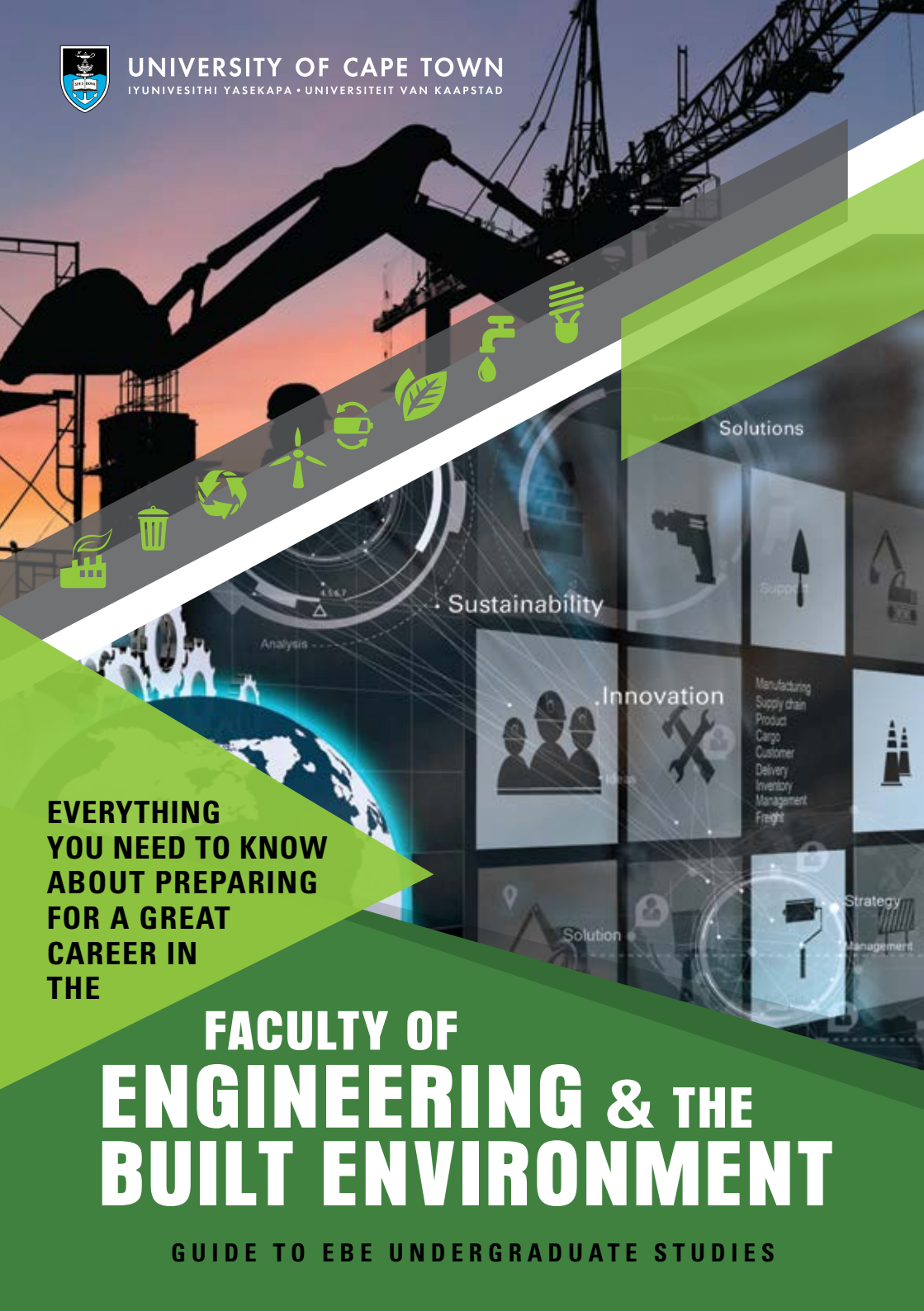




UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD



**EVERYTHING
YOU NEED TO KNOW
ABOUT PREPARING
FOR A GREAT
CAREER IN
THE**

FACULTY OF ENGINEERING & THE BUILT ENVIRONMENT

GUIDE TO EBE UNDERGRADUATE STUDIES

Solutions

Sustainability

Innovation

Support

Manufacturing
Supply chain
Product
Cargo
Customer
Delivery
Inventory
Management
Freight

Strategy
Management



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The Faculty of Engineering & the Built Environment (EBE) at UCT enjoys an outstanding international reputation for its high-quality graduates and for its groundbreaking research.

This brochure will provide you with information that will help you make an informed choice about which programme to study and the career options that will be available to you once you have graduated.

Our degrees are internationally accredited degrees and enable graduates to compete on equal terms with their peers all over the world. We also ensure these degree programmes are responsive to the exciting challenges facing our developing nation.

Should you require further information please contact our Faculty Office at email ebe-faculty@uct.ac.za or telephone (021) 650-2699 or visit www.ebe.uct.ac.za for more information.



ENGINEERING AND THE BUILT ENVIRONMENT DISCIPLINES

ARCHITECTURE, PLANNING, AND GEOMATICS

Undergraduate degree programmes:

- Architectural Studies (BAS)
- Geomatics (BSc):
 - Geoinformatics
 - Surveying



CIVIL ENGINEERING

Undergraduate degree programme:


- Civil Engineering (BSc(Eng))



CONSTRUCTION ECONOMICS AND MANAGEMENT

Undergraduate degree programmes:

- Construction Studies (BSc)
- Property Studies (BSc)



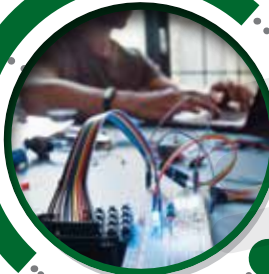
ENGINEERING AND THE BUILT ENVIRONMENT DISCIPLINES



CHEMICAL ENGINEERING

Undergraduate degree programme:

- Chemical Engineering (BSc(Eng))



ELECTRICAL ENGINEERING

Undergraduate degree programmes:

- Electrical Engineering (BSc (Eng))
- Electrical and Computer Engineering (BSc(Eng))
- Mechatronics (BSc(Eng))



MECHANICAL ENGINEERING

Undergraduate degree programmes:

- Electro-mechanical Engineering (BSc(Eng))
- Mechanical Engineering (BSc(Eng))



BUILT ENVIRONMENT

SCHOOL OF ARCHITECTURE, PLANNING AND GEOMATICS

The School offers nationally and internationally accredited degree programmes which give graduates access to career opportunities in many built environment professions.

ARCHITECTURE STUDIES

Bachelor of Architectural Studies is a foundation programme in the design of buildings and the urban and landscape environments around them. This professionally accredited degree provides the necessary ability in design, theory, technology and communication to proceed to a wide range of graduate professional programmes in architecture, landscape architecture, urban design, and city and regional planning.

The studio-based model of the curriculum is underpinned by the objective to produce internationally competitive graduates with a capacity for critical engagement with context and change.



FACT: The Carlton Centre in Johannesburg, built in 1973, is still the tallest building in all of Africa. It is 223 meters high with 50 floors.

Admission to the degree requires your school results, UCT National Benchmark test results, a written motivation and a portfolio of work.

YOU WILL NEED to have Mathematics as a subject.

Career Opportunities

BAS graduates can work in architectural and other design and planning offices, interior design, landscape architecture, property development and in the building industry and can lead to professional registration as a senior architectural technician. If you wish to become a professional architect, you must continue with the BAS (Hons) and MArch (Prof).





BUILT ENVIRONMENT

GEOMATICS

If you are eager to develop your knowledge and understanding of society's needs and possess the desire to contribute to the quality of life of all South Africans as well as the management of our heritage, then a career in the field of Geomatics is for you. Geomatics is both an applied science and a professional discipline and it refers to the integrated approach of measurement, analysis, management and display of spatial data. Using the latest satellite, laser and information technology, Geomatics professionals are involved in planning, conducting and managing activities related to land and engineering surveying, information systems, land development and planning, land reform, law and commerce.

The Bachelor of Science in Geomatics is a four-year degree that provides students with a foundation in surveying and spatial information science. They use this foundation in one of their chosen areas of specialisation which are:

- Geoinformatics, where students take courses in geomatics, computer science, environmental and geographical science, or geology.
- Surveying, with specialisation in engineering surveying, geodesy, and cadastral surveying.

Geomatics also offers a BSc Honours in GIS (Geographical Information Systems) & masters & doctoral research programmes.



FACT: Combining satellite, aerial and street level imagery, google maps has over 20 petabytes of data, which is equal to approximately 21 million gigabytes, or around 20,500 terabytes.

A GOOD PASS in Mathematics and Physical Science is a prerequisite for admission to the degree. Admission will be based on both your school results and the National Benchmark Test results.

Career Opportunities

Geomaticians are making use of technological advances and branching into new and challenging areas of specialisation and research. Due to a growing realisation that spatial information is a very valuable resource and that highly skilled individuals are needed to create, manage and analyse it, employment opportunities abound.

There is a shortage of professionals in surveying, geographic information science (GIS) and remote sensing in South Africa and abroad, resulting in good employment prospects. Career opportunities exist in private practices, aerial survey companies, offshore survey companies, mining houses and government. This is an ideal career for a person who enjoys mathematics and would like to have independence in their day-to-day work.



BUILT ENVIRONMENT

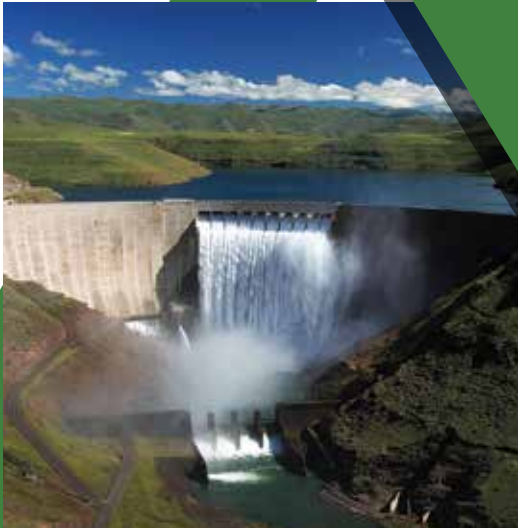
CIVIL ENGINEERING

The Department of Civil Engineering offers an undergraduate programme that is fully accredited by the Engineering Council of South Africa.

Civil Engineering is a profession that focuses on the delivery of engineering services to civil society. These are mainly related to:

- Transportation: roads, bridges, railways, harbours, airports
- Water: dams, treatment works, pipes, drainage systems
- Large structures: high-rise buildings, factories, shops and similar

Bachelor of Science (Eng) in Civil Engineering's curriculum has a strong foundation in the natural sciences, mathematics and applied mechanics. As well as learning about the various civil engineering areas during lectures, you will also have practical sessions in the labs. These involve the investigation of the properties of various construction materials, soil behaviour and foundation design, behaviour of structural members under different loads, water quality and waste treatment. From the second year of study, students are introduced to courses in structural engineering and materials, water engineering (hydraulics and water quality), geotechnical engineering, and transportation. In the final year, the two major courses of Design Project and Research Report allow students to integrate their knowledge and develop advanced problem-solving skills. Professional aspects are covered by courses in communication and civil engineering practice.



FACT: The Katse Dam, a concrete arch dam on the Malibamat'so River in Lesotho, is Africa's second largest double-curvature arch dam. Length: 710 m

During vacations students are expected to do practical training involving both site work and design office experience. The course also includes a survey camp covering basic survey operations and the preparation of a site plan.

A GOOD PASS in Mathematics and Physical Science is a prerequisite for admission to the degree. Admission will be based on both your school results and the National Benchmark Test results.

Career Opportunities

Civil engineers can specialise in any of the diverse aspects of their profession, such as project management, construction, transportation, urban engineering, water management, structural engineering and material technology. A civil engineer commonly works in teams with colleagues from sectors such as environmental planning, architecture, community development and town planning. Some civil engineers work on construction sites, but many UCT graduates will take up positions in design consultancies and government agencies. Hence a civil engineering career is full of variety.





BUILT ENVIRONMENT

CONSTRUCTION ECONOMICS & MANAGEMENT

Recognised as one of the leading academic departments of its kind in the country, UCT's Department of Construction Economics and Management offers degrees, accredited both locally and internationally by professional institutions.

CONSTRUCTION STUDIES

The construction industry is large and covers many different areas of expertise needed to plan and execute a building project. It also needs those with a broad understanding of these areas to co-ordinate and manage the successful realisation of complex projects. A Construction Studies degree meets this demand by preparing students with the skills and knowledge required for a managerial role in the construction industry.

Bachelor of Science in Construction Studies is a three-year degree that encompasses design, construction and engineering technology as well as subjects such as economics, statistics, human resource management, commercial and contract



FACT: Construction of the Mall of Africa used 10 million bricks and 8 500 tons of steel.

law, costing, surveying and professional communication. Practical experience is a component in all three years' curricula. Successfully completing the degree may enable the student to enter into an honours degree in quantity surveying or construction management and assist towards registration with local and international professional accrediting bodies.

A GOOD PASS In Mathematics and Physical Science is a prerequisite for admission to the degree. Admission will be based on both your school results and the National Benchmark Test results.

Career Opportunities

Graduates play a vital role in planning, designing, constructing and managing all types of residential, commercial and industrial developments. Depending on their area of specialisation, they are in great demand by employers such as: large building and construction contractors, developers and managers; financial institutions; and professional quantity surveying practices. In addition, they are well prepared to enter self-employment as consultants in a wide range of vocations in the construction and property industries.





BUILT ENVIRONMENT

PROPERTY STUDIES

Property refers to land and buildings used for housing, offices, shops, industrial manufacturing, hotels, recreation, etc. Almost half of the world's economic wealth is vested in property or 'real estate'. Professional expertise in various aspects of the property industry is required to negotiate the many laws and requirements regulating the sale and development of property, as well as effective investment in and management of property of all kinds.

Bachelor of Science in Property Studies is a three-year degree that equips students with a broad knowledge of the property industry, including finance, economics, accounting, business and property law, as well as appropriate communication and computer skills. In addition, students develop skills in property valuation, investment and development.

These include evaluating and structuring finance for property investments, assessing feasibility and risk in property developments, valuing property assets, managing property portfolios, designing and implementing facilities management programmes, and managing the procurement of buildings.



FACT: Sungbo's Eredo, in Nigeria, is the largest known ancient man-made structure south of the Sahara.

A GOOD PASS in Mathematics is a prerequisite for admission to the degree. Admission will be based on both your school results and the National Benchmark Test results.

Career Opportunities

Depending on the area of specialisation or interest, graduates are in great demand both locally and overseas by employers such as: property valuers; property developers; facilities managers; financial institutions; property asset managers; and property brokers.

In addition, they are well prepared as entrepreneurs or self-employed consultants and professionals.





ENGINEERING

CHEMICAL ENGINEERING

Almost everything you use in daily life – plastics, metals, textiles, paper, food and beverages, toiletries, cosmetics and pharmaceuticals – has been made with the help of a chemical engineer. Chemical engineers are instrumental in the process of converting raw (and sometimes recycled) materials into finished products. This process is complex and involves research and development, design, construction, daily plant operation and management.

Not only do chemical engineers design and operate cost-effective processes, they also ensure that these are accomplished in the most environmentally-friendly way.

Bachelor of Science (Eng) in Chemical Engineering is a four-year degree which prepares graduates for careers in chemical, metallurgical, biotechnical and process industries. The degree focuses on the development of technical expertise, problem-solving, teamwork and communication skills, and is accredited by the Engineering Council of South Africa. There is an opportunity to stream the degree programme with a strong flavour in either minerals processing, bioprocess engineering, catalytic processing, process modelling, or environmental process engineering.

Practical training in the operation of laboratory and pilot scale equipment is given during the second and third years, while the fourth-year research project emphasises



FACT: Fischer and Tropsch are the names of two early German scientists who developed the basic chemistry for the synthetic fuels produced by Sasol from coal.

chemical engineering fundamentals. Chemical Engineering design is addressed in all years of study, culminating in an integrated plant design in the final year.

A GOOD PASS in Mathematics and Physical Science is a prerequisite for admission to the degree. Admission will be based on both your school results and the National Benchmark Test results.

Career Opportunities

UCT chemical engineering graduates are highly sought after in the workplace, and occupy key positions in top companies. Chemical engineers work in many different and exciting workplaces – not only in the expected settings of the petrochemical and mining industries, but also in a wide variety of other process-based industries such as food, beverage, paint and pharmaceutical industries.

As UCT-trained chemical engineers have excellent general problem-solving skills, they also end up in fields such as banking, consulting, marketing and computing.





ELECTRICAL ENGINEERING

Electrical engineers make a profound impact on our lives. Electrical power is used for lighting and appliances and to power industry. Electronic devices from cell phones to super-computers allow us to communicate and work in ways that were unimaginable only a generation ago. These technologies revolutionise the way we live, improve economies and contribute to our development. New forms of technology are emerging daily. Electrical Engineering at UCT is at the cutting edge of research and teaching, not just in South Africa, but across Africa and globally. The Department has active research groups in the electrical engineering disciplines of Radar, Control, Power and Machines, Mechatronics, Telecommunications, Digital Signal, Space Studies and Image Processing. Many students opt to remain for postgraduate study.

The degree equips students to tackle any of the myriad facets of electrical engineering. The Department of Electrical Engineering offers three four-year undergraduate programmes in:

- Electrical Engineering
- Electrical and Computer Engineering, and
- Mechatronics.

The first two years of all three programmes are the same so it is possible to change programmes after second year. All programmes lead to the BSc(Eng) degree. The degrees are accredited by the Engineering Council of South Africa.



A GOOD PASS in Mathematics and Physical Science is a prerequisite for admission to the degree. Admission will be based on both your school results and the National Benchmark Test results.

Bachelor of Science (Eng) in Electrical Engineering

is a four-year degree where the first three years are quite general and cover the fundamentals of the electrical engineering disciplines. Students may select final year courses, which allow some degree of specialisation in one or more disciplines.

These include: Control and Instrumentation; Digital Systems; Electronics; Nuclear Engineering; Power Electronics and Machines; Power and Energy Systems; Signal and Image Processing; Communication Engineering and Microwave Engineering.

Bachelor of Science (Eng) in Electrical and Computer Engineering

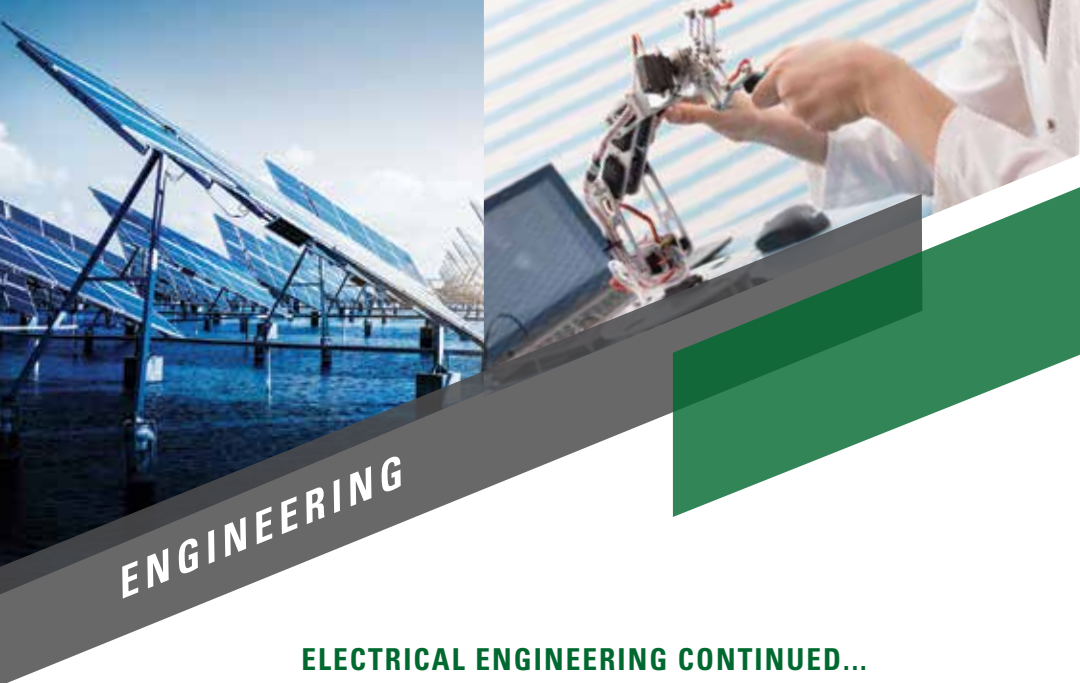
is an interdisciplinary branch of engineering which combines a fundamental study in electrical engineering with computing. It is increasingly recognised that the combination of electrical engineering and computer studies equips graduates with an excellent basis upon which valuable engineering roles in modern industry can be built.

Apart from receiving a thorough grounding in both electrical engineering and computing, the electrical and computer engineering student at UCT gains a foundation of understanding in physical science, advanced engineering mathematics, microcomputer technology and systematic engineering design.

Electrical and computer engineers in industry generally possess expertise across a broad range of engineering disciplines, and are especially well-suited to a career in networking, control & instrumentation, power systems or telecommunications.

Electrical and computer engineers may also become involved in diverse fields such as bio-medical engineering, machine vision, power electronics and machines, or signal and image processing.





ENGINEERING

ELECTRICAL ENGINEERING CONTINUED...

Bachelor of Science (Eng) in Mechatronics is an interdisciplinary branch of engineering, which combines a fundamental background in mechanical engineering with light-current electrical engineering.

It is increasingly recognised that this combination of mechanical and electrical engineering studies equips graduates with an excellent basis upon which to build valuable engineering roles in modern industry.

Apart from receiving a grounding in both electrical and mechanical engineering, the mechatronics student will gain a foundation of understanding in physical science, advanced engineering mathematics, electro-mechanical control theory, microcomputer technology, systemic engineering design and some principles of engineering management. In addition, the degree offers final-year optional courses in related fields, such as bio-medical engineering, power electronics and machines and industrial management.

The mechatronics engineer in industry may require expertise across a broad range of engineering disciplines, and will be especially well-suited to a career in light manufacturing or process control. Mechatronics engineers may become involved in fields such as instrumentation, automation, robotics, bio-medical engineering or machine vision.



Fact: The first mobile phone made by Motorola in 1983 could store 30 contacts and weighed around 1.1kg.



The Mechatronics Programme at UCT aims to equip its graduates with a solid and broad-based engineering education, including the skills in design and the knowledge of computers and other digital systems hardware, that will be necessary for a successful future career in any of these environments.

Career Opportunities

The electronic and electrical industry is one of the fastest growing industries at present. Electrical and electronic engineers work in many organisations and firms. These include private consultation firms and development laboratories, large and small private companies involved with the design, development, production and marketing of electronic systems, subsystems, and components of products as well as government and semi-government organisations.

Graduates of the Mechatronics programme can be found building underwater robots; designing artificial intelligence software to identify faulty machinery; designing new packaging systems for bottled beverages; and developing diagnostic systems for the next generation of motor vehicles.





ENGINEERING

MECHANICAL ENGINEERING

Mechanical Engineering is the branch of engineering dealing with the design, construction and use of systems and machines. It is one of the broadest and most versatile of the engineering professions and offers a wide scope in terms of career opportunities in all areas of industry. The mechanical engineer applies scientific principles to the design, development, construction, installation, operation and maintenance of the machines and systems that drive our world. Graduates are enabled to make a real difference in the world we live in.

The degree will teach you to think independently and approach problems with logic and confidence. You will work as a team and collaborate closely with professional colleagues from other backgrounds.

The **two undergraduate BSc(Eng) degree programmes** namely, **Mechanical** and **Electro-Mechanical Engineering**, have a common first and second year curriculum and students make their choice of which of the programmes to pursue prior to the beginning of their third year of study.

A GOOD PASS in Mathematics and Physical Science is a prerequisite for admission to the degree. Admission will be based on both your school results and the National Benchmark Test results.



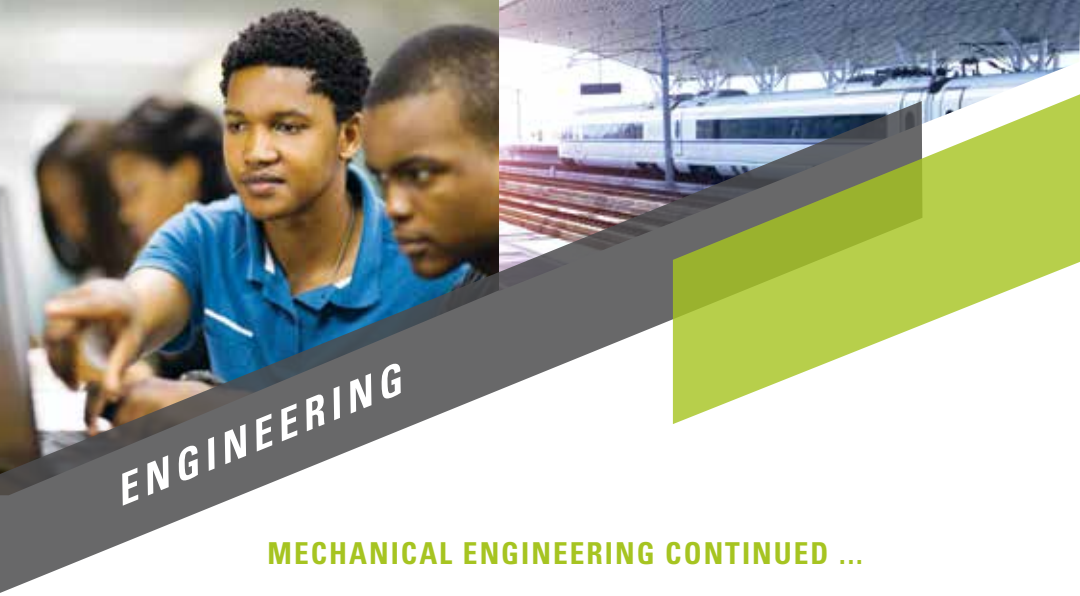
FACT: The first windmills were developed to automate the tasks of grain-grinding and water-pumping and the earliest-known design is the vertical axis system developed in Persia about 500-900 A.D.

Bachelor of Science (Eng) in Mechanical Engineering concentrates on instruction in the areas of solid mechanics, dynamics and thermofluids, accompanied by experimental verification. Communication skills are addressed through expert instruction and application in reports of experimentation and design. Design is made central to the curriculum where team skills and, finally, individual skills are developed. Curriculum flexibility in the final year of study allows students the selection of courses that provide an introduction to a career in mechanical engineering.

Career Opportunities

A wide spectrum of exciting careers require the talents of mechanical engineers for the design, development and manufacture of technologies, products and processes, including the automotive, aircraft and space industries, marine engineering and naval architecture, air conditioning and refrigeration, food and packaging industry, bio-mechanical research and development, energy and power utilisation, robotics, computer-aided manufacturing and design, general manufacturing and production, and the environmental industry, to name a few.





ENGINEERING

MECHANICAL ENGINEERING CONTINUED ...

Bachelor of Science (Eng) in Electro-Mechanical Engineering - in today's world of computer control, industry welcomes electro-mechanical graduates, who understand the basics of both the mechanical and electrical engineering disciplines and can design, build, control, and maintain a wide range of engineering products and processes. Examples of some products are: motor-cars and aeroplanes where computers control the engines and ensure the engines are working efficiently; production machine tools such as lathes and milling machines that have been automated by means of computer control; artificial hearts, and many other products used in the world of medicine; robots that are used more and more in industry and medicine; even the humble washing machine is now computer controlled.

The degree aims to meet the demand for engineers with cross-disciplinary skills - generalists rather than specialists - particularly in the field of robotics, flexible manufacturing and electro-mechanical power systems. Some flexibility is allowed in the selection of courses so that students can tailor the degree to suit their interests and needs.

Career Opportunities

Most industries use forms of mechanical systems with electronic control parts of them. This makes electro-mechanical engineering one of the most diverse of all engineering disciplines with careers in a wide range of sectors. These include management of people and resources, development and use of new materials and technologies, researching and developing medical products, improving production in old refineries and designing building services.



FACULTY OF EBE

ACADEMIC DEVELOPMENT IN EBE

The Academic Support Programme for Engineering in Cape Town (ASPECT) is designed to help students who, after being accepted into the engineering degrees, find they struggle to adapt to the initial load and pace of the degree. Students who are struggling are given opportunities during the first year to transfer into ASPECT. The Programme provides a supportive environment that is sensitive to students' academic, social and emotional needs. The curriculum is designed to reduce load and therefore the degree takes five years to complete. In the first year, students register for Mathematics IA, Mathematics IB, Physics A and Physics B, and these are full credit-bearing courses which count towards the degree. Students also register for up to two more credit-bearing courses, specific to their programme of study.

The Mathematics and Physics courses are taught by staff in ASPECT, except for the Physics laboratory sessions which are offered by the Physics Department. The remaining courses are taught in the departments by the department responsible. Students who continue with engineering at UCT will complete, in their second year, the remaining first-year courses, two second-year courses in Mathematics, the first of which is taught by ASPECT, and up to two courses from second year engineering curriculum. In the third year, students complete the remaining second-year courses together with appropriate courses from the third-year curriculum, while ASPECT continues to provide non-academic support and counselling. ASPECT staff will monitor and advise students while they complete the remaining degree requirements.





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Student Financial Aid Office

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Visit www.ebe.uct.ac.za for more information.



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& the Built Environment**



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