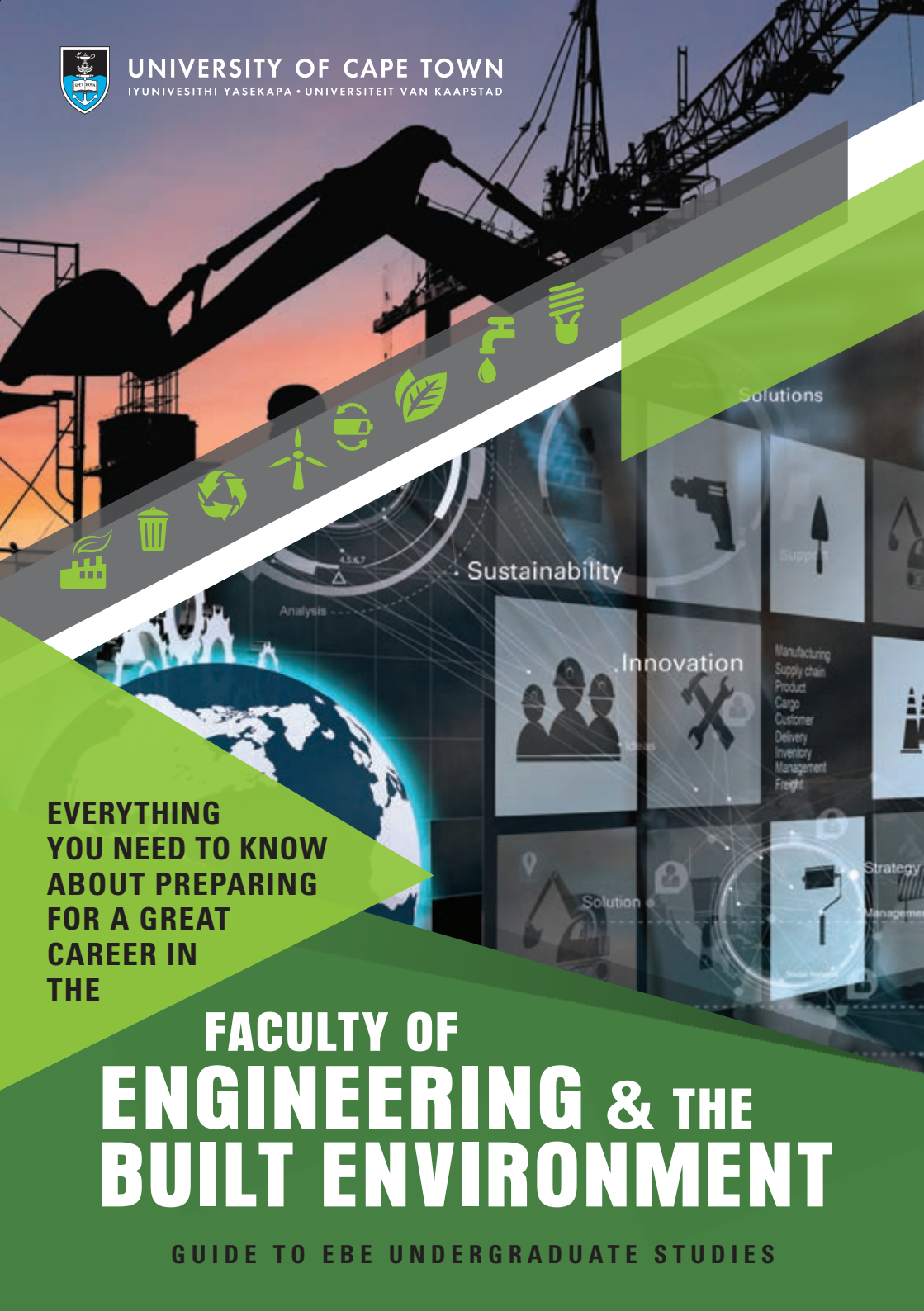




UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD



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

FACULTY OF ENGINEERING & THE BUILT ENVIRONMENT

GUIDE TO EBE UNDERGRADUATE STUDIES



CONTENTS

BUILT ENVIRONMENT	4
Architecture, Planning & Geomatics	4 - 7
Civil Engineering	8
Construction and Property Studies	10 - 13
ENGINEERING	14
Chemical Engineering	14
Electrical Engineering	16 - 19
Mechanical Engineering	20 - 22
ASPECT	23



PUSHING BOUNDARIES. SHAPING THE FUTURE

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



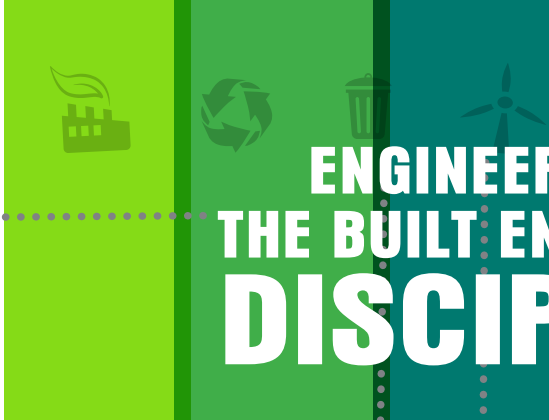
www.ebe.uct.ac.za



@UCTEBEFaculty



ebe_uct



ENGINEERING THE BUILT ENVIRONMENT DISCIPLINES



ARCHITECTURE, PLANNING, AND GEOMATICS

Undergraduate degree programmes:

- BAS Architectural Studies
- BSc Geomatics
 - Geoinformatics
 - Surveying



CIVIL ENGINEERING

Undergraduate degree programme:

- BSc (Eng) Civil Engineering



CONSTRUCTION ECONOMICS AND MANAGEMENT

Undergraduate degree programmes:

- BSc Construction Studies
- BSc Property Studies

ENGINEERING AND ENVIRONMENTAL SCIENCES



CHEMICAL ENGINEERING

Undergraduate degree programme:

- BSc Chemical Engineering



ELECTRICAL ENGINEERING

Undergraduate degree programmes:

- BSc Electrical Engineering
- BSc Electrical and Computer Engineering
- BSc Mechatronics



MECHANICAL ENGINEERING

Undergraduate degree programmes:

- BSc Mechanical Engineering
- BSc Mechanical and Mechatronic Engineering



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).

www.apg.uct.ac.za





BUILT ENVIRONMENT

GEOMATICS

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.

Degrees offered:

- BSc (Geomatics) Surveying stream or Geoinformatics stream
- BSc (Hons in GIS)
- MSc (Engineering)
- PhD

Accreditation with the South African Geomatics Council towards registration as a:

- professional land surveyor
- professional geoinformatics practitioner
- professional engineering surveyor
- professional photogrammetric surveyor.



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

There is a shortage of professionals in surveying, geographic information science (GISc) 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.

Geomaticians are making use of technological advances and branching into new and challenging areas of specialisation and research.

www.geomatics.uct.ac.za





BUILT ENVIRONMENT

CIVIL ENGINEERING

The Department of Civil Engineering offers a four-year Bachelor of Science (Eng) in Civil Engineering. This degree is accredited by the Engineering Council of South Africa (ECSA) and recognised throughout the world in terms of the Washington Accord.

Students learn about the various civil engineering areas during lectures and have practical sessions in 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.

The programme develops aspiring engineers with a challenging curriculum to equip them for the demands of this dynamic profession. There is a strong focus on urban planning and design, leading-edge construction materials technology, a centre for transportation studies, and an emphasis on sustainability, including re-planning cities with fewer roads, upgrading informal settlements and townships and recycling.

During vacations students are expected to do practical training involving both site work and design office experience.



FACT: UCT civil engineers were involved in testing construction materials for the Maputo Bridge – the longest suspension bridge in 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.

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, geotechnical 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.

www.civil.uct.ac.za f @uctcivil





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



**SMART
CITY**



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.

www.cons.uct.ac.za





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.

www.cons.uct.ac.za





ENGINEERING

CHEMICAL ENGINEERING

Almost everything you use in daily life – textiles, metals, plastics, paper, food and beverages, toiletries, cosmetics and pharmaceuticals – is been made with the help of a chemical engineer. Chemical engineers are instrumental in the process of converting raw 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 environmental friendly way.

Bachelor of Science (Eng) in Chemical Engineering is a four-year degree which prepares graduates for careers in chemical, metallurgical, biotechnological and other 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 chemical engineering fundamentals. Chemical Engineering design is addressed in all years of study, culminating in an integrated plant design in the final year.



FACT: Platinum nanoparticles are a key component in hydrogen fuel cells, an important future energy technology.

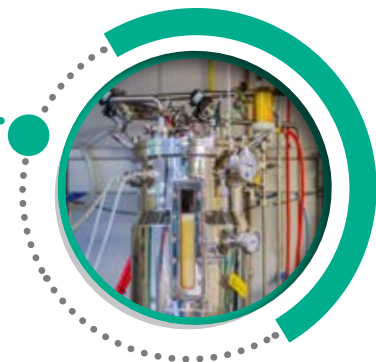
UCT Chemical Engineering is at the forefront of fuel cell research in both South Africa and the world.



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. Entrepreneurs are creating new innovative businesses in the fields of biotechnology, energy, water, and the environment.



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

www.chemeng.uct.ac.za



ENGINEERING

ELECTRICAL ENGINEERING

Electrical engineering is a field of engineering which deals with the study and application of electricity, electronics and electromagnetism. Electrical engineers make a profound impact on our lives. Graduates from any of the three programme we offer fit into a number of industries including electrical power delivery, telecommunications, mechatronics, robotics, biomedical engineering, renewable energy, electric vehicle, Internet of Things, mining and manufacturing. As you would imagine, the technologies from these industries 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 prepares students to tackle any of the myriad facets of electrical engineering. A degree from the department equips students with some of the basic requirements for a successful career as an entrepreneur.

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 which covers a wide range of activities and disciplines. Students are able to select final year courses, which allow some degree of specialisation in one or more disciplines.

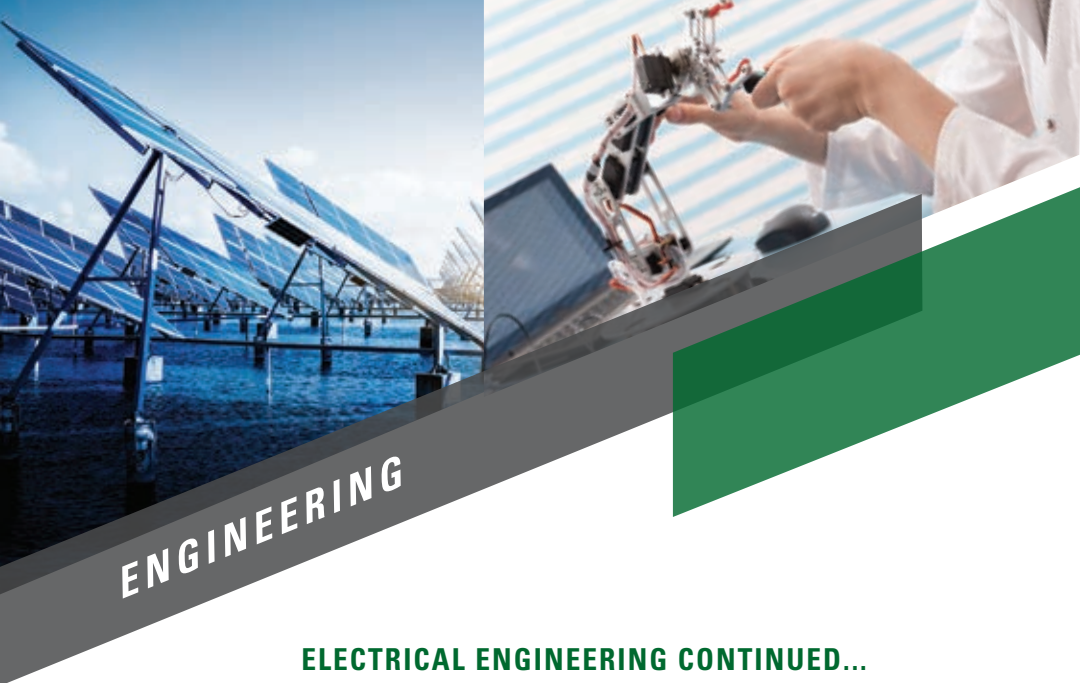
These include: Control and Instrumentation; Digital Systems; Electronics; Nuclear Engineering; Power Electronics and Machines; Power and Energy Systems; Signal and Image Processing; Telecommunications and RF & Microwave Systems.

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.

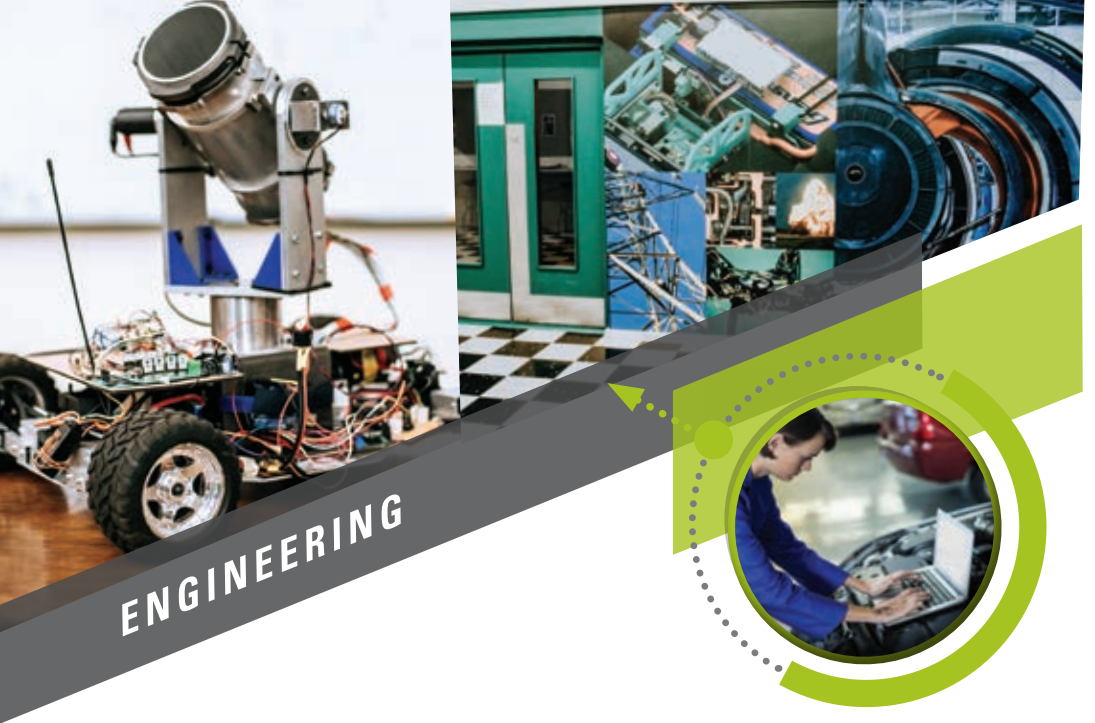
Career Opportunities

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.

www.ee.uct.ac.za





ENGINEERING

MECHANICAL ENGINEERING

Every aspect of contemporary life shows the contributions of mechanical engineers. Mechanical Engineering helps to make machines that manufacture pencils, build computers, design robots, keep aircraft flying, design village wells and manufacture the massive pipe networks that keep our industry, agriculture, and cities supplied with water.

Mechanical engineers design, develop, commission, and manage the operation and maintenance of machines and systems across the world.

The degree will teach you to think independently and approach problems with logic and confidence. You will be exposed to a range of technical and non-technical essential skills and will become a lifelong learner, able to work in multi-disciplinary teams. You will be equipped to work in industry or a range of other careers, ready to address the challenges of South Africa, Africa and the rest of the world.

The department offers two undergraduate degrees, in **Mechanical Engineering** and in **Mechanical and Mechatronic Engineering**. The programmes have the first two years in common and students can transfer between the two programmes at any time up until the start of their third year of study.



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



Mechanical Engineering	Mechanical and Mechatronic Engineering
Shared foundational science courses: mathematics, physics, computer programming, statistics	
Shared technical courses: Drawing, design, manufacturing, thermodynamics, fluid and solid-mechanics, dynamics, material science, analogue and digital electronics, control, numerical methods	
Shared essential-skills courses: Engineer in Society, Engineer in Business, elective complementary studies course	
Advanced thermo-fluids, two open elective courses	Digital and embedded systems, mechatronic system design, one elective specialisation course

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.

The programme in **Mechanical Engineering** places a greater emphasis on thermo-fluid systems and allows students to take several specialisation courses in their final-year. This allows them to enter a range of specialist and general mechanical engineering roles.

Mechanical and Mechatronic Engineering is a degree which encompasses interdisciplinary knowledge that combines mechanical, electronic, control and computer engineering skills allowing graduates to envisage solutions that bridge across these disciplines. At UCT students studying Mechanical and Mechatronic Engineering build a foundation in mechanical engineering expanded to include courses in digital and embedded systems as well as mechatronic system design equipping these graduates



ENGINEERING

MECHANICAL ENGINEERING CONTINUED ...

with the skills to design, automate and control processes, products, machines and robots that are found across the engineering domain from aeronautic and automotive systems to manufacturing and industrial plants.

It should be noted that the Department of Electrical Engineering offers a programme in Mechatronic Engineering. This programme focuses heavily on control and embedded systems, while the Mechanical and Mechatronic Engineering programme in the Department of Mechanical Engineering focuses on mechanical and systems design. Transferring between the two programmes is not seamless and applicants should choose their desired programme with care.

Career Opportunities

Students completing both degrees find work across industry, in design, manufacturing, commissioning and maintenance roles. This includes the automotive, aircraft and space industries, energy and power utilisation, general manufacturing and production, and bio-medical engineering.

Students completing a BSc in Mechanical Engineering can also go on to work in marine engineering and naval architecture, airconditioning and refrigeration and those completing a BSc in Mechanical and Mechatronic Engineering can go on to work in automation or robotics.

Many graduates work in project management or progress into management positions. Graduates wishing to leave the engineering sector are highly sought after by the finance, data-science, and IT sectors.

www.mecheng.uct.ac.za f @UCTMechEng





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.





CONTACT DETAILS

Postal Address:

Faculty of Engineering & the Built Environment
University of Cape Town
Private Bag X3, Rondebosch, 7701

Faculty of Engineering & the Built Environment

5th level, New Engineering Building, Madiba Circle, Upper Campus
Tel: (021) 650 2699 Fax: (021) 650 3782
Email: ebe-faculty@uct.ac.za

Admissions Office

Tel: (021) 650 2128 Fax: (021) 650 3736
Email: admissions-ug@uct.ac.za

Fees Office

Tel: (021) 650 4076 Fax: (021) 686 9794
Email: Fnd-Fees@uct.ac.za

Student Housing

Tel: (021) 650 3010/2429 Fax: (021) 650 4014
Email: res@uct.ac.za

Student Financial Aid Office

Tel: 021 650 2125 Fax: 021 650 5043
Email: sfa-finaid@uct.ac.za

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