



**Tshwane University  
of Technology**

*We empower people*

## Faculty of Engineering and the Built Environment



**2017  
GENERAL INFORMATION**



FACULTY ENGINEERING  
STUDENT SUPPORT OFFICE



*For the final admission requirements, please refer to the latest Faculty Prospectus or the Faculty website, [www.tut.ac.za](http://www.tut.ac.za).*

## VISION STATEMENT

To be a leading faculty at the cutting edge of innovation, which provides quality-driven professional career education of an international standard, that is relevant to the needs and aspirations of the Southern African engineering and built environment communities.

***Are you thinking of making engineering, related design, technology or the built environment your career?***

**Then ask yourself the following questions:**

- Am I creative?
- Do I enjoy calculations?
- Do I enjoy solving technical problems?
- Do I think practically?
- Do I like continuous change?
- Do I see lifelong academic development as a challenge?
- Am I prepared to work very hard?

**If your answer to these questions is YES, this brochure is for you!**

The Faculty of Engineering and the Built Environment issues National Diplomas and Baccalaureus Technologiae (B Tech), Master of Technology and Doctor of Technology degrees in most disciplines and therefore offers students an opportunity to reach their full potential.

### Qualifications in Engineering

The National Diplomas in Electrical, Mechanical, Civil, Industrial, Mechatronic, Chemical and Metallurgical Engineering enable students to register as professional technicians with the Engineering Council of South Africa (ECSA), after having gained a minimum of three years' practical experience after they have qualified. Since these diplomas are internationally recognised through the Dublin Accord, qualified students can work as technicians in co-signatory countries. A technician is a competent engineering practitioner with sound technical knowledge who is able to convert ideas into workable plans, contribute to practical knowledge and solve well-defined engineering problems.

The Baccalaureus Technologiae (B Tech) degrees in Electrical, Mechanical, Civil, Industrial, Mechatronic, Chemical and Metallurgical Engineering enable students to register as professional technologists with the Engineering Council of South Africa (ECSA), after having gained a minimum of three years' practical experience after they have qualified. Since these degrees are internationally recognised through the Sydney Accord, qualified students can work as



technologists in co-signatory countries. In the UK, for example, a technologist can work as an incorporated engineer (IEng) after registration with the Engineering Council of the United Kingdom (ECUK). Baccalaureus Technologiae (B Tech) degrees have a strong application and practical focus and technologists are competent engineering practitioners who are able to innovatively apply and modify engineering practices, solve broadly defined engineering problems, give managerial inputs and work independently. The B Tech degrees differ from BEng degrees, which allow registration as professional engineers, in the sense that the focus is more on the application of technological knowledge than on the derivation of knowledge from first principles.

### Material Engineering

This Faculty offers a qualification in Polymer Technology. This programme requires students with equivalent qualifications who wish to register for the B Tech: Polymer Technology to register for the subject Polymer Technology I concurrently, to prepare and equip them with polymer knowledge.

Many companies that deal with the production and marketing of plastic commodities also offer employment to plastics technologists and engineers. Career opportunities include the management of:

- the production and processing of raw material;
- the manufacturing and processing of products;
- the development, characterisation and quality assurance of products and raw materials;
- the development of new plastic products and material; and
- the marketing and sales of raw materials and products.

### Engineering-support qualifications

TUT also offers surveying technicians and technologists. A route exists for engineering surveying technologists to register with the South African Council for Professional Land and Technical Surveyors (PLATO) as professional engineering surveyors (not to be confused with professional land surveyors).

### Built Environment qualifications

In Building Sciences, TUT offers qualifications in quantity surveying and construction management for technicians and technologists who can register with the South African Council for Quantity Surveying Profession (SACQSP). After having gained enough practical experience and having passed professional examinations, candidates may register with the SACQSP as professional quantity surveyors. There is also a route for construction management students to register with the Chartered Institute of Building (CIOB) as chartered members.

The Department of Architecture at TUT offers qualifications for professional architects and architectural technologists and is accredited by the South African Council for the Architectural Profession (SACAP) and the Commonwealth Association of Architects. It is the only school of architecture at a university of technology that offers a fully accredited professional course.



## Industrial Design

This Faculty offers qualifications in 3D Design (Industrial Design). Talented individuals who successfully complete this programme should be capable of providing junior level industrial design-related services. This may include being a member of a design and development team or a junior design entrepreneur.

## International opportunities

TUT has strong international links. The Faculty is enjoying active partnerships with well-known academic institutions in many countries which enable students to learn from the experts in other parts of the world. Opportunities exist for students in selected disciplines to complete part of their training in countries such as Germany, The Netherlands and France.

## What are the admission requirements for 2017?

The calculation of an admission point score (APS) is based on a candidate's achievement in any six recognised 20-credit subjects by using the National Senior Certificate seven-point rating scale of achievement. Life Orientation is excluded when calculating APS.

The Faculty requires Mathematics for most programmes, except for 3D Design and Architecture, as Mathematical Literacy does not provide sufficient prior knowledge for higher education studies in engineering.

## Admission Point Score (APS) conversion table

APS	NSC %	SC HG M-Score	SC SG M-Score	NCV %
7	7 (80-89)	A		
6	6 (70-79)	B	A	4 Highly competent (70-79)
5	5 (60-69)	C	B	3 Competent (60-69)
4	4 (50-59)	D	C	3 Competent (50-69)
3	3 (40-49)	E	D	2 Not yet competent
2	2 (30-39)	F	E	1 Not achieved
1	1 (0-29)	G	F	

- NSC - National Senior Certificate (completed Grade 12 in and after 2008)
- NCV - National Certificate Vocational (completed Level 4 in and after 2009)
- SC HG - Senior Certificate Higher Grade (completed Grade 12 before 2008)
- SC SG - Senior Certificate Standard Grade (completed Grade 12 before 2008)



Architecture Students who obtained their subject credits at an academic or technical school Bachelor of Architecture (B Arch)		
English	Five other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	24	28

**A National Senior Certificate or an equivalent qualification with an endorsement of a bachelor's degree** with at least an adequate achievement 4 for English (home language or first additional language). Total APS of 28.

Architecture Students who obtained their subject credits at a TVET college Bachelor of Architecture (B Arch)			
English	Mathematics or Mathematical Literacy	Four other subjects, excluding Life Orientation	APS total
5 (60 - 69%)	5 (60 - 69%) / 5 (60 - 69%)	24	34

**A National Certificate Vocational (NCV) at NQF Level 4, with an endorsement of a bachelor's degree**, issued by the Council for Quality Assurance in General and Further Education and Training (Umalusi), with at least 5 for English and 5 for Mathematics/Mathematic Literacy, and at least 6 for any four other vocational subjects. A total APS of 34.

After passing the initial administrative screening, all candidates will sit for additional assessment arranged with the Department of Architecture. The purpose of the assessment is to select only students who are likely to be successful in their studies in Architecture. The University reserves the right to select the best candidates for this programme. Please contact the Department for information about the assessment.

Building Sciences Students who obtained their subject credits at an academic or technical school Diploma in Building				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	3 (40 - 49%)	3 (40 - 49%)	15	25

**A National Senior Certificate or an equivalent qualification**, with at least an adequate achievement of 4 for English, 3 for Mathematics/Technical Mathematics, and 3 for Physical Science/Technical Science. Total APS of 25.



Building Sciences Students who obtained their subject credits at a TVET Diploma in Building				
English	Mathematics	Physical Science/Applied Engineering Technology/ Materials	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	4 (50 - 59%)	5 (60 - 69%)	14	27

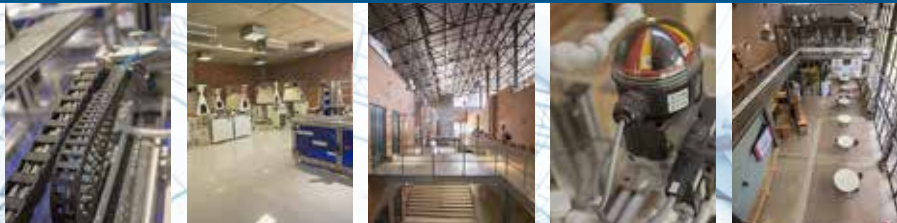
**A National Certificate Vocational or an equivalent qualification**, with at least an adequate achievement of 4 for English, 4 for Mathematics and 5 for Physical Science/Applied Engineering/Materials. Total APS score of 27.

Electrical, Civil, Industrial, Mechanical, Mechatronics Students who obtained their subject credits at an academic or technical school National Diploma				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	5 (60 - 69%)	5 (60 - 69%)	14	28

**A National Senior Certificate with an endorsement of a bachelor's degree or diploma or an equivalent qualification**, with at least 4 for English and 5 for Mathematics/Technical Mathematics and 5 for Physical Science/Technical Science. A total APS of 28 will be considered for the *National Diploma*.

Electrical, Civil, Industrial, Mechanical, Mechatronics Students who obtained their subject credits at an academic or technical school National Diploma (Extended)				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	20 - 27

**A National Senior Certificate with an endorsement of a bachelor's degree or diploma or an equivalent qualification**, with at least 4 for English and 4 for Mathematics/Technical Mathematics and 3 for Physical Science/Technical Science. A total APS of 20 to 27 will be considered for the *National Diploma (Extended)*.



**Electrical, Civil, Industrial, Mechanical, Mechatronics**  
**Students who obtained their subject credits at a TVET college**  
**National Diploma**

English	Mathematics	Physical Science/Applied Engineering Technology	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	5 (60 - 69%)	5 (60 - 69%)	14	28

**A National Senior Certificate Vocational (NCV) at NQF Level 4, with an endorsement of a bachelor's degree or diploma or an equivalent qualification, with at least 4 for English, 5 for Mathematics and 5 for Physical Science. A total APS of 28 will be considered for the National Diploma.**

**Electrical, Civil, Industrial, Mechanical, Mechatronics**  
**Students who obtained their subject credits at a TVET college**  
**National Diploma (Extended)**

English	Mathematics	Physical Science/Applied Engineering Technology	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	4 (50 - 59%)	5 (60 - 69%)	12	25 - 27

**A National Senior Certificate Vocational (NCV) at NQF Level 4, with an endorsement of a bachelor's degree or diploma or an equivalent qualification, with at least 4 for English, 4 for Mathematics and 5 for Physical Science. A total APS of 25 will be considered for the National Diploma (Extended).**

**Three - Dimensional Design (Industrial Design)**  
**Students who obtained their subject credits at an academic or technical school**  
**Diploma in Industrial Design**

English	Any five (5) subjects, (including Mathematics/Technical Maths or Mathematical Literacy) excluding Life Orientation	APS total
4 (50 - 59%)	17	21

**A National Senior Certificate or an equivalent qualification with at least an adequate achievement of 4 for English. A total APS of between 21.**

**In order to be considered for admission to this qualification, you must first meet the minimum academic requirements. All the applications should be supplemented with a portfolio.**





**Chemical and Metallurgical**  
Students who obtained their subject credits at an academic or technical school  
**National Diploma**

English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	5 (60 - 69%)	5 (60 - 69%)	14	28

**A National Senior Certificate with an endorsement of a bachelor's degree or a diploma, or an equivalent qualification**, with an achievement of 4 for English, 5 for Mathematics/Technical Mathematics and 5 for Physical Science/Technical Science. Applicants with a final combined score of 10 and more for Mathematics and Physical Science and a total APS of 28 will be ranked according to the APS achieved and considered for the National Diploma.

**Chemical and Metallurgical**  
Students who obtained their subject credits at a TVET college  
**National Diploma**

English	Mathematics	Physical Science/Applied Engineering Technology	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	5 (60 - 69%)	5 (60 - 69%)	14	28

**A National Certificate Vocational with an endorsement of a bachelor's degree or a diploma, or an equivalent qualification**, with an achievement of 4 for English, 5 for Mathematics and 5 for Physical Science/Applied Engineering Technology. Applicants with a final combined score of 10 and more for Mathematics and Physical Science and a total APS of 28 will be ranked according to the APS achieved and considered for the National Diploma.

**Chemical and Metallurgical**  
Students who obtained their subject credits at an academic or technical school  
**National Diploma**

English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	20 - 27

**A National Senior Certificate with an endorsement of a bachelor's degree or a diploma or an equivalent qualification**, with at least 4 for English, 4 for Mathematics/Technical Mathematics and 3 for Physical Science/Technical Science total APS of 20 - 27 will be considered for the National Diploma. While candidates with a final score of less than 10 for Mathematics and Physical Science and a total APS of 23 - 27 will write an **Academic Placement Test** before final acceptance.



**Chemical and Metallurgical**  
Students who obtained their subject credits at a TVET college  
National Diploma

English	Mathematics	Physical Science/Applied Engineering Technology	Three other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	4 (50 - 59%)	5 (60 - 69%)	12	25 - 28

**A National Senior Certificate Vocational (NCV) with an endorsement of a bachelor's degree or a diploma, or an equivalent qualification, with at least 4 for English, 4 for Mathematics and 5 for Physical Science/Applied Engineering Technology. A total APS of 25 - 28.**

**Polymer Technology and Materials Engineering Baccalaureus Technologiae (B Tech)**

A National Diploma: Polymer Technology or a National Diploma: Engineering: Chemical/Mechanical/Metallurgical, or a National Diploma: Analytical Chemistry or an NQF Level 6 bachelor's degree in Chemical/Mechanical Engineering or Analytical Chemistry or a closely related field obtained with an average of 60% or more from an accredited South African university. Students other than those with a National Diploma in Polymer Technology will also have to complete Polymer Technology I as part of their B Tech.

**Surveying**  
Students who obtained their subject credits at an academic or technical school  
National Diploma

English	Mathematics Technical Mathematics	Physical Science Technical Science	Five other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	20

**A National Senior Certificate with an endorsement of a bachelor's degree or a diploma, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language), 4 for Mathematics/Technical Mathematics and 3 for Physical Science/Physical Science. A total APS of 20.**

**Surveying**  
Students who obtained their subject credits at a TVET college  
National Diploma

English	Mathematics	Physical Science/ Applied Engineering Technology	Five other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	4 (50 - 59%)	5 (60 - 69%)	7	20

**A National Certificate Vocational (NCV) at NQF Level 4 with an endorsement of a bachelor's degree or a diploma, issued by the Council for Quality Assurance in General and Further Education and Training (Umalusi) with at least 4 for English, 4 for Mathematics, and at least 5 for Physical Science/Applied Engineering Technology and any two other vocational subjects. Alternative and international qualifications will be assessed on the equivalent issued by the South African Qualifications Authority. Applicants may also apply for recognition of prior learning at the Office of the Registrar. The relevant documentation will be requested from these applicants, and these cases will be handled on an ad hoc basis.**



## CLOSING DATE FOR APPLICATIONS:

31 July and 30 September for the January intake the following year.

15 May for the July intake of the current year.

New aligned HEQSF (Higher Education Qualification Sub-Framework) programmes

### What is happening with the transition to and addition of new qualifications to align with the new National Qualifications Framework Act?

The following sets of new qualifications will be implemented from 2017:

- Diploma in Building
- Bachelor of Architecture
- Master of Engineering in Chemical Engineering
- Master of Engineering in Civil Engineering
- Master of Engineering in Electrical Engineering
- Master of Engineering in Mechanical Engineering
- Master of Engineering Polymer Engineering

These qualifications will be presented pending approval from the Higher Education Quality Committee (HEQC)

- *Higher Certificate in Engineering (Construction, Electrical, Mechanical and Industrial)*
- *Bachelor of Engineering Technology (Civil, Electrical, Industrial, Mechanical, Mechatronics)*

What are the proposed admission requirements for these new qualifications?

*Higher Certificate in Engineering (Construction, Electrical, Mechanical and Industrial)*

Higher Certificate in Engineering				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Five other subjects, excluding Life Orientation	APS total
4 (50 - 59%)	4 (50 - 59%)	4 (50 - 59%)	12	22

A **National Senior Certificate or an equivalent qualification**, with at least a moderate achievement of 3 for English, 3 for Mathematics/Technical Mathematics and 3 for Physical Science/Technical Science. A total APS of 22. This is a one-year qualification.



## Bachelor of Engineering Technology (B Eng Tech)

Civil, Chemical, Electrical, Industrial, Materials (Polymer), Metallurgical, Mechanical, Mechatronics Bachelor of Engineering Technology (B Eng Tech)				
English	Mathematics/Technical Mathematics	Physical Science/ Technical Science	Five other subjects, excluding Life Orientation	APS total
5 (60 - 69%)	5 (60 - 69%)	5 (60 - 69%)	13	28 - 31 (selection test) 31

**A National Senior Certificate (NSC - completed Grade 12 in and after 2008), with an endorsement of a bachelor degree or an equivalent qualification, with at least a substantial achievement of 5 for English, 5 for Mathematics/Technical Mathematics and 5 for Physical Science/Technical Science. A total APS of 32. Applicants with a score between 28 - 31 need to write a selection test. This is a three-year qualification (integrated theory and practical).**

Civil, Chemical, Electrical, Industrial, Materials (Polymer), Metallurgical, Mechanical, Mechatronics Students who obtained their subject credits at a TVET college Bachelor of Engineering Technology (B Eng Tech)				
English	Mathematics	Physical Science	Five other subjects, excluding Life Orientation	APS total
5 (60 - 69%)	5 (60 - 69%)	6 (70 - 79%)	18	34

**A National Senior Certificate Vocational (NCV) at NQF Level 4, with an endorsement of a bachelor degree or an equivalent qualification, with at least 5 for English, 5 for Mathematics and 6 for Physical Science. A total APS of 34 will be considered**



## EXTENDED CURRICULUM

### What happens if I need more preparation?

The Engineering Extended Curriculum is a programme exclusively for students who have the potential to obtain an engineering qualification, but need more preparation and skills.

### Why the extended curriculum?

Students who are accepted for National Diploma studies, but who need more academic and practical preparation, are required to start with the extended curriculum. This programme give students extended time to obtain the required knowledge and skills by completing their first semester in one year.

*An extended curriculum is offered for each of the following engineering programmes:*

- Civil Engineering
- Electrical Engineering
- Industrial Engineering
- Mechanical Engineering
- Mechatronics Engineering

*During the extended phase, students learn new skills and gain knowledge of the following:*

- English language
- Engineering and technology
- Computer literacy
- Mathematics and physical science

For enquiries about the Engineering Extended Programmes, please phone:

Emmerentia Pieterse

Tel: 012 382 5037

Fax: 012 382 3577

E-mail: [pieterseej@tut.ac.za](mailto:pieterseej@tut.ac.za)

## FOR MORE INFORMATION:



Follow us  
[@tutengineering](https://www.instagram.com/tutengineering)



[www.tut.ac.za](http://www.tut.ac.za)



Like us  
[TUTEngineeringNews](#)



Like us  
[TUTEngineering Faculty](#)



## WHAT ENGINEERING PROGRAMMES ARE OFFERED?

Programme	Intake for the qualification	Which campus?	To apply, please phone the following departments:
Architecture	January only	Pretoria	Lemaria Labuschagne Tel: 012 382 5252 Fax: 012 382 5036 Email: architecture@tut.ac.za
Building	January and July	Pretoria	Kobie de Villiers Tel: 012 382 5242 Fax: 012 382 4107 Email: devilliersk@tut.ac.za
Surveying	January only	Pretoria	Antoinette Viljoen Tel: 012 382 5211 Fax: 012 382 5214 Email: viljoena@tut.ac.za
Chemical Engineering	January only	Pretoria	Refilwe Ngaka Tel: 012 382 4392/3550 Fax: 012 382 3532 Email: ngakarm@tut.ac.za
Metallurgical Engineering	January only	Pretoria	
Polymer Technology	January and July	CSIR	Elaine Relling Tel: 012 841 4978 Fax: 012 841 4924 E-mail: erelling@tut.ac.za
Civil Engineering	January and July	Pretoria	Daphney Ngoma Tel: 012 382 5212 Fax: 012 382 5226 Email: ngomadm@tut.ac.za
Electrical Engineering	January and July	Pretoria	Ofentse Mahlo Tel: 012 382 5159 Fax: 012 382 5688 Email: mahloo@tut.ac.za
		eMalaheni	Martize van Niekerk Tel: 013 653 3130 Fax: 013 653 3122 Email: vanniekerkme@tut.ac.za
Industrial Engineering	January and July	Pretoria	Ibbi van Rooyen Tel: 012 382 4402 Fax: 012 382 4847 Email: vanrooyenhi@tut.ac.za
Mechanical Engineering	January and July	Pretoria	Susan Wilbers Tel: 012 382 5162 Fax: 012 382 5602 Email: wilbersms@tut.ac.za
Mechanical: Mechatronics	January and July	Pretoria	
3D-Design (Industrial Design)	January only	Pretoria	Bets van Eeden Tel: 012 382 4637 Fax: 012 382 5602 Email: vaneedene@tut.ac.za

*Since our programmes focus strongly on each specific field of study, students acquire specialised knowledge in their chosen field of study within a relatively short period.*



The main fields of study comprise the following specialised career possibilities:

## ARCHITECTURE AND BUILT ENVIRONMENT

### Architecture

Architecture falls in the realm of creativity. It has its roots both in the arts and science. It demands a love for precision, geometry and order, as well as a passion for mystery, wonder and the unknown. The study of architecture involves an exploration of diverse disciplines that affect the built environment. If you aspire to be a professional and have a social mission, if you appreciate the value of science and technology and are intrigued by the revelations offered in works of art, then architecture may well be your field of study. Architecture is one of the most diversified and stimulating careers. Students not only learn to handle the conflicting demands of function, aesthetics, technology and economy, and all the inherent aspects of design, but are also trained in various means of expression, including writing, model-making, drawing, photography, video filming, digital media and oral presentations. An architectural office is an informal and colourful environment. Projects are usually a team effort involving everybody in the office, as well as many other people, such as clients, consultants and contractors.

The Department of Architecture at TUT offers professional architects, architectural technologists and architectural draftspersons and is accredited by the South African Council for the Architectural Profession (SACAP) and the Commonwealth Association of Architects.

A master's degree enables registration with the South African Council for the Architectural Profession (SACAP) as a professional architect, on successful completion of the Council's professional practice examination.

On obtaining your Bachelor of Architecture (B Arch) degree in architectural technology, you may choose to pursue your studies in a related specialised field that would enable you to become an architectural office manager, architectural project manager, architectural communications media specialist, an architectural IT specialist or a specialist in green technologies.

**Intake for the qualification:** January only.

**For more information and to apply, contact:**

Lemaria Labuschagne  
Fax: 012 382 5036

Tel: 012 382 5252  
E-mail: labuschagnemm@tut.ac.za

### Building Sciences

The urgent need for housing, clinics and schools in South Africa creates numerous job opportunities for trained technicians and technologists in this field of study. Currently, there is a huge demand for females in these careers.

- **Quantity Surveying and Construction Management**

The quantity surveyor or construction manager is responsible for costing, cost control, project management and construction supervision.

**Intake for the qualification:** January and July.

**For more information and to apply, contact:**

Kobie de Villiers  
Fax: 012 382 4107

Tel: 012 382 5242  
E-mail: devilliersk@tut.ac.za



## GEOMATICS

### Surveying

A surveyor does all the preliminary measurements required for planning the construction of structures such as roads, bridges, dams, buildings and power lines. He or she is also responsible for setting out these constructions and ensures their accuracy. A qualified surveyor may specialise in the photogrammetric field, or in geographic information systems (GIS). Both fields of specialisation are mainly computer-orientated.

**Intake for the qualification:** January only.

**For more information and to apply, contact:**

Antoinette Viljoen  
Fax: 012 382 5214

Tel: 012 382 5211  
E-mail: viljoena@tut.ac.za

## ENGINEERING

### Chemical Engineering

Chemical Engineering focuses on the industrial manufacturing of chemicals, as well as processes for converting raw materials into products of economic value. Such processes are applied in the oil, coal, food and textile industries, in mineral processing, in water and affluent treatment, and in power generation.

Bricks, metals and plastics, and even chocolate, soap and cheese, are some of the products that chemical engineers do research on and for which they develop, design, construct and operate production plants.

An increasingly important aspect of chemical engineering is the protection of the environment against pollution. As more and more countries and companies become aware of their responsibility in that regard, chemical engineers are becoming important role players in the conservation and protection of the environment.

**Intake for the qualification:** January only.

**For more information and to apply, contact:**

Refilwe Ngaka  
Fax: 012 382 3532

Tel: 012 382 4392/3550  
E-mail: ngakarm@tut.ac.za

### Civil Engineering

It is a general three-year National Diploma programme, with specialisation at Baccalaureus Technologiae (B Tech) degree level in the following fields:

- *Construction Management*

In this discipline of civil engineering, the training is focused on developing construction managers to manage the spectrum of processes related to concept and initiation, design and development, construction, commissioning, maintenance, and even deconstruction. Construction management entails the management of the business of construction, and consequently includes the management of projects.





- *Geotechnical Engineering*

In this branch of civil engineering, training is focused on all aspects of geotechnical and foundation engineering, including monitoring of site conditions, earthwork and foundation construction.

- *Environmental Engineering*

In this branch, training is focused on the application of science and engineering principles to improve the environment, provide healthy water, air and land for human habitation and for other organisms, and to also remediate polluted sites. Other factors involved include environmental engineering law and studies on the environmental impact of pro- posed civil engineering projects.

- *Structural Engineering*

The training focuses on the analysis, design, planning and research on structural components and structural systems to achieve design goals that ensure the safety and comfort of users or occupants. A trained structural engineer takes into account the safety, technical, economic and environmental concerns and considers aesthetic and social factors.

- *Transportation Engineering*

As a key discipline in civil engineering, training in this field involves the application of technology and scientific principles to the planning, functional design, operation and management of facilities for any mode of transportation in order to provide for the safe, rapid, comfortable, convenient, economical and environmentally compatible movement of people and goods. Key divisions handled at this level include highway and urban transportation.

- *Urban Engineering*

Training in this discipline is mainly concerned with municipal infrastructure. This involves specifying, designing, constructing and maintaining streets, sidewalks, water supply networks, sewers, street lighting, municipal solid waste management and disposal, storage depots for various bulk materials used for maintenance and public works (paint, sand, etc.), public parks and bicycle paths.

- *Water Engineering*

As a discipline of civil engineering, training in this area is concerned with the flow and conveyance of fluids, mainly water and sewage. Thus, it entails the application of fluid mechanics principles to problems dealing with the collection, storage, control, transport, regulation, measurement and use of water. This area of civil engineering is intimately related to the design of bridges, dams, channels, canals and levees, and to both sanitary and environmental engineering.

Civil Engineering graduates in these specialisation fields usually start their own businesses or work for consulting engineers, government departments and municipalities. They may also work on construction sites for construction companies.

**Intake for the qualification:** January and July.

**For more information and to apply, contact:**

Daphney Ngoma

Fax: 012 382 5226

Tel: 012 382 5212

E-mail: ngomadm@tut.ac.za



## Electrical Engineering

All students who wish to pursue a career in electrical engineering initially enrol for Electrical Engineering and do the same subjects in the first two semesters. Students learn enough of the industry during these semesters to make an informed choice to orient to a specific field in Electrical Engineering at the beginning of the second year. The core subjects stay the same, with a selection of subjects in the different electrical engineering fields.

- *Clinical Engineering - Pretoria Campus only*

A career in clinical engineering relates to the design, maintenance, implementation and management of electrical and electronic equipment used in hospitals for the medical care and treatment of patients. The career entails finding solutions to engineering problems and the implementation and maintenance of medical equipment by applying sound scientific and technical knowledge and mathematical skills. Technicians and technologists are employed in public and private hospitals, by manufacturers and suppliers of medical equipment and by the National Department of Health and other private companies.

- *Digital Technology - Pretoria and eMalahleni campuses*

Digital technology is defined as the technology of processing and distributing data, audio and video signals with equipment and in subsystems. It forms the basis of modern computer technology, computer networks, all audio and video equipment and telecommunications technology. The training programme equips students with a sound scientific background and mathematical skills that enable them to solve engineering problems by designing, implementing and maintaining systems at a technical level. Possible employers are Eskom, Telkom, AEC, Kentron, LEW, SAA, SANW, Siemens, SAMES, SABC and many other smaller electronic companies.

- *Electronic Engineering - Pretoria and eMalahleni campuses*

Electronic engineering deals mainly with the design, implementation and maintenance of electronic systems, using the accumulation of signals at the analogue level from signals and sensors, the amplification of these and the presentation and processing of the data. Appropriate feedback systems may be implemented in order to enhance the performance of systems. The discipline finds application in the audio, video, electronic manufacturing and electronic control fields. The discipline involves sound scientific and mathematical skills at a technical level to solve engineering problems.

- *Power Engineering - Pretoria and eMalahleni campuses*

Power engineering becomes more advanced in the generation and distribution of power through the use of sophisticated digital and electronically controlled devices. Students who have completed this qualification will be able to understand, evaluate, design, plan, install, repair and maintain electrical power equipment used in the field. Possible employers are manufacturers, Eskom, mines, municipalities and general industrial manufacturers.

- *Process Instrumentation - Pretoria and eMalahleni campuses*

Process instrumentation becomes more sophisticated every day with the development of digital and electronic components and controlled devices. Students who have completed this qualification will be able to understand, evaluate, design, plan, install, repair and maintain the digital, electrical and electronic equipment used in industry. Possible employers are industrial manufacturers, Eskom, mines and general industrial workplaces.



- *Telecommunication Engineering - Pretoria Campus only*

Students who have completed their studies will be skilled and competent in the marketing, developing and repair of electronic systems for the world market. They will also be able to design, program, integrate and maintain design, implement and commission RF systems, telecommunication, satellite and cellular telecommunication systems. Possible employers are electronic system companies and general electronic application companies that operate in all fields such as Telkom, cellphone companies and telematic design companies

- *Own choice - Pretoria and eMalahleni campuses*

A student can compile his or her own stream leading to a desired field of specialisation by combining subjects from any of the optional subject choices given above. This will enable students who have completed their studies to be skilled and competent in a stream leading to the desired new specialisation field as required by their industry. Possible employers are companies using cutting-edge technologies such as electronic system companies, power electronic and power application companies that operate in all electrical engineering fields.

**Intake for the qualification:** January and July

**For more information and to apply, contact:**

Ofentse Mahlo - Pretoria Campus  
Fax: 012 382 5688

Tel: 012 382 5159  
Email: mahloo@tut.ac.za

Marlize van Niekerk - eMalahleni Campus  
Fax: 013 653 3122

Tel: 013 653 3130  
E-mail: vanniekerkme@tut.ac.za

## Industrial Engineering

Industrial engineering is primarily about the effective and efficient utilisation of resources in both production and service-orientated enterprises. The following are essential elements for professionals in the field of industrial engineering:

- Design, development and industrialisation of new production or service delivery systems
- Participation in continuous improvement programmes
- Project management
- Quality management
- Technical and economic feasibility studies
- Management of operational and support functions
- Logistics engineering
- Supply chain management
- Facility layout planning

**Intake for the qualification:** January and July.

**For more information and to apply, contact:**

Ibby van Rooyen

Tel: 012 382 4402

Fax: 012 382 4847

E-mail: vanrooyenhi@tut.ac.za



## Three-Dimensional Design (Industrial Design)

Three-dimensional designers are the professionals who design products and experiences that add value to business and the user, and which are innovative and aesthetically appropriate. A professional industrial design service is often rendered in a cooperative working relationship with members of other development groups. Such groups typically consist of marketers, engineers, manufacturers, members of the research and development environment, software developers, entrepreneurs or members of other professions. The industrial designer places special emphasis on human characteristics, needs and interests that require a particular understanding of visual, tactile, safety and convenience criteria. Industrial designers combine such considerations with a practical concern for technical processes and requirements for manufacturing, marketing opportunities and economic constraints, and for distribution, sales and servicing arrangements.

**Intake for the qualification:** January only.

**For more information and to apply contact:**

Bets van Eeden

Tel: 012 382 4282

Fax: 012 382 5602

E-mail: mulderme@tut.ac.za

## Mechanical Engineering

Students who enrol for studies in mechanical engineering may specialise in one of the following fields:

- *Mechanical Engineering*

Mechanical engineering is a very broad field of study and involves all forms of mechanisms and movement. The course consists of design, manufacturing, improving and maintaining machinery and equipment. Mechanical engineering also combines various fields of study such as mechatronics, electrical engineering and manufacturing.

- *Mechatronics Engineering*

The term “mechatronics” describes the integration of electronic engineering, electrical engineering, computer technology and control engineering with mechanical engineering. This process forms a crucial part of the design, manufacturing and maintenance of a wide range of engineering products and processes. Consequently, there is a need for engineers and technicians to adopt an interdisciplinary and integrated approach involving skills and knowledge that are not confined to a single subject area. They should be able to operate and communicate across a range of engineering disciplines.

**Intake for the qualification:** January and July.

**For more information and to apply, contact:**

Susan Wilbers

Tel: 012 382 5162

Fax: 012 382 5602

E-mail: wilbersms@tut.ac.za



## Metallurgical Engineering

Metallurgical technologists design, process, manufacture, characterise and improve all mineral-based and metal materials used today, as well as those yet to be developed. They are concerned with the extraction of minerals and the production, development and monitoring of engineering materials. Metallurgy is about extracting and refining valuable minerals and metals and converting them into useful engineering products. The student will:

- separate minerals, using their physical properties;
- extract metals or minerals by chemical reactions;
- utilise the properties of metals and alloys to tailor products for specific purposes; and
- characterise and improve the properties of engineering materials.

Metallurgy is divided into two broad fields: extractive metallurgy and physical metallurgy.

### • *Extractive Metallurgy*

Most ores contain very little valuable metal; sometimes as little as one per cent. The job of the metallurgical technologist is to separate and purify those small amounts in an economical way. The extractive metallurgist should therefore have knowledge of the physical and chemical properties of various materials and the extent of variation under different conditions. The knowledge gained is used to design, test, operate and maintain plants as efficiently and economically as possible. State-of-the-art instruments and computers are used to keep track of the complex processes in modern plants and to pinpoint problems as soon as they arise.

### • *Physical Metallurgy*

Methods to develop and manufacture metals and alloys with a high resistance to various forms of corrosion, high temperatures and stress form part of this programme. Physical metallurgists develop metals with specific properties that are essential for power generation, transport and housing. New and improved alloys developed through physical metallurgy are used in the structures of offshore oilrigs, chemical processing plants and high-performance aircraft.

**Intake for the qualification:** January only.

**For more information and to apply, contact:**

Refilwe Ngaka

Tel: 012 382 4392/3550

Fax: 012 382 3532

E-mail: ngakarm@tut.ac.za

## Polymer Technology

The course deals with the processing of polymers using facilities such as injection moulding, extrusion (including film and profile-tubing and pipes), blow moulding and composite material. The flow characteristics of the polymer are important parameters that will advise on the processing conditions of the processing equipment. These characteristics are studied on the Rheometer (polymers in the melt state) and viscometers (polymers in solution). Students are introduced to the interpretation of rheological data of polymers undergoing deformation in shear, tension, compression and flow (from melt and solution).



# Polymer Technology Practical

Students are introduced to reviews of the different kinds of processing equipment. During this period, students are taught technical writing and the reporting of data.

## Polymer Science

### 1. Polymer Chemistry

Polymer Chemistry looks at the polymerisation processes and mechanisms involved with step growth and chain polymerisation systems. Chain polymerisation includes radical and ionic polymerisation as well as stereospecific catalytic system. The production of different copolymers and their properties are investigated. Different reactions that are used on polymers to change their properties are looked at. These include cross-linking reactions and polymer degradation.

### 2. Polymer Physics

The physics aspect of the course deals with the rudimentary building blocks of polymers, the aggregates of which significantly affect the bulk properties of the materials. It also covers the aspect of molecular and crystal orientations, crystal size and crystallinity. The architectural organisation of the crystals determines the ultimate integrity of the polymer. It is fundamentally important for students to have a good knowledge of these parameters in the selection and design of a particular polymer for a particular application, as these parameters will ultimately affect the processing conditions of the polymer. Students are taught the interpretation of XRD data, microscopy (SEM, optical polarising), tensile, IR (for anisotropy information), thermal (TGA, DSC and DMA) and rheological information.

#### • Polymer Science Practical

This involves a work-related or industrial project. The student will need to write a proposal and do the experimental part of the project. A final report, poster and project presentation form part of the final assessment.

**Intake for the qualification:** January and July.

**For more information and to apply, contact:**

Elaine Relling  
Fax: 012 841 4924

Tel: 012 841 4978  
E-mail: erelling@tut.ac.za

## WHICH QUALIFICATIONS CAN I OBTAIN?

The qualification structure of the Tshwane University of Technology provides the following exit points:

- A National Diploma (N Dip) after three years (three and a half years in the extended curriculum)
- A *Baccalaureus Technologiae* (B Tech) after four years
- A master's degree (M Tech) after five years
- A doctorate (D Tech) after seven years

**These qualifications will be presented pending approval from the Higher Education Quality Committee (HEQC)**

- *Higher Certificate in Engineering (Construction, Electrical, Mechanical and Industrial)*
- *Bachelor of Engineering Technology (Mechanical, Electrical, Industrial, Civil, Chemical, Metallurgy and Material Science)*
- *Bachelors in Geomatics*
- *Bachelors in Building Sciences*

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT



Qualification	Minimum time to complete studies	Maximum time to complete studies	Mode of delivery
Higher Certificate	1 year	2 years	Full-time study only
Bachelor of Engineering Technology (Not presented yet)	3 years	6 years	Full-time study only
N Dip	3 years	6 years	Full-time study only
N Dip Extended	3,5 years	7 years	Full-time study only
B Tech Architecture (Prof)	4 years	8 years	Full-time study only
B Tech Architecture (Extended)	4 years	8 years	Full-time study only
B Arch	5 years	10 years	Full-time study only
M Tech	2 years	3 years	Full-time or part-time
M Eng	2 years	3 years	Full-time study only
D Tech	3 years	5 years	Full-time or part-time

### Where is the emphasis?

- *Vocational training*

During the diploma programme, vocational training is emphasised. Students with a diploma may register with the Engineering Council of South Africa (ECSA) as professional technicians when they have gained a minimum of two years' practical experience after qualifying.

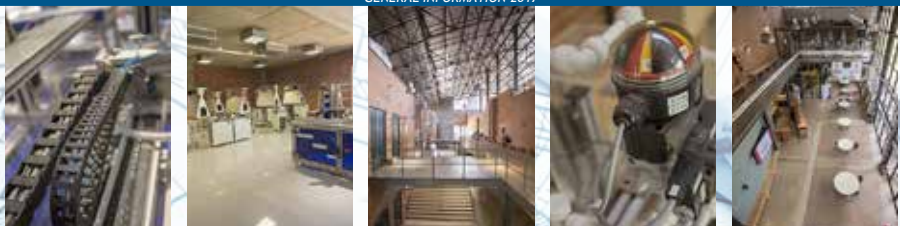
- *Career training*

In the B Tech programme, the emphasis is placed not only on specialised technical skills, but also on management skills. With a B Tech degree and three years of postgraduate experience, the student may register with the Engineering Council of South Africa (ECSA) as a professional technologist.

- *Personal development*

To qualify for an M Tech degree, the student has to write a dissertation, and he or she also has to undertake a research or development project under the supervision of a study panel. Such a project should concentrate on the innovative application of existing knowledge, the establishment of new technology, or the improvement of existing technology. The minimum study period is one year, but most students complete the course on a part-time basis over a period of one to three years.

The highest qualification offered by the Tshwane University of Technology is a D Tech degree. The requirements are the completion of a comprehensive, independent research or development project, as well as a thesis that adds value to engineering technology.



### How many subjects are included?

- Twenty to 25 theoretical subjects for the National Diploma
- Seven to ten theoretical subjects for the B Tech degree

### How high is the academic standard?

Engineering students at the Tshwane University of Technology do not have to worry about uncertain or deteriorating academic standards.

The content of our programmes is determined by industry. This system is called the Advisory Committee System and means that representatives of the industry ensure that the syllabi stay relevant and updated.

Those representatives monitor all the examination papers in the capacity of moderators and do spot checks on the marked examination papers. Two external examiners, independent from each other and often from abroad, mark all dissertations and theses. Only when both examiners give the student a pass mark will he or she pass.

An engineering graduate of the Tshwane University of Technology will therefore have the skills required by industry to become a technician or technologist.

### Are our qualifications recognised internationally?

The TUT engineering qualifications are recognised internationally through the Sydney and Dublin accords (only applicable to engineering). These accords govern mutual recognition in the Commonwealth countries, and South Africa forms part of the accords through the Engineering Council of South Africa (ECSA).

### Financial Aid

Closing date for financial aid applications:

15 November annually for all returning students

10 January for first-time entering students

For more information on financial aid, please phone one of the numbers below.

### Telephone numbers of Financial Aid on the various campuses:

Tel. 012 382 6295 (Arcadia and Arts campuses)

Tel. 013 653 3121 (eMalahleni Campus)

Tel. 012 382 0612 (Ga-Rankuwa Campus)

Tel. 013 745 3559 (Nelspruit Campus)

Tel. 015 287 0776 (Polokwane Campus)

Tel. 012 382 4465 (Pretoria Campus)

Tel. 012 382 9082 (Soshanguve Campus)





## ACCOMMODATION

Most male engineering students at the Pretoria Campus are accommodated in the Monitor Men's Residence (subject to availability) in Capital Park, approximately five kilometres from the campus. They stay in single rooms with communal facilities, which include a volleyball court and swimming pool.

Female engineering students are accommodated at Polonaise and The Heights residences.

For more information on accommodation at Pretoria Campus, refer to the table above indicating the contact details for specific programmes.

### What kind of transport is available?

There is a very reliable bus service, with a bus leaving every 30 minutes from the Pretoria Campus to the off-campus residences and back.

### During what hours are lectures presented?

Lectures are presented from 8:00 to 17:00. Different hours for courses in B Tech.

### What facilities are available?

Various specialist facilities with state-of-the-art equipment are available to engineering students.

### More information

You are most welcome to make an appointment with the faculty marketer or arrange an appointment for a group through your school:

Ms Zelda Janse van Rensburg

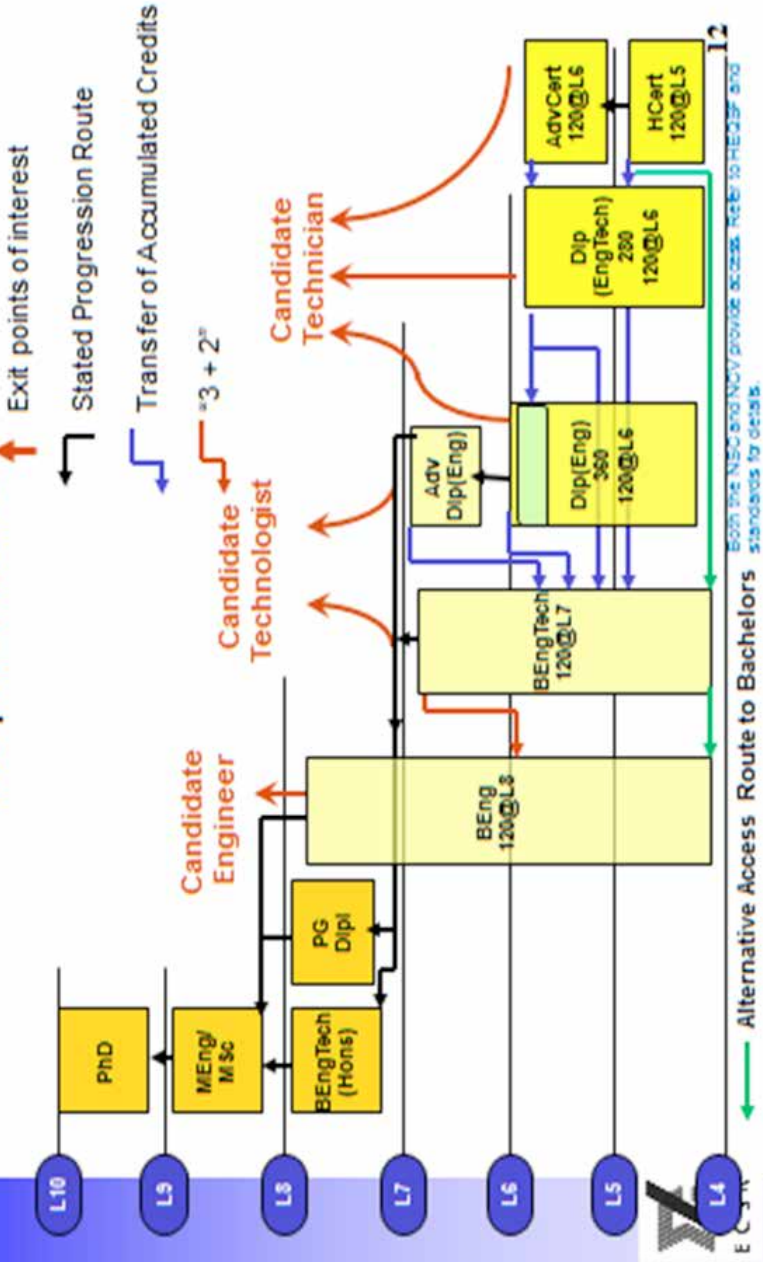
E-mail: [jansevanrensburgz@tut.ac.za](mailto:jansevanrensburgz@tut.ac.za)

### Please note:

At the time of publication, this information was correct, but Tshwane University of Technology reserves the right to amend all or any information without prior notification



# HEQSF and ECSA Educational Requirements





ty Improvement

Work Integrated Learning (WIL)

Workforce Development and Employability

IndustryGrid

Welcome

Welcome

Tshwane University of Technology  
Faculty of Engineering and the Built Environment

