

Faculty of Engineering, Built Environment and IT

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.

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.

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.

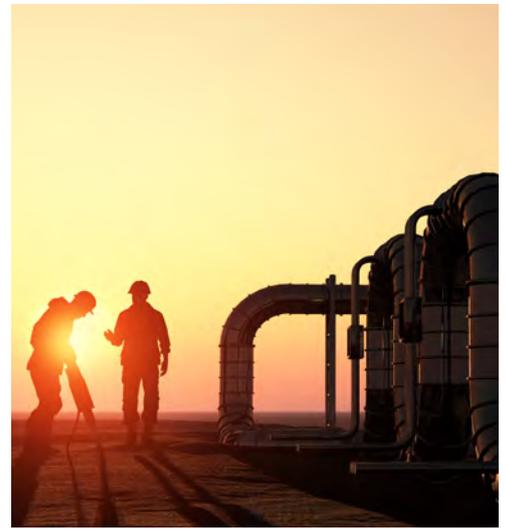
The aptitudes and skills of successful engineers include the following:

- 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

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: NSC/IEB

Programmes	Minimum requirements for NSC and IEB for 2023			
	Achievement level			APS
SCHOOL OF ENGINEERING	English Home Language or English First Additional Language	Mathematics	Physical Sciences	
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.

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

Minimum admission requirements: Qualifications other than the NSC/IEB

For qualifications not indicated in the table below, refer to the conversion table in the brochure:

2023 Undergraduate programme information - Qualifications other than the National Senior Certificate (NSC) and Independent Examination Board (IEB) at www.up.ac.za/programmes > Undergraduate > Admission information

Programme	Minimum requirements for 2023									
	Achievement level									
	Compulsory subjects	IGCSE/LGCSE/BGCSE/SGCSE/GCSE/NSSC OL/O Level = Gr 11*	AS Level	IB SL	IB HL	HIGCSE/NSSC HL	KOMBI ABITUR	CGCE UCE NECO WAEC ZIMSEC O Level = Gr 11*	CGCE UACE WAEC ZIMSEC A Level	KCSE
BEng (Mining Engineering)	English Mathematics Physics Chemistry	C B B B	C B B B	4 5 5 5	3 4 4 4	3 2 2 2	60–69% 70–79% 70–79% 70–79%	C B B B	E D D D	B+ A- A- A-



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