Frequently Asked Questions:
Department of Chemical Engineering

The Department of Chemical Engineering takes pride in developing well-rounded, highly-skilled chemical engineers since 1969.

What is chemical engineering?

Chemical engineering relates to the design, operation and optimisation of processes used to produce valuable products from raw materials on a large scale. These valuable products are critically important to almost every sphere of modern society, from basic consumables to commodities. Processes designed and operated by chemical engineers are also important for delivery of services, such as supply of potable water, pollution prevention, and environmental management. The chemical engineer, therefore, plays a pivotal role in society and has the opportunity to improve the everyday lives of people.

Where do chemical engineers work?

Chemical engineers focus on ensuring safe and environmentally friendly processing, while also considering economical aspects. They can specialise in many sectors and areas of expertise, including:

- Biotechnology
- Vaccine development
- Pharmaceuticals
- Petrochemicals
- Cosmetics
- Mining and metallurgy
- Water purification and technology
- Fertilizers
- Renewable energy

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- Nanotechnology
- Explosives
- Paper and pulp
- Food and beverages
- Fast-moving consumer goods (FMCG)
- Energy and environmental affairs
- Cement and glass
- Data science and machine learning
- Business and financial services
- Biomedical sector
- Management consultancy

Typical job functions of chemical engineers include the following:

- Designing processes for conversion of raw materials
- Improving and optimising existing processes
- Coordinating production
- Managing business units
- Researching and developing novel processes and products

Should students wish to pursue postgraduate studies after their BEng degree, they could do research in one of the five research focus areas: bioresource engineering, extractive metallurgy, separation technology, water technology, and machine learning. Completing postgraduate research degrees would enable you to enter the academe or pursue research as a career path.

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What do chemical engineers study (i.e. a bit about the curriculum)?

Watch this video for a detailed description of our curriculum, presented by Prof Tobi Louw, our Undergraduate Programme Coordinator.

The Bachelor of Engineering (BEng) (Chemical Engineering) degree starts with a common first year; all BEng first-year students will register for the same modules. Modules focus mainly on mathematics and fundamental natural sciences, such as physics and chemistry, applied to the engineering context. They will also learn about ethics, professionalism and effective communication.

Second- and third-year modules will equip students with a sound theoretical knowledge of key chemical engineering concepts. Students will learn how to best describe and model the behaviour of different phases of matter. They will understand the fundamental concepts that explain how heat is transferred, why chemicals react, what entropy means, and will use mathematics to calculate how quickly, and to what extent, it all happens. They will learn to design reactors, heat exchangers, transport equipment (such as pipes, valves and pumps) and the required separation process units to obtain a pure product.

The fourth year is the final preparation to enter industry. Students will be trained to manage large engineering projects as a member of a team of engineers from different disciplines. Undergraduate studies will culminate in the design of a chemical, biochemical or metallurgical plant through application of all the theory learnt up to that point. A final-year research project will be completed that investigates an engineering problem in order to arrive at a suitable solution through independent learning and application of chemical engineering principles.

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Do I have to do Engineering Graphics and Design or Information Technology at school to be able to study chemical engineering?

Engineering Graphics and Design or Information Technology are not required for admission to the BEng programme. All first-year BEng students register for Engineering Drawings 123, which will equip students with the necessary knowledge and skills in this subject area. Engineering drawings is important in the chemical engineering context as it relates to the use of equipment design and plant layout drawings in many chemical engineering areas of specialisation. Students will also register for a computer programming module in the second semester of the first year where they will learn the necessary programming skills required for subsequent years of study.

What facilities does the Department of Chemical Engineering offer?

The Department offers excellent facilities for teaching, practical training, and research, equipping our graduates for the world of work and postgraduate research. These include modern lecture rooms and well-equipped laboratories with a wide range of laboratory-scale setups and pilot-scale unit operations that are used for undergraduate practical modules and final-year research projects.

What are the admission requirements and selection criteria for BEng programmes for 2026?

Please click here for detailed information on the minimum admission requirements for all four-year engineering programs.

How can I contact the department?

Visit our website: Our website has more information and videos about our BEng (Chemical) degree, our education philosophy, our lecturers, and the department. The contact information for the liaison for prospective students is also listed on the website.

Email us: Contact undergradchem@sun.ac.za if you have any questions or need support.