



DEPARTMENT OF MATERIALS SCIENCE AND METALLURGICAL ENGINEERING

www.up.ac.za/materials-science-and-metallurgical-engineering

KEY RESEARCH IMPACT

The research of EBIT's Department of Materials Science and Metallurgical Engineering often results in optimised industrial processes, be it in minerals processing, the extraction of valuable metals or in the manufacture of metallic products. Such process innovations are frequently aimed at the realities of South African plants and feedstocks, and result, among others, in the production of high-quality products through the innovative use of ageing plant or low-grade minerals.

RESEARCH OPPORTUNITIES

- Minerals processing
- Pyrometallurgy and pyrometallurgical modelling
- Refractory materials
- Microalloying and thermomechanical processing
- Physical metallurgy and corrosion
- Materials degradation and forensics
- Welding engineering

RESEARCH PRIDE

Research chairs and entities

- Anglo-American Chair in Pyrometallurgy
- Centre for Pyrometallurgy
- Industrial Metals and Minerals Research Institute
- SAIW Centre for Welding Engineering

South African National Research Foundation (NRF)-rated researchers

- Prof Andrie Garbers-Craig (C1 NRF-rating)
- Prof Waldo Stumpf (C2 NRF-rating)
- Dr Dick Groot (C3 NRF-rating)
- Dr Theresa Coetzee (C3 NRF-rating)

INDUSTRY CONTRIBUTION

The Department's research programme is focused on industrial problems faced by the metallurgical industry in South Africa and the rest of the continent. It receives generous support from and has many healthy interactions with leading mining and metallurgical companies such as Anglo American Corporation, Kumba Iron Ore, Exxaro, Columbus Stainless, Sasol, ArcelorMittal SA and BHP Billiton.

One of the cornerstones of Industry 4.0 is advanced manufacturing processes and alloys. The South African government has invested significantly in establishing a local titanium industry, given the abundance of this mineral in South Africa. The Department plays an increasingly important role here with research contributions on light metal alloy development, powder metallurgy, investment casting and 3D printing. One example of this is additive manufacturing (3D printing) of Ti-alloys for medical implants and aerospace applications.



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research institution.

Metallurgical engineers unlock the riches of mineral deposits present in the earth's crust. They are assets to the economy of a country and ensure continuous optimisation of minerals processing and metals extraction plants. Enhancing industrial plant and component life in demanding process environments is another focus area of metallurgical engineers.

CAREER PATHWAYS

Qualified metallurgical engineers can register as professional engineers (Pr. Eng.) after obtaining the required industry exposure. In addition to occupying highly satisfying positions, professional engineers can also undertake consultation work. Honours and master's degree programmes in the Department allow postgraduate students to obtain specialised knowledge in their chosen field, which will benefit them in their careers in industry. Metallurgical engineers who are interested in becoming qualified welding engineers with international certification will be able to do so after completing an honours degree in this field. For those interested in an academic or research career, a PhD degree from the Department is an invaluable asset.

POSTGRADUATE DEGREE PROGRAMMES

Honours and master's programmes

These programmes provide students with in-depth knowledge in selected fields of metallurgical engineering and serve either to enrich the knowledge of the student, or as the fundamental basis of doctoral research.

BEngHons (Metallurgical Engineering) ■ BScHons (Applied Science) (Metallurgy)
MEng (Metallurgical Engineering) ■ MSc (Applied Science) (Metallurgy)

Welding engineering

The honours programmes in welding engineering provide students with the knowledge required to register as an International Welding Engineer (in the case of the BEngHons (Metallurgical Engineering) option Welding Engineering degree programme), or as an International Welding Technologist (in the case of the BScHons (Applied Science) (Metallurgy) option Welding Technology degree programme).

BEngHons (Metallurgical Engineering) option Welding Engineering
BScHons (Applied Science) (Metallurgy) option Welding Technology

Doctoral programmes

PhD Metallurgical Engineering ■ PhD Metallurgy

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Curriculum, rules and regulations: www.up.ac.za/en/yearbooks/2018/home



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