

Engineering, Built Environment and Information Technology

From Beach Sands to Metal 3-D Printing to Medical Implants

by Prof Roelf Mostert

Materials and metallurgical engineering as an exciting and fulfilling career

Southern Africa is blessed with rich mineral reserves and natural sources of energy. These reserves must, however, be responsibly harnessed for use by communities, and it is in this regard that the materials and metallurgical engineer makes a valuable contribution.

One example of a valuable resource found in South Africa is the titanium-rich sands with their typical black appearance that are found in some coastal areas.

Titanium sands are magnetic and metallurgical engineers utilise magnetism to separate the valuable portions of the sand (this is a subfield of metallurgy called minerals processing). High heat is applied and through smelting processes (pyrometallurgy) the minerals are transformed into a molten state. The end purpose of the beneficiation processes is to produce the value-added products required by society, such as titania powder, which is used in the manufacturing of paints; pig iron, used in foundries; and titanium alloys, used in **aerospace manufacturing and medical implants**.

Physical metallurgists develop, manufacture and monitor the production and use of components made from metals and alloys. They often use advanced manufacturing processes, such as **metal 3-D printing** (laser-assisted additive manufacturing) to produce components with new sets of properties. When materials and metals fail, for instance when a bridge collapses, a **physical metallurgist** works as part of the **forensic team**, to conduct an investigation and is often called as an **expert witness** to explain the reasons for the failure to the court.

The rich diversity of materials applications and the challenges faced by metallurgical engineers ensure a career that is always exciting, fulfilling and rewarding.

Contact information

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Minimum admission requirements for 2019

Programme	Minimum requirements for 2019						
	Achievement level*						APS
SCHOOL OF ENGINEERING	English Home Language or English First Additional Language		Mathematics		Physical Science		
	NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
BEng (Metallurgical Engineering) [4 years] Closing dates: SA – 30 September Non-SA – 31 August	5	C	6	B	6	B	35

Careers: Metallurgical engineers unlock the riches of deposits of metal ores, coal and diamonds and optimise the manufacture of metal components. They work in plants where valuable minerals are recovered from ore, where metals are produced out of the minerals and where the metals are converted into useful materials – such as steel or aluminium. Careers include production engineers, plant managers, consultants and researchers.

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