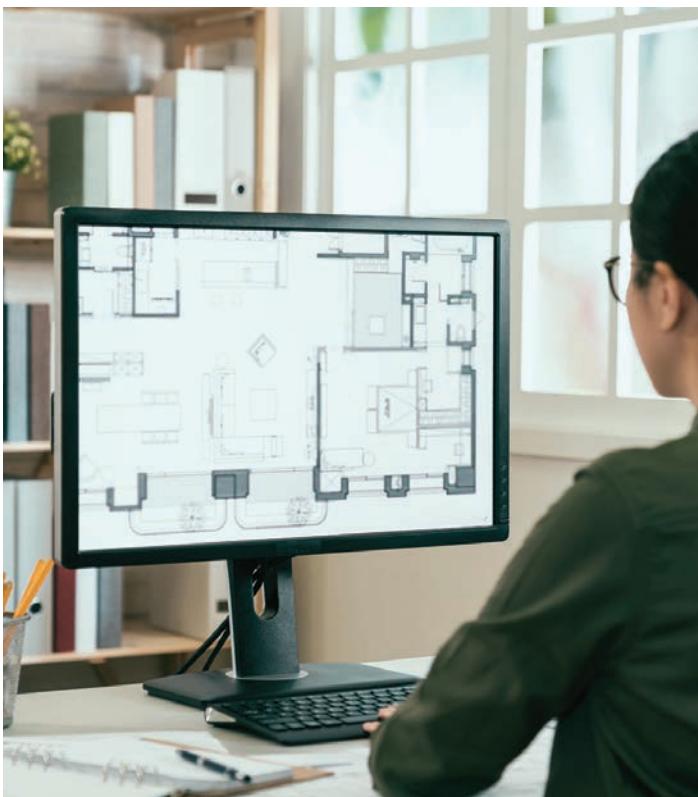
First year	
First semester	**Second semester**
- Building drawings - Building science - Academic information management - Academic literacy - Building services - Quantities - Economics - Real estate - Mathematics	- Building organisation - Building science - Building services - Quantities - Economics - Real estate

Second year	
First semester	**Second semester**
- Building science - Statistics - Financial management - Building services - Real estate	- Building science - Statistics - Building services - Civil engineering services - Real estate - Property law - Community-based project - Site surveying

Third year	
First semester	**Second semester**
- Business law - Building science - Building services - Property valuation - Real estate - Financial management	- Housing - Building science - Sustainable construction - Property valuation - Real estate - Introduction to construction contract law

School for the Built Environment

Construction management
Mashoto Tsogae

'I AM a BSc Construction Management student at the University of Pretoria. I am looking forward to graduating and starting the honours programme in EBIT.

Initially, it was difficult for me to decide which degree programme would suit me best. Fortunately, the Faculty has various options to guide one. I chose to study construction management because of the poor infrastructure, or lack thereof, in the township in which I grew up. I am passionate about ensuring that quality construction is provided in our communities, because people's safety should always be of the utmost importance.

My Department is located on the University's South Campus, which is always in close proximity to active construction projects. Construction is an ever-changing industry, which allows room for innovation. I look forward to forging my path in this field.

The Faculty aims to produce well-rounded students by encouraging us to not only excel academically, but also to engage in community outreach projects. EBIT serves students who are inquisitive, open minded, independent and hardworking. It has been a privilege to be lectured by experts in their respective fields, because they are always willing to shed light on current issues and how we should equip ourselves for the future.'

IAMEBIT
#ChooseUP

JCP

Community-based Project Module

In this module, all EBIT students engage with a section of society that is different from their own social background. 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.

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 the widening of choice, promotion of equity, ensuring sustainable human settlements and improving people's quality of life.

The guiding motive of the profession is the pursuit of innovative, inclusive, 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 the different interests and expectations of stakeholders, role-players and participants for the future are often contradictory and conflict-ridden.

A professional approach that combines sensitivity, empathy and care, coupled with strong 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 can put forward innovative solutions to complex problems. This mediator can reconcile diverse points of view, a strategic thinker, a passionate 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. They 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 (CSIR) and the Human Sciences Research Council (HSRC), non-governmental and development organisations, community-based organisations, major financial institutions and property development groups.

The professional four-year BTRP qualification enables graduates to register as professional town and regional planners with the South African Council for Planners (SACPLAN), 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 into the programme. Lectures, practical projects and studio work focus on stimulating critical thinking, engaging students in discussion, and applying theory to real-world situations using practical problem-solving exercises. Instruction is student-centred, and the progress of each student is carefully monitored.

One of the characteristics of the Department is its desire to take on new challenges and develop innovative ways of serving the reconstruction and development of the country. We are actively immersed and involved in, and committed to inclusive and transformative community development in South Africa, 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 planners with the necessary knowledge and skills to present interventions to deal with many problems on properties and 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; public policy preparation and review; and planning methods and techniques.

Several modules in related fields are also prescribed to ensure that students acquire a multidisciplinary perspective and the knowledge base that is necessary to provide innovative, inclusive, affordable and appropriate solutions to complex urban and rural problems.
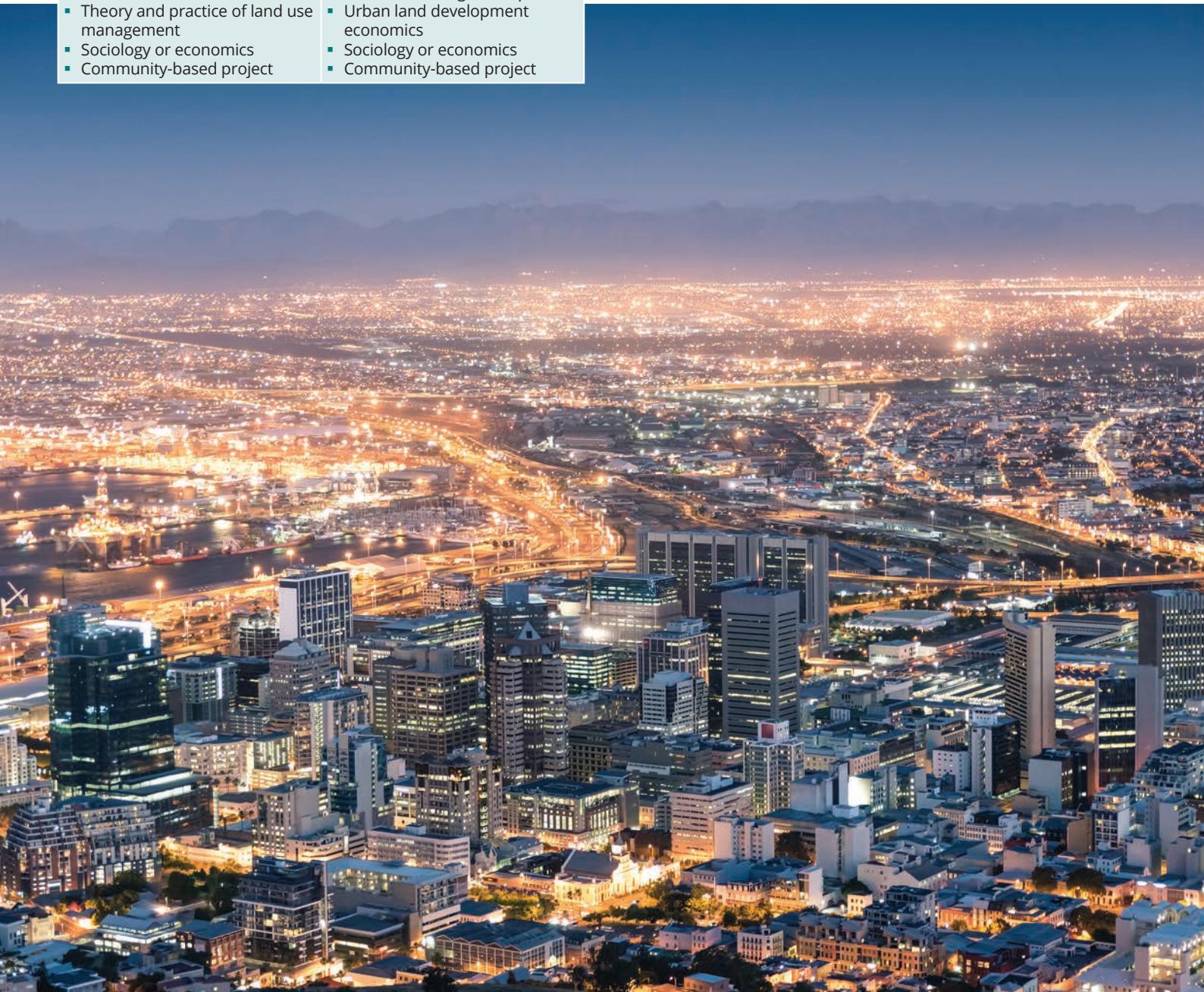
For a list of all modules, visit: www.up.ac.za/en/town-and-regional-planning/article/50045/undergraduate

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School for the Built Environment

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 practice 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 scales ▪ Research methodology ▪ Professional practice	▪ Planning interventions: Metropolitan scale ▪ Planning interventions: Supranational 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. With modern laboratories and programmes in computer science, informatics and information science it offers students the advantage of an integrated approach to IT. 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 research focus areas of the Department of Informatics are data science, IS and education, IS and organisations, ICT for sustainable development and human-computer interaction. The Department of Informatics has a fully-equipped User Experience (UX) Lab with sophisticated eye-tracking equipment and software. A coursework master's degree in ICT management, as well as research master's and doctoral degrees, are offered.

The Department of Information Science offers a two-year coursework master's degree in information technology (MIT), as well as research master's and doctoral degrees. It hosts the African Centre of Excellence for Information Ethics (ACEIE), which produces research on information ethics and presents awareness-raising workshops across Africa. The Department also hosts the Virtual Reality and Interaction Lab, which provides students with access to cutting-edge virtual reality equipment and is used for interaction and user experience research in virtual reality. The lab concentrates on using XR (extended reality) technology to create interactive user experiences for various applications. The main aim is to use commercial XR technologies to create user-centred solutions for complex problems from both academic and industry perspectives (http://vri.up.ac.za).

The Department of Computer Science is internationally recognised for its research in the fields of artificial intelligence, data science and digital forensics and computer and information security, and hosts the South African Initiative Chair in Artificial Intelligence, the DRS Chair in Cybersecurity, the ABSA Chair in Data Science and the Multichoice Joint Chair in Machine Learning. The Department offers a two-year coursework master's degree in big data science (MIT), as well as research master's and doctoral degrees.

School of Information Technology

Department of Informatics

BIT (Information Systems)

Students who enrol for this programme study the application and use of computer and information systems in organisations. The use of information technology by organisations is growing exponentially, and new, more complex and challenging applications are being explored and developed all the time.

Informatics specialists are trained to analyse business problems of organisations, which are associated with improving the efficiency, effectiveness and control of their business processes for commercial organisations, government, government departments, non-profit organisations or any other organisation where information is crucial. They not only analyse the needs but also address them by designing and implementing information systems.

Nowadays, the term information systems is used to refer to computer-based systems (including mobile applications) that store and manipulate data so that people can understand and interpret information and use it for decision-making.

What does the programme entail?
What makes the Informatics degree at the University of Pretoria unique is the Capstone Project, which gives third-year exposure to working with a real-life client.

In addition to the obvious fact that the work environment of the informatics specialist is particularly interesting, well-qualified informatics specialists can choose between many excellent job opportunities. The superiority of graduates 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.

Duration of the programme
The BIT (Information Systems) programme takes a minimum of three years to complete.

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First year	
First and second semesters	
Compulsory modules	**Elective module (Choose one stream)**
▪ Academic information management ▪ Academic literacy for information technology ▪ Informatics ▪ Business management	▪ Computer auditing ▪ Information science ▪ Entrepreneurship ▪ e-Business ▪ Geography ▪ Data science management ▪ e-Taxation

Second year	
First and second semesters	
Compulsory modules	**Elective modules (Choose one stream)**
▪ Informatics ▪ Business ethics ▪ Community-based project	▪ Computer auditing ▪ Information science ▪ Entrepreneurship ▪ e-Business ▪ Geography ▪ Data science management ▪ e-Taxation

Third year	
First and second semesters	
Compulsory module	**Elective modules (Choose one stream)**
▪ Informatics	▪ Computer auditing ▪ Information science ▪ Entrepreneurship ▪ e-Business ▪ Geography ▪ Data science management ▪ e-Taxation

School of Information Technology

BCom (Informatics)
Focus area: Information Systems

What does the programme entail?

The BCom (Informatics) focus area is Information Systems, which is the study of the application and use of computer and information systems in organisations. The superiority of students in this field lies in their broad background in the field of economic and management sciences, which implies familiarity with the world of business.

The use of information technology by organisations is growing exponentially, and new, more complex and challenging applications are being continuously explored and developed. In addition to the fact that their work environment is particularly interesting, many job opportunities are available to well-qualified informatics specialists.

Informatics specialists are trained to analyse the information needs of 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. The term information systems is used nowadays to refer to computer-based systems (including mobile applications) that store and manipulate data so that people can understand, interpret information and use it for decision making.

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.

Duration of the programme

The BCom (Informatics) programme takes a minimum of three years to complete.

Contact information

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Website www.up.ac.za/informatics

First year	
First and second semesters	
Compulsory modules	**Elective module**
▪ Computer and information literacy ▪ Academic literacy levels ▪ Informatics ▪ Financial accounting ▪ Economics ▪ Statistics ▪ Business management	▪ Marketing management An elective module that is taken only if chosen as an elective at the second- and third-year levels.

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

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

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 carefully and systematically, have logical minds, are good at reasoning in a step-by-step way, find it fun to design things that others can use, can pay attention to detail, can recognise good style 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 ensures that they have a solid 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 wide variety of computer science modules that emphasise the most up-to-date ways of developing software for use in the IT industry.

This programme includes a significant number of mathematics and natural sciences modules to strengthen the kind of thinking needed for the development of software and the enhancement of 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
Graduates follow careers in programming, system analysis, system architecture, consulting, database administration and network analysis. They can also be employed as researchers.

Contact information
Dr Linda Marshall (Programme Coordinator)
Tel   +27 (0)12 420 2361
Email   compsci@up.ac.za
Website www.cs.up.ac.za

First year

First and second semesters

- 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 modules from:
- Statistics
- Science

Second year

First and second semesters

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 modules from:
- Chemistry
- Mathematics
- Mathematical statistics or statistics
- Physics

Third year

First and second semesters

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

Specified modules from:
- Computer science
- Data 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, and specifically in one of the following areas of specialisation: data science, genetics, geographical information systems, IT and enterprises, law, music or software development.

What does the programme entail?
The minimum period for the completion of the BSc (Information and Knowledge Systems) programme, which aims to prepare students for careers in the IT industry, is three years.

Computer science has a multidisciplinary application domain, and the purpose of the programme is reflected in the composition of the curriculum, which combines computer science with other fields of study. The possibility of taking a second major other than computer science broadens the scope of the curriculum for students.

Contact information
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Email   compsci@up.ac.za
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First year
First and second semesters

▪ Academic information management ▪ Academic literacy for IT	**Mathematics** ▪ Calculus ▪ Discrete structures
Computer science ▪ Program design ▪ Computers and algorithms ▪ Operating systems	

Second year
First and second semesters

Computer science ▪ Computer organisation and architecture ▪ Data structures and algorithms ▪ Computer systems ▪ Concurrent systems ▪ Theoretical computer science ▪ Software modelling ▪ Introduction to database systems	**Mathematics** ▪ Discrete structures
Community-based project	**Community-based project**

Third year
First and second semesters

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 the first-, second- and third-year levels can be chosen from one of the following fields:
▪ Data science
▪ Genetics
▪ Geographic 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 enjoy working with computers and programming for multiple platforms, are interested in web design and development, would like to learn how to do animation and create computer games, and to do 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. The information can be delivered in many different ways: from using a network-based technology such as the web to using personal computers and mobile devices. Information can thus be delivered in many different media (multimedia). The multimedia degree aims to provide students with the theoretical and technical know-how needed 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 and developers.

The BIS (Multimedia) programme prepares graduates for employment in companies that require insight into both development and design. They could also become dedicated programmers or choose to further develop their skills in particular areas of interest, for example, digital video, front-end development, user experience design, game development or web development.

Contact information
Ms. Annique Smith (Programme Coordinator)
Tel   +27 (0)12 420 4681
Email   annique.smith@up.ac.za
Website www.up.ac.za/information-science

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)

The type of student for whom this qualification is ideal is interested in engaging with information and creating and sharing new knowledge across platforms, primarily digitally, but also in analogue formats.

This qualification will enable graduates to discover, organise, manage and utilise information in an ethical manner. Graduates with skills in this field are highly sought after to help information-intensive industries to meet their visions and missions and become globally competitive.

What does the programme entail?
The high prevalence of information and technology in the modern world implies that graduates are needed with specific competencies and skills related to the interaction between humans and information technologies. This is especially relevant concerning the technologies associated with the Fourth Industrial Revolution (and any further similar innovations).
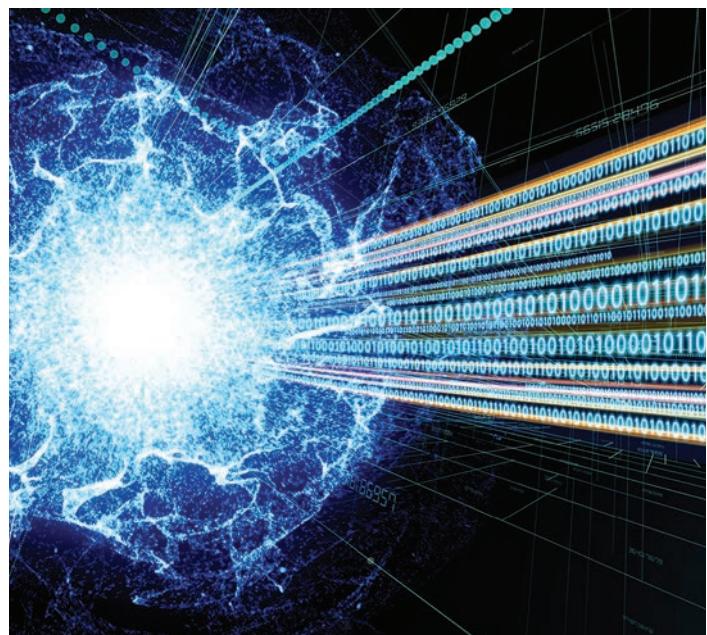
This programme focuses on the use of information technology and the processing of information products. It is designed to train students in the management, retrieval and organisation of information, as well as teach them to package, distribute and add value to information. Students will also have the opportunity to develop their knowledge and skills in the management of information and knowledge, which are the most important resources of enterprises.

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 minimum period for the completion of the BIS (Information Science) programme is three years.

Contact information
Prof Marlene Holmner (Programme Coordinator)
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Email   marlene.holmner@up.ac.za
Website www.up.ac.za/information-science

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 the first-year level	**Elective modules** • Group A: *Informatics or • Group B: Any subject(s) at the first-year level

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

Infographic

BIS (Information Science)

The high prevalence of information and technology in the modern world implies that graduates are needed with specific competencies and skills related to the interaction between humans and information technologies. This is especially relevant concerning the technologies associated with the Fourth Industrial Revolution (and any further similar innovations).

This programme focuses on the use of information technology and the processing of information products. It is designed to train students in the management, retrieval and organisation of information and teach them to package, distribute and add value to information.

Students will also have the opportunity to develop their knowledge and skills in managing information and knowledge, which are the most critical resources of enterprises—information and knowledge. This will include knowledge management, competitive intelligence and also digitisation and digital repositories.

Who is the ideal candidate?

The type of student for whom this qualification is ideal is interested in engaging with information and creating and sharing new knowledge across platforms, primarily digitally and in analogue formats.

This qualification will enable graduates to discover, organise, manage and utilise information in an ethical manner.

Graduates with skills in this field are highly sought after to help information-intensive industries to meet their visions and missions and become globally competitive.

Which companies employ our graduates?

Banks, telecommunication companies, consultancy agencies and information-intensive industries.

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)

Minimum admission requirements

Programme	Minimum requirements for NSC and IEB for 2023		
	Achievement level		APS
SCHOOL OF INFORMATION TECHNOLOGY	English Home Language or English First Additional Language	Mathematics	APS
BIS (Information Science) [3 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	4	-	28

The suggested second-choice programmes for BIS (Information Science) are BIS (Publishing), BCom (Informatics) and BA.

If informatics is selected as a subject at the first-year level, an achievement level of 4 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).

Contact information Prof Marlene Holmner (Programme Coordinator) | **Tel** +27 (0)12 420 5215 | **Email** marlene.holmner@up.ac.za

Infographic

BIS (Multimedia)

Modern information technology offers the possibility of information products being designed and created comprising various types of media over and above the traditional text medium. Information technology, therefore, results in the convergence of various previously separate traditional media. There is not a single discipline that handles the combination of information products.

The Multimedia qualification in the Department of Information Science addresses this shortcoming. Institutions in any economic sphere, including government, may profit from a multimedia approach to information design, organisation and retrieval.

Multimedia documents include text, graphics, sound, video and animation. This qualification aims to enable students to understand the necessary concepts to build multimedia products and maintain the products.

This programme is, therefore, a combination of theory and practice. The explosion of the web and the exponential growth and power of information technology require the introduction of this degree following international trends.

Who is the ideal candidate?

The ideal candidate is someone who is:
- Passionate about computing and technological advancements.
- Happy to spend many hours in front of a computer.
- Interested in creating and maintaining websites (both front- and back-end).
- Interested in learning about animation, image, sound and video editing.
- Interested in the intersection between technical aspects (programming) and design aspects (user experience, visual design).
- Interested in understanding how people interact with computing systems and how to design them based on this knowledge (user experience and interaction design).

What makes this programme unique?

A student with this degree will work in a team of developers and designers and communicate easily with both groups. They will also have the skills to move between these two types of roles within a company.

They will also be able to further their understanding of design, animation, and game design and development and then work in those fields.

Career opportunities

Full-stack web developer

Software engineer

Front-end designer

Multimedia content creator

User experience designer
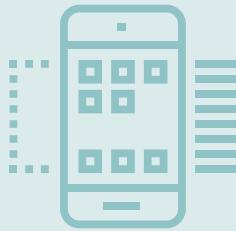
Infographic

Structure of the programme

Core modules
- Theory of information science
- Mark-up languages
- Multimedia theory and trends
- Multimedia authoring tools
- Human-computer interaction
- Programming and program design
- Computer science theory
- Visual design

Elective modules
(3rd year computer science only)
- Software engineering
- Artificial intelligence
- Computer networks
- Programming languages
- Compiler construction
- Computer security
- Database systems
- Computer graphics

Which companies employ our graduates?

- RetroRabbit
- Gendac
- EPI-USE Labs
- Derivco
- bizAR Reality
- 5DT

Minimum admission requirements

Programme	Minimum requirements for NSC and IEB for 2023		
	Achievement level		APS
SCHOOL OF INFORMATION TECHNOLOGY	English Home Language or English First Additional Language	Mathematics	
BIS (Multimedia) [3 years] **Close on availability of space:** As soon as the number of places available for this programme are filled, it will be closed for further applications.	4	5	30

The suggested second-choice programmes for BIS (Multimedia) are BIS (Information Science), BIS (Publishing), BSc (Information and Knowledge Systems) and BCom (Informatics).

Careers: Programmers, web designers, animation specialists, video editors and 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.

Contact information Ms Annique Smith **|** **Email** annique.smith@up.ac.za **|** **Website** www.up.ac.za/information-science > multimedia

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School of Information Technology

BIS (Publishing)

The BIS (Publishing) programmes teaches publishing theory and skills: selecting and developing content based on the needs of the user, and appropriately packaging this content through a process of adding value. Publishing can happen in both paper-based and electronic format and includes a range of products such as books for the trade market, and publications for educational, academic and corporate readers. Publishing processes are also used in the production of mass media products such as newspapers and magazines.

What does the programme entail?
This programme aims to:
- 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 who add value to the production and dissemination of content; and
- 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-oriented candidates can become part of this highly competitive environment at the 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 or the commissioning editor of a media house, or the editorial, production or marketing manager);
- market or picture research;
- copyright negotiations;
- copy-editing and proofreading;
- marketing and promotion; and
- 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; and
- self-publishing and consultancy enterprises.

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

Contact information
Dr Beth le Roux (Programme Coordinator)
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Website www.up.ac.za/information-science
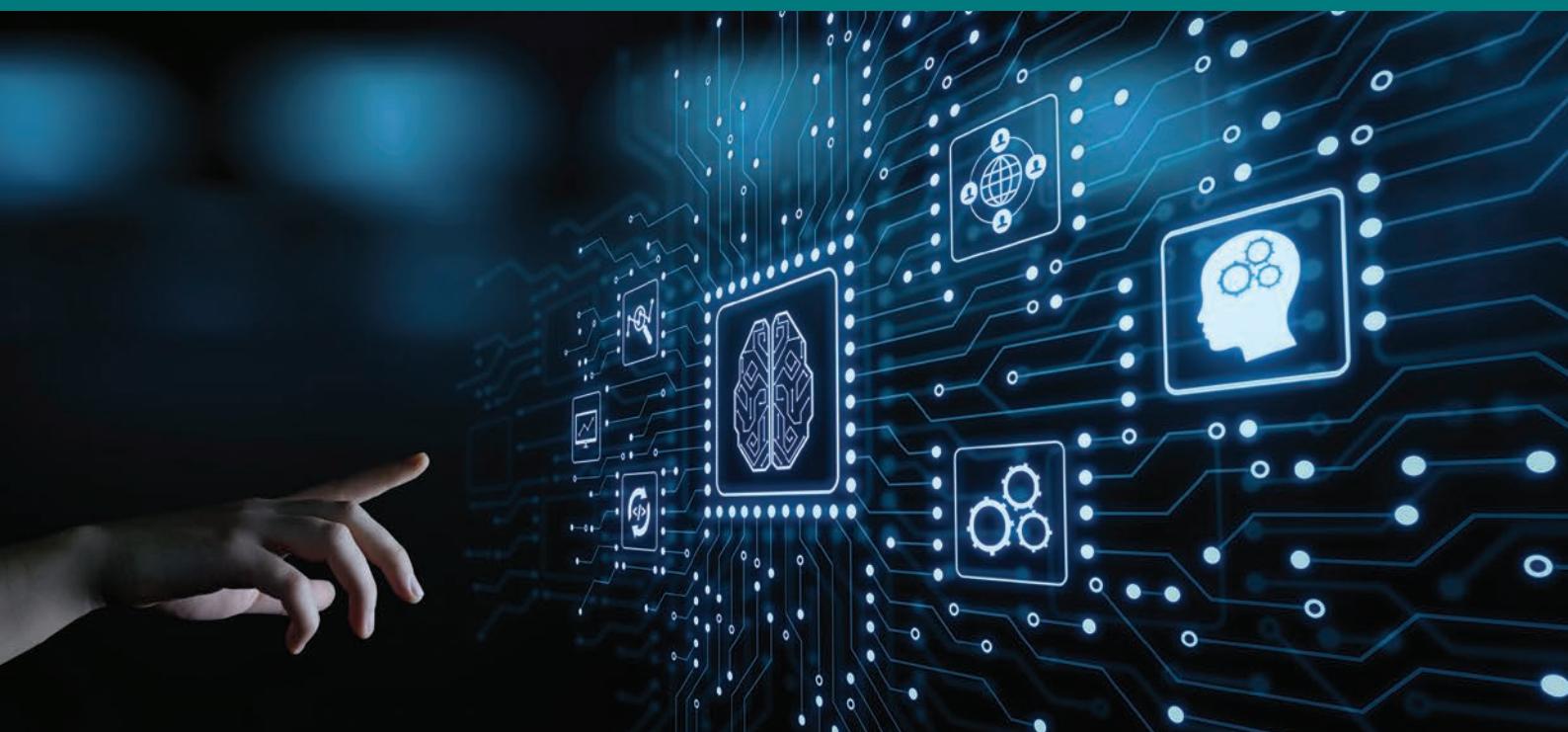
First year	
First semester	**Second semester**
Fundamental modules - Academic information management - Academic literacy levels - Visual culture studies	**Fundamental modules** - Academic literacy levels - English for specific purposes
Core modules Information science - Introduction to information science - 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 programme coordinator.	**Elective modules** Select a modern language of your choice in consultation with the programme coordinator.

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 language selected earlier and select modules in consultation with the programme coordinator.	**Elective modules** Continue with the language selected earlier and select modules in consultation with the programme coordinator.

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 in the first year of study and select one first- or second-semester module in consultation with the programme coordinator.	

EBIT WEEKS

EBIT Weeks are a four-day holiday programme presented by the Faculty of Engineering, Built Environment and Information Technology (EBIT) bi-annually for learners in Grade 10, 11 and 12.

Prospective students are offered this hands-on opportunity to obtain information regarding all the disciplines offered in the School of Engineering, Built Environment and the School of Information Technology. During this event, learners are introduced to the practical as well as the theoretical aspects in order to help them make sound career choices. Learners also obtain industry exposure on-site, or off-campus.

Programmes presented by the School of Engineering during the first and second EBIT Week are listed below:
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Electronic Engineering
- Industrial Engineering
- Mechanical Engineering
- Metallurgical Engineering
- Mining Engineering

Programmes presented by the School for the Built Environment during the first EBIT Week are listed below:
- Architecture
- Construction Management
- Real Estate
- Quantity Surveying
- Town and Regional Planning

Programmes presented by the School of IT during the second EBIT Week are listed below:
- Computer Science
- Publishing
- Information and Knowledge Systems
- Information Science
- Information Systems
- Informatics
- Multimedia

Apply online at www.up.ac.za/ebitweek | **Facebook page** https://www.facebook.com/UP.EBIT

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