

## Chemical Engineering: Frequently Asked Questions

The Department of Chemical Engineering (previously the Department of Process 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 crucially important to almost every sphere of the modern society, be it in the form of basic consumables or 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 taking economical aspects into consideration; they can specialise in many areas of expertise.

Some of the various sectors that our alumni work in include:

- Biotechnology
- Vaccine development
- Pharmaceuticals
- Petrochemicals
- Cosmetics
- Mining and metallurgy
- Water purification and technology
- Fertilizers
- Renewable energy
- 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
- Improvement and optimisation of existing processes
- Coordination of production
- Management of business units
- Performing research for the development of novel processes and products

Should you wish to pursue postgraduate studies after your BEng degree, you could do research in one of our six research focus areas: bioresource engineering, extractive metallurgy, separation technology, waste valorisation, water technology, and machine learning. Pursuing research would enable you to enter the academia or become involved in research as a career path.

### What do Chemical Engineers study (i.e. a bit about the course itself)?

Watch [this video](#) for a detailed description of our curriculum. It's presented by Prof Tobi Louw, who is currently our Undergraduate Programme Coordinator.

**The Bachelor of Engineering (BEng Chemical Engineering) degree starts with a common first year;** you and your fellow 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. You will also learn about ethics, professionalism and effective technical communication.

**Second and third-year modules will equip you with a sound theoretical knowledge of key chemical engineering concepts.** You'll learn how to best describe and model the behaviour of different phases of matter. You'll understand the fundamental concepts that explain how heat is transferred, why chemicals react, what entropy means, and you'll use mathematics to calculate how quickly and to what extent it all happens. You 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 and final year is the final preparation to enter industry.** You will be trained to manage large engineering projects as a member of a team of engineers from different disciplines. Your undergraduate studies will culminate in designing a chemical, biochemical or metallurgical plant through application of all the theory you have learned up to that point. You will also do a final-year research project where you will investigate an engineering problem and arrive at a suitable solution through independent learning and application of chemical engineering principles.

### **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 programme. The curriculum of the first year module Engineering Drawings 123, which all engineering students register for, is structured assuming that first year students did not have Engineering Graphics and Design as a school subject. Engineering drawings is important in the chemical engineering context because of the use of equipment design and plant layout drawings in many chemical engineering areas of specialisation. You will also register for a computer programming module in the second semester of your first year where you'll learn the necessary programming skills required for subsequent years of study.

### **What facilities does the Department of Chemical Engineering offer?**

The Department of Chemical Engineering 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.

### **How can I contact the department?**

**Visit our [website](#):** The website has many interesting videos and information about our BEng (Chemical) degree, our education philosophy, our lectures, and the department. The contact information for the liaison for prospective students is also listed on the website.

**Email us:** [chemengchair@sun.ac.za](mailto:chemengchair@sun.ac.za)