

Engineering @ Unisa

A complete guide to preparing
yourself for career opportunities



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of south africa

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The information in this document was correct as on 27 February 2018. Visit the Directorate for Counselling and Career Development website (<http://bit.ly/2ux94B5>) for the latest version of this document.

How will this brochure help me?

- It will provide you with information about the different engineering career fields.
- It will provide you with information about the different levels of professional registration as an engineer, engineering technologist, and engineering technician.
- It will help you gain more information about the skills needed in the field of engineering.
- It will assist you in finding engineering-related qualifications offered by Unisa.

What is engineering?

Engineering is the application of scientific knowledge to solving problems in the real world. While science (physics, chemistry, biology, etc.) allows us to gain an understanding of the World and the Universe, Engineering enables this understanding to come to life through problem-solving, designing and building things (<http://whatisengineering.com/>).

The Unisa School of Engineering offers National Diploma and BTech qualifications 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.

Experienced vs inexperienced engineering student

When you first apply to study with Unisa you may enter the University with work experience and realistic expectations of the career you wish to pursue. You may also enter the University without any work experience and without any understanding of what you may face as a distance learner wanting to complete a professional qualification. The table below outlines two possible scenarios: the first scenario describes an experienced engineering student with work experience in the field he or she wishes to study. The second scenario describes a student who does not have experience in the field he or she wishes to study. The information in the third column is related to the impact of this on your decision to study engineering. The fourth column indicates how you can prepare yourself to become a successful engineering student.

Experienced Engineering student (currently working in the field)	Inexperienced Engineering student (no work experience in the field)	How does this impact on your decision to study engineering	How can you prepare yourself to become a successful engineering student
Has work experience in the field or related field and knows which specialisation in the field of engineering to pursue	Has no experience in the field of engineering and is uncertain about which specialisation in the field of engineering to pursue	When you have experience in the field you have a realistic perception of what your future career will entail and whether there is a good fit between you and the chosen specialisation. If there is a good fit between yourself and the field of work you will be successful in meeting the demands of the job	Spend time conducting some informational interviews with individuals who work in the field you wish to work in. This will assist you to gain a realistic understanding of what the job will demand of you. You will gain a better understanding of whether there is a good fit between you and the field you wish to work in. You can find details on how to go about this process in the Career research part of this brochure

Experienced Engineering student (currently working in the field)	Inexperienced Engineering student (no work experience in the field)	How does this impact on your decision to study engineering	How can you prepare yourself to become a successful engineering student
Aware of the practical requirements of the course	Unaware of the practical requirements of the course	If you are aware of the practical requirements of the course you are able to make arrangements, complete the relevant practical components, meet all the requirements of the qualification and graduate	You must investigate and consider the practical requirements of the course, how you will manage to complete these, and how you plan to meet all the requirements of the qualification in order to graduate
You are aware of how your skills and values match those to become successful in the field of engineering	You are unaware of how your skills and values match those to become successful in the field of engineering	When you have a good understanding of your skills and values you are able to make informed career decisions which will result in greater job satisfaction	Spend time exploring what your skills and values are by visiting http://bit.ly/2gmt8nv . Compare how these match the skills for a specific engineering discipline

Experienced Engineering student (currently working in the field)	Inexperienced Engineering student (no work experience in the field)	How does this impact on your decision to study engineering	How can you prepare yourself to become a successful engineering student
You have a realistic understanding of the demands that training in the field of engineering will place on you	You have a vague understanding of the demands that training in the field of engineering will place on you	When you have a realistic understanding of the demands that will be placed on you, you are more inclined to achieve academic success	Spend time job shadowing or conducting some informational interviews with individuals who works in the field you wish to work in. This will assist you to gain a realistic understanding of what the job will demand of you.

Fields of specialisation

Civil Engineering

Civil engineers are closely involved with the design, construction and maintenance of the built environment, including roads, buildings, bridges, and dams. 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, bills of quantities, cost estimates, specifications, tender documentation, project

management, work inspections, testing of materials, and payment certificates. Civil engineering practitioners could also specialise in fields such as construction engineering, control engineering, forensic engineering, materials science, structural engineering, and water resources engineering.

Skills and qualities needed

The following qualities are important:

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

Unisa specialisations related to civil engineering

Water engineering:

- Dams
- Pipelines and reticulations
- Reservoirs
- Water purification works
- Wastewater treatment works

- Concrete structures
- Steel structures
- Masonry structures
- Timber structures

Urban engineering

Development and maintenance of municipal facilities

Structural

Possible work environments for engineers and technologists

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

Possible work environments for technicians

- Structures Including buildings
- Streets and roads
- Water including storm water and wastewater treatment
- Dams

Chemical Engineering

Chemical engineering is concerned with industrial processes for the conversion of raw material through physical and chemical changes. Chemical engineers also play a key role in the conservation and protection of the environment.

Chemical engineers work in manufacturing, pharmaceuticals, healthcare, design and construction, pulp and paper, petrochemicals, food processing, speciality chemicals, microelectronics, electronic and advanced materials, polymers, business services, biotechnology, and the environmental health and safety industries amongst others. They rely on their knowledge of mathematics and science, particularly chemistry, to overcome technical problems safely and economically. Chemical engineers also apply their skills 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 fibres 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 for refining petroleum products, making energy and chemical sources more productive and cost-effective.

Skills and qualities needed

The following qualities are important:

- Creative, yet logical thinker
- Problem solver
- Systematic approach to problem-solving
- Likes to take on challenges
- Decision-making

Possible work environments for engineers and technologists

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

Possible work environments for technicians

- Process plant operation
- Process plant design, erection, and commissioning
- Research and development
- Soil conservation
- Water Utilisation

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 typical example of the involvement of mechanical engineers 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, mechanical workshops, automotive design and production, production plants and even mining. The technician must ensure that the design elements of the projects are compatible and that all resources are optimally employed, resulting in feasible and economically viable projects.

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 are designed to ensure maximum profits through the product lifecycle. 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 life cycle

Skills and qualities needed

- An aptitude for and interest in mathematics and science
- Communication skills
- Computer skills
- Analytical thinking
- Ability for creative and practical work
- Problem-solving
- Teamwork
- 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

Access a mechanical engineer skills list here: <http://bit.ly/2gg7H7A>.

Possible work environments for engineers and technologists

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

- Consulting
- Education
- Energy conversion
- Environmental control
- Systems
- Government
- Mass transfer
- Hospitals
- Material science
- Management
- Manufacturing
- Mechanical systems
- Mining
- Motor industry
- Mechanics
- Noise control acoustics
- Power generation
- Rail transportation
- Research and development
- Textile
- Tribology

Possible work environments for technicians

- Vehicles and transport
- Fluids and hydraulics including pressure vessels
- Thermodynamics including turbines
- Structures and machines
- Refrigeration and air conditioning
- Aircraft design
- Aircraft systems
- Aircraft performance
- Airport management

- Agricultural mechanisation and facilities

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 skills 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 obtain from such systems. Industrial engineers work mostly in the manufacturing industry, but are also found in industries such as banking, distribution and supply chain, retail management, education, and healthcare.

Skills and qualities needed

The following qualities are important:

- An aptitude for mathematics and science
- Enjoys working with people
- An analytical mind that enjoys exploring possible improvements to existing systems coupled with the ability for creative and practical work
- Enjoy business transactions and the analysis of spending patterns and preferences

Possible work environments for engineers and technologists

- Aerospace
- Aluminium and steel
- Banking
- Ceramics
- Construction
- Consulting
- Education
- Electronics assembly

- Energy
- Forestry and logging
- Government
- Insurance
- Materials testing
- Medical services
- Military
- Mining
- Oils, coals and gas
- Plastics and forming
- Retail
- Shipbuilding
- Transportation

Possible work environments for technicians

- Manufacturing systems
- Robotics
- Safety, Health, Environmental and Quality (SHEQ) management
- Productivity, time and method studies and re-engineering
- Project management
- Planned maintenance
- Product processing
- Storage and climate control

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. 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.

Skills and qualities needed

The following qualities are important:

- An aptitude for mathematics and science
- Enjoys working with people
- An interest in developing the ability to solve complex problems
- An analytical mind
- Enjoys 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

Possible work environments for engineers and technologists

- Power distribution – both primary and secondary distribution
- Power generation, including co-generation and standby systems
- Lighting systems 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

Possible work environments for technicians

- Power: transmission and distribution including protection and control
- Power: generating and rotating machines including protection and control
- Power: building reticulation and lighting including protection and control
- Power: energy management including metering
- Electronics: bio-engineering (clinical)
- Electronics: computer and software engineering
- Electronics: telecommunication including radio and television
- Electronics: instrumentation and control

Mining Engineering

Mining engineers are in charge of planning, designing, organising and supervising the development of mines and much of the related facilities, equipment, and infrastructure. They are hired by mining companies to prepare for the extraction of minerals, coals or metals from underground or open-pit mines. They work for mining companies, manufacturers, government, and in education. Mining engineering includes facets of geological, civil, mechanical, and materials engineering. Mining engineers conduct initial surveys of the deposits in a potential area for mining to determine the economic and environmental benefits, as well as the costs of starting an operation. Mining engineers are involved in every step of development from determining the best method of drilling and blasting, to starting a mine and then creating the shafts, ventilation systems, mine services, haulage mechanisms and

other supporting structures to allow miners to work safely. Once a mine is up and running, mining engineers supervise further development and ongoing maintenance of existing areas. They also supervise survey personnel, other engineers, scientists and technicians working on the site.

Skills and qualities needed

- Problem solving
- Team player
- Evaluate information
- Communication skills

Mine surveying

The main objective of mine surveying is to map the workings of the mine, above and below the surface. There is constant pressure on the mining industry to reduce costs by extracting as much of the valuable product as possible while leaving unwanted material behind. The mine surveyor is involved in planning the mining operations to ensure the most cost-effective mining method to use, as well as where such mining methods should be used. They also monitor and even manage the quality and quantity of product that is extracted.

Possible work environments for engineers and technologists

- Mining industry
- Education
- Government
- Research and consulting

- Financial institutions (banks)

Possible work environments for technicians

Metallurgical

- Metallurgical plant operation
- Establishment of metallurgical plants
- Research, development and technology transfer

Mining

- Production processes
- Rock mechanics
- Mine environmental engineering
- Mineral evaluations

Engineer, Technologist, Technician

Engineer	Engineering technologist	Engineering technician
An engineer has completed a four-year degree at a University. After graduation, they are required to work for three years before being	An engineering technologist has completed a National Diploma and BTech at a University. After graduation, they are	An engineering technician has completed a National Diploma at a University. After graduation, they are required to work for two

eligible to register as a Professional Engineer with the Engineering Council of South Africa	required to work for three years before being eligible to register as a Professional Engineering Technologist with the Engineering Council of South Africa	years before being eligible to register as an Engineering Technician with the Engineering Council of South Africa
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The registration categories are outlined in the Engineering Council of South Africa's Framework for the Identification of Work for Persons Registered in terms of the Engineering Profession Act, 2000 (<http://bit.ly/2zqxzID>). The broad nature of work performed by each category of engineering professional is also explained in this document.

Professional registration

- Engineering Council of South Africa: <https://www.ecsa.co.za>
- Chamber of Engineering Technology: <http://engineeringchamber.mirrorz.com>
- Institute of Mine Surveyors of South Africa: <http://www.ims.org.za/>
- Institute of Professional Engineering Technologists: <http://www.ipet.co.za>
- South African Association of Consulting Engineers: <https://www.cesa.co.za>
- South African Institute of Electrical Engineers: <http://www.saiee.org.za>
- South African Institution of Mechanical Engineering: <http://www.saimeche.org.za>

Identify opportunities with career research

How do you identify opportunities?

Your career research will connect you to others who will help you to: answer questions you have with relation to your career choice; expand your understanding of the opportunities related to your career vision; identify “hidden” career paths that you did not think of previously; and think about how you could plan to pursue specific opportunities.

Prepare

Think about what you still need to find out: what questions do you have? You will use these questions as a starting point to structure your research. Examples of questions include: *What can I do with a specialisation in electrical engineering? How much do mechanical engineering technologists earn? or What must I study to be an industrial engineer?”*

Keep track of information

Keep track of your research by making notes about what you learn and what you still need to find out.

Evaluate

Evaluate the information that you are finding: Who wrote the information (person/ organisation)? Which country does the information relate to? When was the information last updated? After you have visited a number of websites, you could compare your notes with the information you found – what are the similarities and differences? What else do you need to find out?

Further ways to do career research

1 Online search

Use a search engine such as Google to search for information related to your questions. For example, you need to find out about career opportunities related to engineering. You could start with using keywords such as “engineering careers” and then to further contextualise your findings, you could search keywords such as “engineering careers Africa” and “engineering careers South Africa”. Scan the brief descriptions of the first ten results and decide which website you would want to explore first. Skim read through the information on the website (start with the headings) to get an understanding of the content of the page and to find information related to your question. Also, check whether there are links to other websites that

you could further explore. As you are reading, make a summary of the information. You could use the information you find to make lists of job titles related to your field of study, organisations that employ individuals in these fields and professional organisations.

Remember to bookmark pages that you would want to return to and make notes about what you find and what you would still like to find out about. Use online services or apps such as Evernote (<http://www.evernote.com>), Diigo (<http://www.diigo.com>) or Google Bookmarks (<http://www.google.com/bookmarks/>) to keep track of your research online.

Activity

Use Google to find specific job titles related to engineering. The following are some search terms you could consider: “job titles engineering” “engineering graduate jobs south africa”.

Job title	Website
Example: Mechanical engineering technician	Quintcareers.com

2 Occupational information websites

The following websites will help you to learn more about specific job titles:

Website	Description
Unisa Counselling & Career Development http://bit.ly/2fE0Xd0	This website provides more information about opportunities related to qualifications at Unisa.
Kheta (from SAQA) http://ncap.careerhelp.org.za/occupations	Search for information about specific job titles.
Career Planet http://www.careerplanet.co.za/	Learn more about career areas such as IT, tourism, engineering and more. The website also contains information about learnerships and student finance

<p>O*Net http://www.onetonline.org/</p>	<p>Explore job titles related to different categories such as your interests, skills, values, typical work activities, and more. You could also browse through groups of occupations related to specific industries or economic sectors.</p>
<p>Prospects http://www.prospects.ac.uk/</p>	<p>Explore different job titles related to job sectors, as well as what you could do with your major subject.</p>

3 Job-search portals

Another type of website that is useful in terms of researching specific job titles linked to different industries is job search portals. Finding jobs advertisements that interest you is a worthwhile activity, even if you are not currently applying for jobs. You may not yet be eligible to apply for your dream job, but you can still gain a lot of information for your career planning. For example, you are interested in

mechanical engineering, but you are not sure which specific job titles are linked to this field.

You can use this information to make career goals and to think strategically about how you can develop experiences that will help you meet more of the selection criteria in the future.

Job search sites include

- PNet (<http://www.pnet.co.za>)
- Careerjunction (<http://www.careerjunction.co.za>)
- Careers24 (<http://www.careers24.com/>)
- Indeed (<http://www.indeed.co.za>)
- Government positions (<http://www.gov.za/aboutgovt/vacancies.htm>)

4 LinkedIn

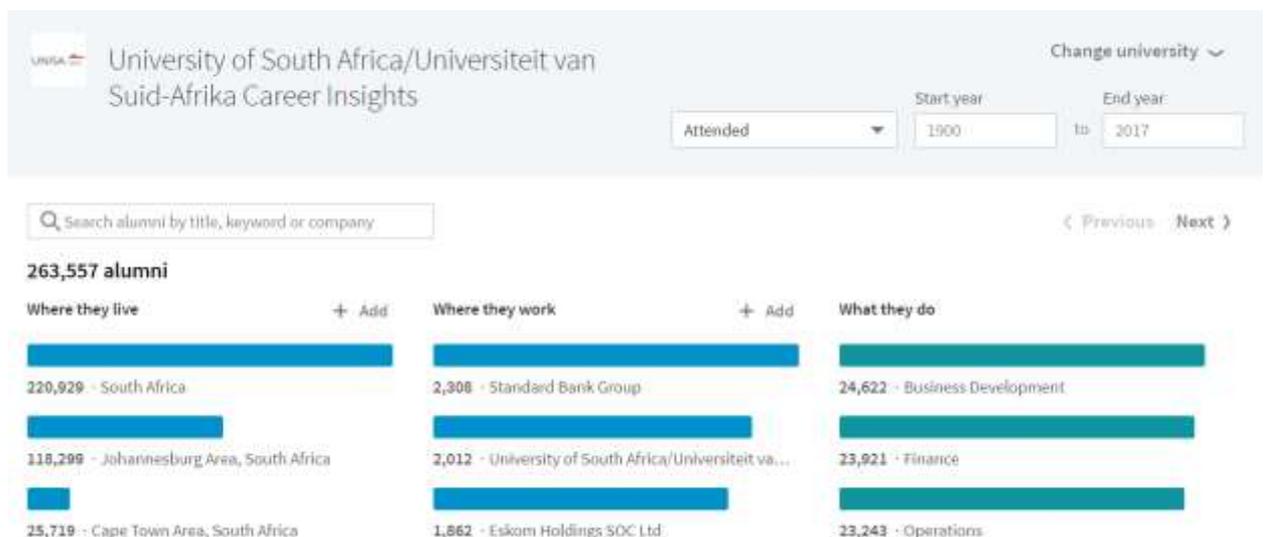
If you have not done so already, start building your network on LinkedIn (<http://www.linkedin.com>) today!

Register for a free account and start connecting with your network online. Join groups relevant to your career field so that you could participate in discussions, ask questions and provide answers about specific topics and search for people, organisations and jobs in your field of interest. Do research about companies and

employees to help you identify opportunities. To learn more about using LinkedIn effectively, go to <http://bit.ly/2gyOAzS>.

Activity

1. Go to www.linkedin.com and sign in to your LinkedIn account. If you do not have an account yet, then create one.
2. Make sure that you have captured your current or previous studies at Unisa on your LinkedIn profile.
3. Once you are signed in, go to the University of South Africa page at <https://www.linkedin.com/school/12049/>.
4. Click on the “See alumni” button.
5. You will now be presented with a page with Headings and graphs beneath the headings (e.g. Where they live, Where they work, What they do).



- Click on the “Next >” link to go to the next set of headings (What they studied, What they are skilled at, and How you are connected).



- Click on “+Add” next to the heading “What they studied”
- Start to type “engineering” in the search box. You will notice that you are provided with suggestions for study fields (e.g. Electrical and Electronics Engineering, Mechanical Engineering, Engineering, etc).
- Choose one of those options that you would want to explore.
- You will notice that the graphs for the different headings adjust. You have now filtered the information to contain information about Unisa graduates who work in the field you searched for.
- You can now see how many graduates in these fields are on LinkedIn, where they work, what they do, what they’re skilled at, etc.
- You are also able to view the profiles of alumni who meet the criteria you searched for. For example, you can filter your search results to those alumni who indicated that they studied mechanical engineering, and work at Eskom.

5 Talk to others (informational interviewing)

Once you have done some research about specific options, your next step is to talk to individuals in the type of job/ industry that you are interested in. The goal of these conversations is to explore your career options, to expand your network, to build confidence, to access information and to identify your own strengths and areas of development. For example, you read an article about the expansion of the Re Yeng bus service into South Africa's high-density areas in a bid to provide safe, affordable and reliable transport system in areas such as Mamelodi, Atteridgeville and Soshanguve and you feel curious about how the transport system was built. You could contact one of the authors of the article to ask if they would be willing to share how they went about gaining access to the information they needed for their evaluation. Before you interview

someone, do research about what you would want to discuss with them – you could ask this person to “fill in the gaps” for you. Start with people you already know: friends, family, neighbours, colleagues, lecturers, tutors and fellow students. Use online social networks such as LinkedIn to further identify potential people. For more information on how to go about this and suggestions for questions that you might want to ask, go to <http://bit.ly/2riGpQq>. Also, watch this video to learn more: The Dos and Don'ts of Informational Interviews: <http://youtu.be/ixbhtm8l0sl>.

Remember to keep track of the information you have gathered and how you make sense of this. Also, track the questions you still have and how you think you would be able to get answers to these questions.

Activity

Write a list of any people you know who might work in the fields you are interested in. For instance, do any of your parents' friends work in any of the fields you are

considering? And write a list of those people who could give you information about any careers you are considering.

You may have identified a lot more people than you thought! Imagine how much information you can gather about the career you are interested in just by talking to these people. Each person will give you fresh insights opinions and valuable information about the careers you are considering, whether they are currently working in that field or are only remotely related to or associated with it.

6 Attend a careers fair event

Attending a careers fair event gives you the opportunity to speak to people from different industries. You may be studying a qualification that does not seem to have a direct link to the exhibitors or the presenters, but they have one thing in common: they employ people, who work in organisations, who do business with all kinds of suppliers and services. Somewhere in this value chain, your qualification will find a place to fit – either as a customer or as an employer or employee.

The annual Unisa Careers Fair usually takes place in March, July and August at various venues. Go to <http://www.unisa.ac.za/counselling> for more information.

7 Experience studying topics related to your field of interest

Explore what engineering is by watching and listening to online lectures and reading free open textbooks. These resources will enhance your understanding of the various fields in engineering and the various opportunities related to these fields.

Search for engineering related courses and open textbooks on these sites:

- Khan Academy (<https://www.khanacademy.org/>)
- Coursera.org (<http://www.coursera.org/>)
- Udemy (<http://www.udemy.com/>)

- Saylor Academy (<http://www.saylor.org/books/>)
- Open Textbook Library (<http://open.umn.edu/opentextbooks/>)
- College Open Textbooks (<http://www.collegeopentextbooks.org/textbook-listings/textbooks-by-subject/>)
- MITOpenCourseware (<http://ocw.mit.edu/index.htm>)
- Open Culture (<http://www.openculture.com/freeonlinecourses>)
- iTunes university (<http://www.apple.com/education/itunes-u/>)
- YouTube education (<http://www.youtube.com/education?b=400>)
- FreeVideoLectures (<http://freevideolectures.com/>)

8 Career resources for engineering students

South African

[Get Set Go! career brochure](#)

[Water @ Work Career Guide](#)

International

Discover-e Engineering Careers (<http://bit.ly/2yhDpFN>)

Qualifications offered by Unisa

Undergraduate

Chemical Engineering

- [Baccalaureus Technologiae: Engineering: Chemical \(BTENC\)](#)
- [Baccalaureus Technologiae: Engineering: Chemical \(Environmental\) \(BTECE\)](#)
- [National Diploma: Engineering: Chemical \(NDENG\)](#)
- [National Diploma: Pulp and Paper Technology \(NDPPT\)](#)

Civil Engineering

- [Baccalaureus Technologiae: Engineering: Civil Environmental Engineering \(BTECV - ENV\)](#)
- [Baccalaureus Technologiae: Engineering: Civil Structural \(BTECV - STR\)](#)
- [Baccalaureus Technologiae: Engineering: Civil Urban Engineering \(BTECV - URB\)](#)
- [Baccalaureus Technologiae: Engineering: Civil Water \(BTECV - WAT\)](#)
- [National Diploma: Engineering: Civil \(NDECI\)](#)

Electrical Engineering

- [Baccalaureus Technologiae: Engineering: Electrical Clinical Engineering \(BTELN - CEN\)](#)
- [Baccalaureus Technologiae: Engineering: Electrical Computer Systems \(BTELN - COS\)](#)
- [Baccalaureus Technologiae: Engineering: Electrical Power Engineering \(BTELN - PEN\)](#)
- [Baccalaureus Technologiae: Engineering: Electrical Telecommunication \(BTELN - TEL\)](#)
- [National Diploma: Engineering: Electrical Clinical Engineering \(NDEEN - CEN\)](#)
- [National Diploma: Engineering: Electrical Computer Systems \(NDEEN - COS\)](#)
- [National Diploma: Engineering: Electrical Electronics and Electronic Communication \(NDEEN - EEC\)](#)
- [National Diploma: Engineering: Electrical Mechatronics \(NDEEN - MEC\)](#)
- [National Diploma: Engineering: Electrical Power Engineering \(NDEEN - PEN\)](#)
- [National Diploma: Engineering: Electrical Process Instrumentation \(NDEEN - PIN\)](#)

Industrial Engineering

- [Baccalaureus Technologiae: Engineering: Industrial \(BTENI\)](#)
- [National Diploma: Engineering: Industrial \(NDEID\)](#)

Mechanical Engineering

- [Baccalaureus Technologiae: Engineering: Mechanical \(BTMEE\)](#)
- [National Diploma: Engineering: Mechanical \(NDEMC\)](#)

Mining Engineering

- [National Diploma: Mine Surveying \(NDMSR\)](#)
- [National Diploma: Mining Engineering \(NDMIN\)](#)

Master's degrees

- [Magister Technologiae: Engineering: Chemical \(98989\)](#)
- [Magister Technologiae: Engineering: Electrical \(98988\)](#)

Short Learning Programmes (SLPs)

Unisa offers an SLP related to engineering. It is important to remember that a SLP is not a formal qualification and will not allow you to qualify for a formal qualification.

For more information about the Programme in Industrial Engineering, visit

http://brochure.unisa.ac.za/slp/showlist.aspx?d=d_294.

Frequently asked questions

I did not complete mathematics at matric level can I study engineering at Unisa?

No. Mathematics at grade 12 level is one of the requirements for admission to any engineering qualification at Unisa. Admission to a qualification consists of three sets of requirements: statutory and College-specific requirements, as well as your APS score. Currently, the admission requirements for all engineering-related national diplomas are as follows:

You completed an NSC	You completed a Senior Certificate
<ul style="list-style-type: none">• A National Senior Certificate (NSC) (Diploma endorsement) or equivalent,• with at least 50% in the language of teaching and learning, 50% in Mathematics and 50% in Physical Science, if any Physics or Chemistry modules form part of the curriculum of a selected qualification, or at least N4 Mathematics passed with a minimum of 50% and N4 English, or N4 Communication, or N4 Communication Technology passed with at least 50%, and at	<ul style="list-style-type: none">• A Senior Certificate (SC) with at least a D symbol on HG or a C symbol on SG in the language of teaching and learning,• with at least a D symbol on HG or a C symbol on SG in Mathematics, and a D symbol on HG or a C symbol on SG in Physical Science, if any Physics or Chemistry modules form part of the curriculum of a selected qualification, or at least N4 Mathematics passed with a minimum of 50% and N4 English, or N4 Communication, or N4

You completed an NSC	You completed a Senior Certificate
<p>least N4 Engineering Science passed with a minimum of 50%, if any Physics or Chemistry modules form part of the qualification</p> <ul style="list-style-type: none"> • APS score requirement: 18 	<p>Communication Technology passed with at least 50%, or at least N4 Engineering Science passed with a minimum of 50%, if any Physics or Chemistry modules form part of the qualification</p> <ul style="list-style-type: none"> • APS score requirement: 18

Read more about the admission requirements for the College of Science, Engineering, and Technology here: <http://bit.ly/2gl4FPk>.

Visit the qualification web page in order to check requirements for a specific National Diploma/ BTech. Access these pages here: <http://bit.ly/2hl4oT2>.

Does Unisa offer a lower level qualification to help me meet the requirements for the National Diploma or degree?

Unisa does not offer a lower level qualification in the College of Science, Engineering and Technology. If you did not pass mathematics (and physical science, if any Physics or Chemistry modules form part of the curriculum of your selected qualification) on grade 12 level, you will need to complete the outstanding required subjects on grade 12 or N4 level (see table on the previous page for requirements) at a TVET (Technical Vocational Education and Training) College or other private Higher Education Institution. Do an online search to identify institutions. The Department of Higher Education and Training's Register of Private Higher Education Institutions at <http://www.dhet.gov.za/SitePages/DocRegisters.aspx> can help you to identify registered institutions.

I completed mathematics, the language of teaching and learning (English or Afrikaans), and physical science on grade 12 level but my percentage for these is below the percentage required – what now?

You can apply for admission to an engineering diploma. Unisa will then inform you whether you are placed in the alternative pathway programme. Applicants who have not obtained at least 50% in the language of teaching and learning (English or Afrikaans), 50% in Mathematics and 50% in Physical Science will be limited to 48 credits at NQF level 5 in their first period of study and must register for the following:

- To meet the **language requirement**: two language proficiency modules (ENG1511 and ENN103F)
- To meet the **Mathematics requirement**: a Mathematics module (MAT0511)
- To meet the **Physical Science requirement**: a Science module (SMI181Q)

Unisa will advise you of the modules you may register for.

All 48 credits must be passed before you can continue with diploma studies. You must re-apply for admission to the Diploma.

I completed an engineering-related National Diploma (S4/T3/ T4) at a TVET College, or I have a foreign engineering qualification – where must I start?

Please review the requirements for admission to the BTech qualification you wish to pursue on the Unisa website at <http://bit.ly/2hl4oT2>. Information about relevant bridging subjects is provided.

Please note that N3-N6 is not a completed qualification – you will need to complete the outstanding practical requirement to complete your National Diploma before applying to continue with your studies at Unisa.

I am non-South African – can I train to become an engineer at Unisa?

The Engineering Council of South Africa will evaluate your qualification to determine whether you need to complete outstanding requirements. Contact the Department of Education at the Engineering Council of South Africa.

Is there a practical component to the course and do I need to complete these to graduate with an engineering qualification at Unisa?

Yes. All of the engineering qualifications contain practical components on each level of study. Subjects are at times split into theory and practical components. You must register and complete both the theory and practical components of the subject to gain a credit. In addition, you must register for the practical component simultaneously or after the theoretical component. Some practical modules are only offered at specific locations and will require you to relocate for the duration. Some qualifications may include projects. At times, project-based modules, are only on offer at specific locations and may require you to relocate for the duration.

I want to know more about the content of a National Diploma/ BTech

Read more about the curriculum for different qualifications on the Unisa registration website at <http://bit.ly/2xIkZMv>.

What is Work Integrated Learning (WIL) and how does it link to my qualification?

Your curriculum may contain one or more compulsory WIL modules. You must ensure that you complete the workplace experience modules successfully to meet

the requirements of the qualification and graduate. Learn more about WIL here <http://bit.ly/2gIp4Lh>.

How can I register as an engineer after I have completed an engineering-related National Diploma or a BTech at Unisa?

You need to enquire with other Universities as to the possibilities available for you to continue with your studies in order to meet the requirements for registering as a professional engineer. Also contact the Engineering Council of South Africa for advice regarding this.

Counselling and career development services at Unisa

The Unisa Directorate for Counselling and Career Development offers career-, academic- and personal counselling services to Unisa students and the broader community. You can talk to a counsellor about:

- **Career decisions.** I am not sure which career path to follow; I don't know which qualification would be best; I want to change my career direction...
- **Career information.** How can I find out more about a career in ...
- **Employability.** How do I market myself to employers? How can I look for work? How can I compile an effective CV? How do I go about networking with others? How do I put together my career portfolio? How can I meet potential employers? How can I improve my interview skills?)
- **My studies at Unisa.** How can I get started with my studies? How do I plan my studies? How can I study more effectively? I don't feel motivated to continue with my studies... I feel worried about preparing for/ writing the exams. I failed my exams – what now? I need to improve my reading/ writing/ numeracy skills
- **Personal issues.** How can I have better relationships with others? How can I cope more effectively with issues that impact on my studies?

Visit our website at <http://www.unisa.ac.za/counselling> to access many self-help resources, or talk to a counsellor by e-mail to counselling@unisa.ac.za.