The School of Engineering offers national diploma and degree courses in engineering through open distance learning (ODL) to students who are interested in becoming professional technicians and technologists in a number of engineering disciplines. These disciplines include civil, chemical, electrical, mechanical, industrial and mining engineering. National diplomas in paper and pulp as well as mine surveying is also available. Join us as a student to develop yourself as a professional.

Department of Civil and Chemical Engineering

When one considers the rapid advancement and changes in the physical and naturally constructed environments, one can’t but acknowledge, amongst others, the civil engineers who are closely involved with the design, construction and maintenance of roads, buildings, bridges and dams. Chemical engineers, on the other hand are widely employed across many sectors including chemicals, explosives, coal and gas, pharmaceuticals.

CIVIL ENGINEERING

Careers in civil engineering

Are you a person with the following qualities?

- A creative, yet logical thinker
- A problem solver
- Systematic in your approach to problems
- Likes to take on challenges
- A good decision maker
- Likes to improve the quality of community life

If your answer is YES to these questions then you should consider a career in civil engineering!

What is civil engineering?

Civil engineering is the art and science of planning, design and construction of infrastructure for society, through critical and creative thinking on work that is functional, economical, aesthetically pleasing and environmentally sustainable.

What do civil engineers and technologists do and how?

The civil engineering work is multidisciplinary as it encompasses the planning, design and construction of projects. The work requires a vast knowledge and understanding of the behaviour, quality, properties and application of engineering materials. Generally, any civil engineering work and products require fair supervision and managerial skills, and therefore knowledge of non-technical matters such as economics, finance, legal and labour affairs.

The civil engineer will be responsible individually or as part of a team for one or more of the following aspects: Planning, investigations, design, detailing, analysis, bill of quantities, cost estimates, specifications, tender documentation, project management, work inspections, testing of materials and payment certificates.

Where do civil engineers and technologists work?

- In the public sector, whether at municipalities or provincial or national government departments
- In the private sector as consulting engineers and contractors

Specialisation options offered at Unisa civil engineering:

Water engineering:
- Dams
- Pipelines and reticulations
- Reservoirs
- Water purification works
- Waste water treatment works

Structural engineering:
- Concrete structures
- Steel structures
- Masonry structures
- Timber structures

Construction management:
- Management of the construction of all types of civil engineering work

Urban engineering:
- Development and maintenance of all municipal facilities

Environmental engineering:
- Environmental impact studies of all civil engineering work and products on the environment

Admission requirements

Please refer to the MyChoice brochure or visit www.unisa.ac.za/cset for admission requirements

Contact information

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Department of civil and chemical engineering

Unisa (Florida Campus)
Private Bag X 6
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CHEMICAL ENGINEERING

Careers in Chemical Engineering

Are you a person with the following qualities?

- A creative, yet logical thinker
- A problem solver
- Systematic in your approach to problems
- Likes to take on challenges
- A good decision maker

If your answer is YES to these questions then you should consider a career in chemical engineering!
What is chemical engineering?
Chemical engineering is concerned with industrial processes for the conversion of raw materials into products with a higher economic or social value through physical and chemical changes. Chemical engineers also play a key role in the conservation and protection of the environment. They enjoy a wide variety of employment opportunities compared to other engineering disciplines. There is a shortage of chemical engineers and technologists worldwide, and salaries have increased in line with demand.

What do chemical engineers and technologists do and how?
Chemical engineers work in manufacturing, pharmaceuticals, healthcare, design and construction, pulp and paper, petrochemicals, food processing, specialty chemicals, microelectronics, electronic and advanced materials, polymers, business services, biotechnology and the environmental health and safety industries, among others.

Chemical engineers rely on their knowledge of mathematics and science, particularly chemistry, to overcome technical problems safely and economically. And, of course, they draw upon and apply their engineering knowledge to solve any technical challenges they encounter. Their expertise is also applied in the areas of law, education, publishing, finance and medicine, as well as in many other fields that require technical training.

They also construct the synthetic fibers that make our clothes more comfortable and water resistant; they develop methods to mass-produce drugs, making them more affordable and they create safer, more efficient methods of refining petroleum products, making energy and chemical sources more productive and cost effective.

Where do chemical engineers and technologists work?
Chemical engineers are widely employed in the following employment sectors:

- Chemicals
- Metallurgical
- Oil, coal and gas
- Pharmaceuticals
- Petrochemicals
- Plastics and fibres
- Explosives
- Agriculture
- Food processing
- Effluent treatment
- Water treatment
- Power generation
- Cement manufacturing
- Papermaking
- Education
- Government
- Research and consulting

QUALIFICATIONS IN CIVIL AND CHEMICAL ENGINEERING
Diplomas
- National Diploma: Engineering: Civil
- National Diploma: Engineering: Chemical
- National Diploma: Pulp and Paper Technology

BTech
- BTech: Engineering: Chemical
- BTech: Engineering: Chemical (Environmental)
- BTech: Engineering: Civil
- Construction Management
- Environmental Engineering
- Structural
- Urban Engineering
- Water

Admission requirements
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DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

MECHANICAL ENGINEERING
Are you a person with the following qualities?
- An aptitude for mathematics and science who also enjoys working with people?
- An analytical mind that enjoys exploring possible improvements to existing systems coupled with the ability for creative and practical work?
- An interest in learning about the machines that bring convenience and excitement to our lives, and in discovering the secrets behind control systems such as the cruise control of an airplane?

If your answer is YES to these questions then you should consider a career in mechanical engineering!

What is mechanical engineering?
Mechanical Engineering is concerned with the design, development, installation, operation and maintenance of just about anything that has movable parts. It involves the production, transmission, and use of mechanical power. Everyday mechanical engineering work involves a wide range of activities and challenges.

A good example of the involvement of mechanical engineering practitioners may be found in the design and planning of new products. The mechanical engineering team designs better products as well as facilities for manufacturing these products.
The scope of projects could include capital equipment, market research, workshops, production plants and even mining. The technician must ensure that the design elements of the projects are compatible and that the capital, plant, manpower and raw materials are optimally employed, resulting in feasible and economically viable projects.

What do mechanical engineers do and how?
Mechanical engineers specialise in designing systems and machines for the economic use of natural and human resources. The emphasis is on the design, production and maintenance of improved or more efficient systems. Owing to the scope and nature of engineering assignments, which can be very large and complex, engineering practitioners normally work in teams to effectively and efficiently complete projects.

The Mechanical engineering teams concentrate on the following branches of mechanical engineering:
- **Quality**: the quality of the products or services provided must exceed the expectations and needs of the consumer.
- **Design**: products must be designed to ensure maximum profits through the product life cycle. This includes all market aspects from the start of the research phase to proper phasing out of products and manufacturing equipment.
- **Manufacturing**: manufacturing processes and systems, production planning, factory layout, ergonomics and reduction of waste must be optimised to limit expenses to a minimum.
- **Maintenance**: systems and equipment must be maintained to perform at their optimal level. Products must be developed so that they can be economically maintained through their lifecycle.

Where do mechanical engineers work?
The breadth of the mechanical engineering discipline allows students a variety of career options beyond some of the industries listed below. Regardless of the particular path they envision for themselves after they graduate, their education will have provided them with the creative thinking that allows them to design an exciting product or system, the analytical tools to achieve their design goals, the ability to overcome all constraints, and the teamwork needed to design, market, and produce a system. These valuable skills could also launch a career in medicine, law, consulting, management, banking, and finance.

- Aerospace
- Agriculture
- Automation
- Banks
- Biotechnology
- Computers and electronics

INDUSTRIAL ENGINEERING
Are you a person with the following qualities?
- An aptitude for mathematics and science who also enjoys working with people?
- An analytical mind that enjoys exploring possible improvements to existing systems coupled with the ability for creative and practical work?
- Enjoys business transactions and the analysis of spending patterns and preferences?

If your answer is YES to these questions then you should consider a career in Industrial Engineering!

What is Industrial Engineering?
Industrial engineering is concerned with the design, improvement and installation of integrated systems of people, materials, information, equipment and energy. It draws upon specialised knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design, to specify, predict, and evaluate the results to be obtained from such systems.

The history of Industrial Engineering is rooted in the application of these core disciplines to the analysis and design of the manufacturing enterprise. However, Industrial Engineering problems are found in retail, distribution and supply chain, banking, healthcare, many other environments. Industrial Engineering is almost universal in its applicability.

Industrial Engineers concentrate on the following branches of Industrial Engineering:
- **Quality**: the quality of the system and processes, as well as the quality of the products or services provided.
- **Manufacturing**: manufacturing processes and systems production planning, factory layout, ergonomics and reduction of waste.
- **Logistics**: transport networks, movement of material, scheduling, project management, etc.

Mechanical Engineering is concerned with the design, development, installation, operation and maintenance of just about anything that has movable parts. It involves the production, transmission, and use of mechanical power. Everyday mechanical engineering work involves a wide range of activities and challenges.
What do industrial engineers and technologists do and how? Everyday industrial engineering work involves a wide range of activities and challenges. A good example of the involvement of industrial engineering practitioners may be found in the design and planning of new projects. The industrial engineering team designs more effective methods and facilities for manufacturing and services. These projects could include capital equipment, civil construction work, workshops, production plants and even mining. The technician must ensure that the design elements of the projects are compatible and that the capital, plant, manpower and raw materials are optimally employed, resulting in feasible and economically viable projects.

Where do Industrial Engineers and technologists work? Industrial engineers are widely employed in the following employment sectors:

- Aerospace
- Aluminium and Steel
- Banking
- Ceramics
- Construction
- Consulting
- Education
- Electronics Assembly
- Energy
- Forestry and logging
- Government
- Insurance
- Materials Testing
- Medical Services
- Mining
- OIl, Coal and Gas
- Plastics and forming
- Retail
- Shipbuilding
- Transportation

QUALIFICATIONS IN MECHANICAL AND INDUSTRIAL ENGINEERING

Diplomas
- National Diploma: Engineering: Industrial
- National Diploma: Engineering: Mechanical

BTech
- BTech: Engineering: Industrial
- BTech: Engineering: Mechanical

Admission requirements Please refer to the MyChoice brochure or visit www.unisa.ac.za/cset for admission requirements.

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DEPARTMENT OF ELECTRICAL AND MINING ENGINEERING

Electrical engineering

Careers in electrical engineering Are you a person with the following qualities?
- An aptitude for mathematics and science
- Enjoys working with people
- An interest in developing the ability to solve complex problems
- An analytical mind
- Enjoy exploring possible improvements to existing systems coupled with the ability for creative and practical work
- The desire to develop a professional approach to your work and conduct

If your answer is YES to these questions then you should consider a career in electrical engineering!

What is electrical engineering? Electrical and electronic engineering are exciting and dynamic fields. Electrical engineers and technologists are responsible for the generation, transfer and conversion of electrical power while electronic engineers and technologists are concerned with the transfer of information using radio waves, the design of electronic circuits, the design of computer systems and the development of control systems such as aircraft autopilots. These sought-after professionals can look forward to rewarding and respected careers.

What do electrical engineers and technologists do and how? Electrical engineers and technologists are the professionals that deal with the study and application of electricity, electronics and electromagnetism. They work on the development of new and advanced products that are powered by electricity or produce electricity. Examples are projects on medical technology, gaming systems, cellular phones, robots, cars and airline navigation systems. Electrical engineering is also concerned with control systems, telecommunications and signal processing.

Where do electrical engineers and technologists work? Electrical engineers and technologists work:
- Power distribution—both primary and secondary distribution
- Power generation, including co-generation and standby systems
- Lighting design and control, including both interior and exterior lighting
- Power conditioning and uninterruptible power supply
- Telecommunications
- Security and surveillance
- Fire alarm systems
- Programmable controllers
- Lighting protection
- Renewable Energy Systems

Industrial engineering is concerned with the design, improvement and installation of integrated systems of people, materials, information, equipment and energy. It draws upon specialised knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design, to specify, predict, and evaluate the results to be obtained from such systems.
Electrical and electronic engineering are exciting and dynamic fields. Electrical engineers are responsible for the generation, transfer and conversion of electrical power.
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