

Civil Engineering

Civil engineers create facilities to improve the quality of life of man and its environment. The responsibility of civil engineers is the planning, design, construction and maintenance of facilities and structures such as roads, railway lines, bridges, tunnels, transport systems, harbours and airports, irrigation systems, water and sewage purification, buildings of all types and many more. They therefore play a leading role in development of the infrastructure. Civil engineers usually specialize in one of the following fields:

Structural Engineers use materials such as pre-stressed concrete, reinforced concrete, metal, timber and reinforced plastics. These materials are indispensable in the design of large buildings and bridges.

Water Resources Engineers design and build dams, irrigation systems, storm water systems, sewerage and water purification systems, and harbours and coastal structures.

Geotechnical Engineers study rock and soil mechanics and take responsibility for the design of effective and economic earth and rock structures, dam walls and road fills.

Traffic and Transportation Engineers are involved in the design and construction of roads, railways, airport runways and traffic systems in cities.

All disciplines in civil engineering have close ties with industry, therefore it is necessary for civil engineers to receive practice, training and experience while still studying.

Education

- ◆ **Professional Engineer** – a four year university degree followed by a practical period of three years to receive professional status.
- ◆ **Professional Technologist (Engineering)** – a five year technikon diploma of which two years are devoted to practical training to qualify for a Master Diploma in Technology. Professional status is achieved in three years in the field.
- ◆ **Registered Engineering Technician** – a three year technikon diploma course of which 50% comprises of practical training, followed by two years of experience to achieve professional status.
- ◆ **Artisan** – education requires registration as an apprentice, practical training and theoretical education at a technical college.

*The Engineering Professions
Association of Namibia*

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A Career in Engineering

Like every young person about to embark on a career, you have dreams and aspirations and are setting yourself goals of personal achievement. Engineering offers a good profession for both men and women.

How do you know you are suited for engineering?

If you are someone who:

- Is diligent with the ability to persevere
- Is creative
- Has mathematical ability
- Is environmentally conscious

Engineering offers many various disciplines, the main disciplines are;

Industrial Engineering

Industrial Engineers create systems to create wealth for everybody. They concern themselves with production, to increase production factors to their optimum values. Industrial engineers are involved in the full life cycle of a product. In the design stage, they see to the functionality and the aesthetic aspects of the product and ensure the manufacturability of the product. They even design the product line on which the product is manufactured. At each step of production they identify and choose the most economic alternative. The study and the use of labour and machines in the most productive manner are a significant part of the industrial engineer's daily task. They design and manage large informative systems and help to develop a scientific basis for making management decisions. Almost every organisation in the industrial, business or service sector can make use of the expertise of industrial engineers.

Chemical Engineering

Chemical engineers use the principles of chemistry, biochemistry and physics to convert agricultural and mineral resources into useful products on an industrial stage. They convert the laboratory chemist's test tube reaction into a process that will produce hundreds or thousands of tons of a particular product daily. Chemical engineers develop industrial processes that change the composition or characteristics of material on a large scale, for example food, petroleum, mining products and minerals, fertilizer, paper, glass and pharmaceutical industries. An interest in chemistry and managing and operating installations are important for success as a chemical engineer. Chemical engineers deliver products that play an important role in every aspect of modern society. They design equipment to combat and minimize pollution, thereby protecting the environment.

Electrical and Electronic Engineering

Electrical and electronic engineers work with the distribution and effective utilization of electrical energy to man's benefit.

Electrical engineers are responsible for the generation of electricity in power stations, where the primary source energy (coal, hydro-energy, and nuclear energy) is converted into electrical energy. The electrical energy reaches the consumers through distribution network. The

energy is used for heating, lighting or transport purposes, to power electrochemical processes, electronic equipment and household appliances

Electronic engineers are responsible for the processing and control of information in all forms. The electronic engineer's main task is the computer aided control of systems and the establishment and operation of telecommunications systems. Some products of these engineers include radio and television, computers, video and hi-fi equipment, electronic games, medical electronic systems, telephone networks, aircraft control systems etc. The availability of electrical energy is a main factor in development and information gains. Worldwide, electrical and electronic engineering are currently fast-growing industries.

Computer Engineering

This specialised field of electronic engineering has resulted from the international explosion in the fields of information and communication technology, and the incredible shortage of skilled human resources in particularly these fields.

Agricultural Engineering

The agricultural engineer plans designs and develops equipment and structures needed for the production of agricultural products, eg. fruit and vegetables. Agricultural engineering has the following focal areas; agricultural mechanization, irrigation and drainage, agricultural structures, soil and water conservation. The engineer can be involved in community services, and testing and evaluating of equipment and products related to agriculture.

Mining Engineering

The profession of mining engineer encompasses a wide spectrum of engineering work among other things, the evaluation of new mining projects. This is followed by the design and construction of a mine until it becomes productive. The operation of a mine includes the planning and management of mining activities, the management of the entire mining operation, the expert control and improvement of aspects such as blasting, mine climate control, strata control, plant design and the devising of mining methods.

Mechanical and Aeronautical Engineering

The mechanical engineer designs, develops, manufactures, maintains and markets mechanical plant. Mechanical plant comprises all machines that improve the quality of our daily lives, such as vehicles, ships, aircraft, video machines, air-conditioning plants, lifts, cold drink cans, hair dryers etc. They also organize and run industrial installations and process plants.

The types of activity in which mechanical engineers are typically involved include research, development, manufacture, commissioning, maintenance, management, marketing and training. Mechanical engineers can specialize in fields such as machine design, marine engineering, naval architecture, aeronautical engineering, air conditioning and refrigeration and metallurgical engineering. Computer-aided design is a tool for modern mechanical engineers.