

2018 GENERAL INFORMATION



**Tshwane University
of Technology**
We empower people

**Faculty of Engineering
and the Built Environment**



Faculty of Engineering and The Built Environment

2018 General Brochure

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?

For the final admission requirements, please refer to the latest Faculty Prospectus or the Faculty website, www.tut.ac.za.

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 only	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	Pretoria	Elaine Relling Tel: 012 382 3609 E-mail: erelling@tut.ac.za
Civil Engineering	January only	Pretoria	Daphney Ngoma Tel: 012 382 5212 Fax: 012 382 5226 Email: ngomadm@tut.ac.za

Programme	Intake for the qualification	Which campus?	To apply, please phone the following departments:
Electrical Engineering	January only	Pretoria	Ofentse Mahlo Tel: 012 382 5159 Fax: 012 382 5688 Email: mahloo@tut.ac.za
		eMalahleni	Marlize van Niekerk Tel: 013 653 3130 Fax: 013 653 3122 Email: vanniekerkme@tut.ac.za
Industrial Engineering	January and July	Pretoria	Bets van Eeden Tel: 012 382 4403 Fax: 012 382 4847 Email: VanEedenE@tut.ac.za
Mechanical Engineering	January only	Pretoria	Susan Wilbers Tel: 012 382 2848 Fax: 012 382 5602 Email: wilbersms@tut.ac.za
Mechatronics	January only	Pretoria	
3D-Design (Industrial Design)	January only	Pretoria	

PIPELINE QUALIFICATIONS

Baccalaureus Technologiae (B Tech)

The last intake for this qualification is discipline specific and between 2017 to 2019. Pipeline students will be allowed twice the minimum time to complete. Qualifying graduates will be allowed to articulate into the Bachelor of Engineering Technology (BEngTech). From 2021, B Tech graduates will be admitted to the Bachelor of Engineering Technology Honours (BEngTech (Hons)), if they meet the admission requirements.

National Diploma (N Dip)

The last intake for this qualification, including the Extended Programme, is in 2017. Pipeline students will be allowed twice the minimum time to complete. After 2019, qualifying National Diploma graduates will be allowed to articulate into the Bachelor of Engineering Technology (BEngTech), if they meet the requirements.

POSSIBLE CAREER OPPORTUNITIES

Higher Certificate (HC)

With a *Higher Certificate* qualification, the undergraduate will be able to work in *engineering support occupations* such as, draftspersons, installers and maintainers of engineering equipment and systems, engineering sales and marketing, site and production foreman, etc.

Diploma

The *Diploma* enables students to register as professional technicians with the Engineering Council of South Africa (ECSA), after having gained a minimum of four years' practical experience once 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.

Bachelor of Engineering Technology (B Eng Tech)

The B Eng Tech degrees in Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering, Mechatronics, Metallurgical Engineering and Materials Engineering in Polymer Technology enable students to register as *professional engineering technologists* with the Engineering Council of South Africa (ECSA), after having gained a minimum of four 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). The Bachelor of Engineering Technology (B Eng 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 Eng Tech degrees differ from B Eng Tech 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.

Bachelor of Technology in Polymer

This Department offers a qualification in Polymer Technology for students with a National Diploma in Polymer Technology. Students with a National Diploma qualification in Analytical Chemistry, or Mechanical, Chemical and Metallurgical Engineering can also apply for this course. Students who do not have the necessary polymer background will be required to register for a semester subject, Polymer Technology I, which will run concurrently with the B Tech classes.

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 qualifications for surveying technicians and technologists. A route exists for engineering surveying technologists to register with the South African Geomatics Council (SAGC) as professional engineering surveying technologist (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 department offers qualifications in 3D Design (Industrial Design). Talented individuals who successfully complete this programme will be able to provide 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.

Qualification	Duration of course	Mode of delivery
Higher Certificate	1 year	Full-time study only
Bachelor of Engineering Technology (BEngTech)	3 years	Full-time study only
Diploma	3 years	Full-time study only
Advanced Diploma	1 year	Full-time study only
B Tech Architecture (Prof)	4 years	Full-time study only
B Tech Architecture (Extended)	5 years	Full-time study only
B Arch	4 years	Full-time study only
Baccalaureus Technologiae (B Tech)	2 years	Part-time study only
Master of Engineering (MEng)	2 years	Full-time study only
Doctor of Engineering (DEng)	3 years	Full-time or part-time

What are the admission requirements for 2018?

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 in most cases when calculating APS.

The Faculty requires Mathematics for most programmes, except for Architecture and Industrial Design 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 SGM- Score	NCV %
7	7 (80-89)	A		Outstanding competent (80-100)
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 or after 2008)

NCV - National Certificate Vocational (completed Level 4 in or after 2009)

SC HG - Senior Certificate Higher Grade (completed Grade 12 before 2008)

SC SG - Senior Certificate Standard Grade (completed Grade 12 before 2008)

Alternative and international qualifications will be assessed on the equivalent issued by the South African Qualifications Authority (SAQA). 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

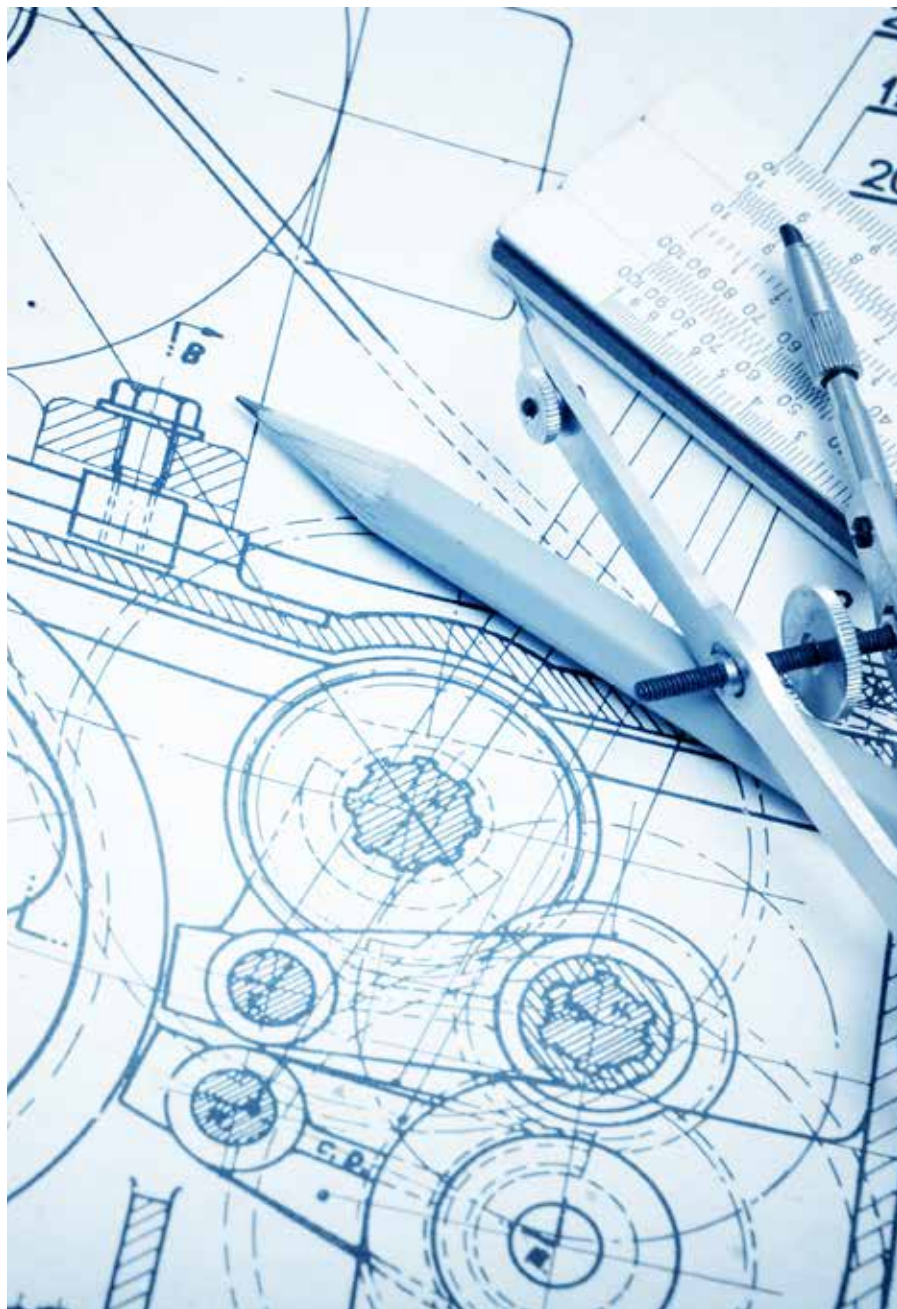
What is happening with the transition to and addition of new qualifications to align with the new National Qualifications Framework Act?

The following sets of new qualifications will be implemented from 2018:

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

Pending approval, the following qualifications will be presented in 2018/2019:

- Diploma in Electrical Engineering
- Diploma in Industrial Design
- Advanced Diploma in Industrial Design
- Master of Architectural Technology in Architecture (Structured)
- Master of Building Sciences (Structured)
- Master of Building Sciences (Research)
- Master of Engineering In Chemical Engineering
- Master of Engineering in Civil Engineering
- Master of Engineering in Engineering Management
- Master of Engineering in Industrial Engineering
- Master of Engineering in Metallurgical Engineering
- Master of Engineering in Polymer Technology
- Doctor of Engineering



DEPARTMENT OF ARCHITECTURE

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 educates professional architects and senior architectural technologists 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 (technology option), 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

Tel: 012 382 5252

Fax: 012 382 5036

E-mail: labuschagnemm@tut.ac.za

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%)	21	25

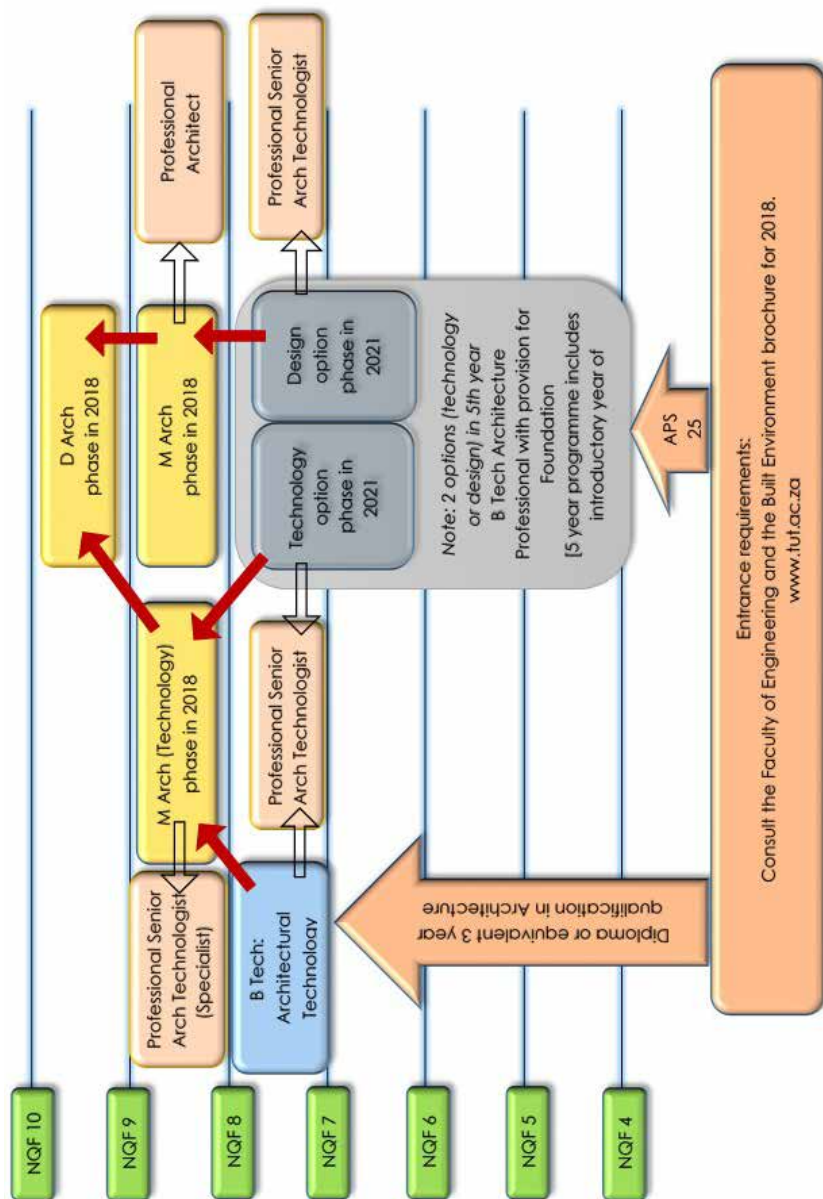
A National Senior Certificate or an equivalent qualification with an endorsement of a bachelor's degree with at least 4 for English (home language or first additional language). Total APS of 25.

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) 4 x 6	APS total
5 (60 - 69%)	5 (60 - 69%) 5 (60 - 69%)	24	38

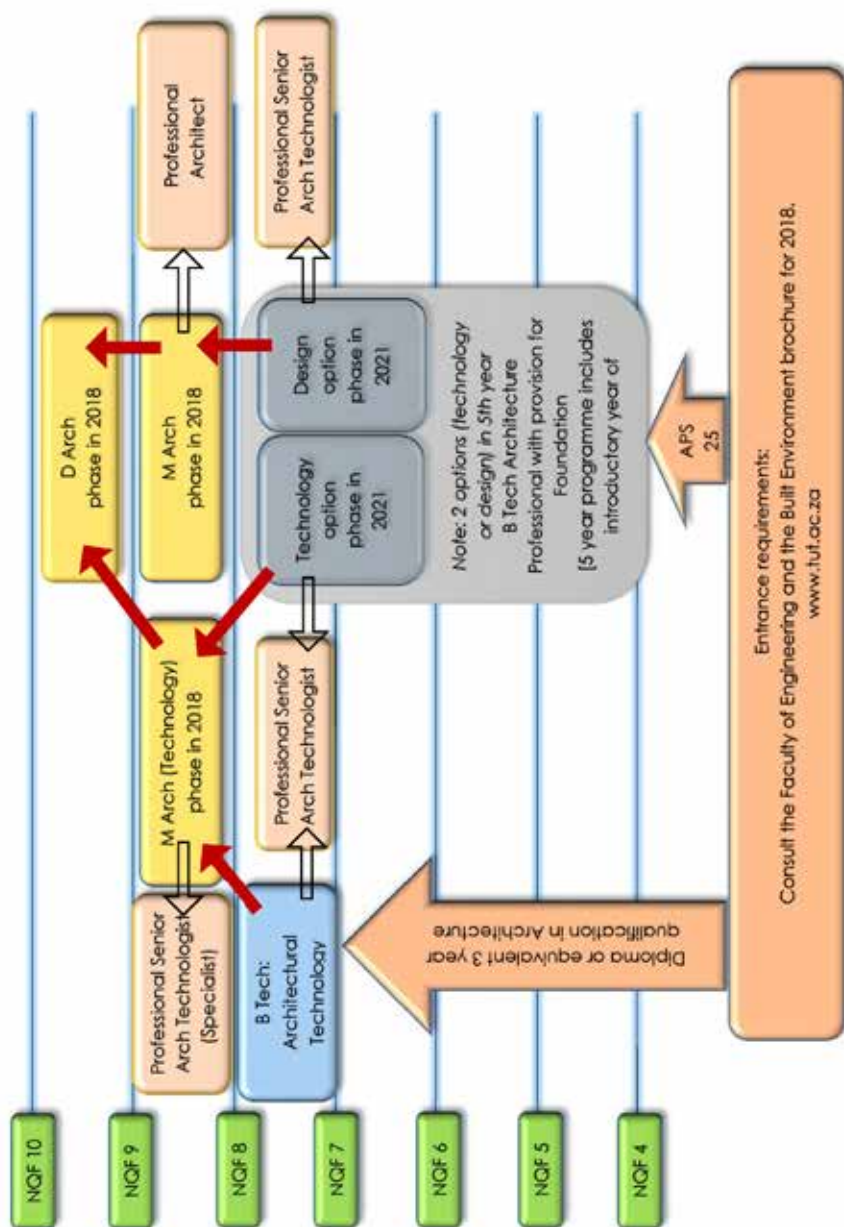
A National Certificate Vocational (NCV) at NQF Level 4, with an endorsement of a bachelor's degree, issued by the Council for Quality Assurance in General and Further Education and Training (Umalusi), with at least 5 for English and 5 for Mathematics/Mathematic Literacy. Total APS of 38.

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.

Qualification Structure: B Architecture with provision for Foundation



Qualification Structure: B Architecture with Provision for Foundation



DEPARTMENT OF BUILDING SCIENCES

Building Sciences

The urgent need for housing, clinics and schools and other infrastructure in South Africa creates numerous job opportunities for trained professionals and technologists in this field of study. Currently, there are vast opportunities for females in these careers.

Quantity Surveying and Construction Management

The quantity surveyor is responsible for costing, cost control and legal advice to the client. Whereas the construction manager plans, coordinates and manages the construction process.

Intake for the qualification: January only.

FOR MORE INFORMATION AND TO APPLY, CONTACT:



Kobie de Villiers

Tel: 012 382 5242

Fax: 012 382 4107

E-mail: devilliersk@tut.ac.za

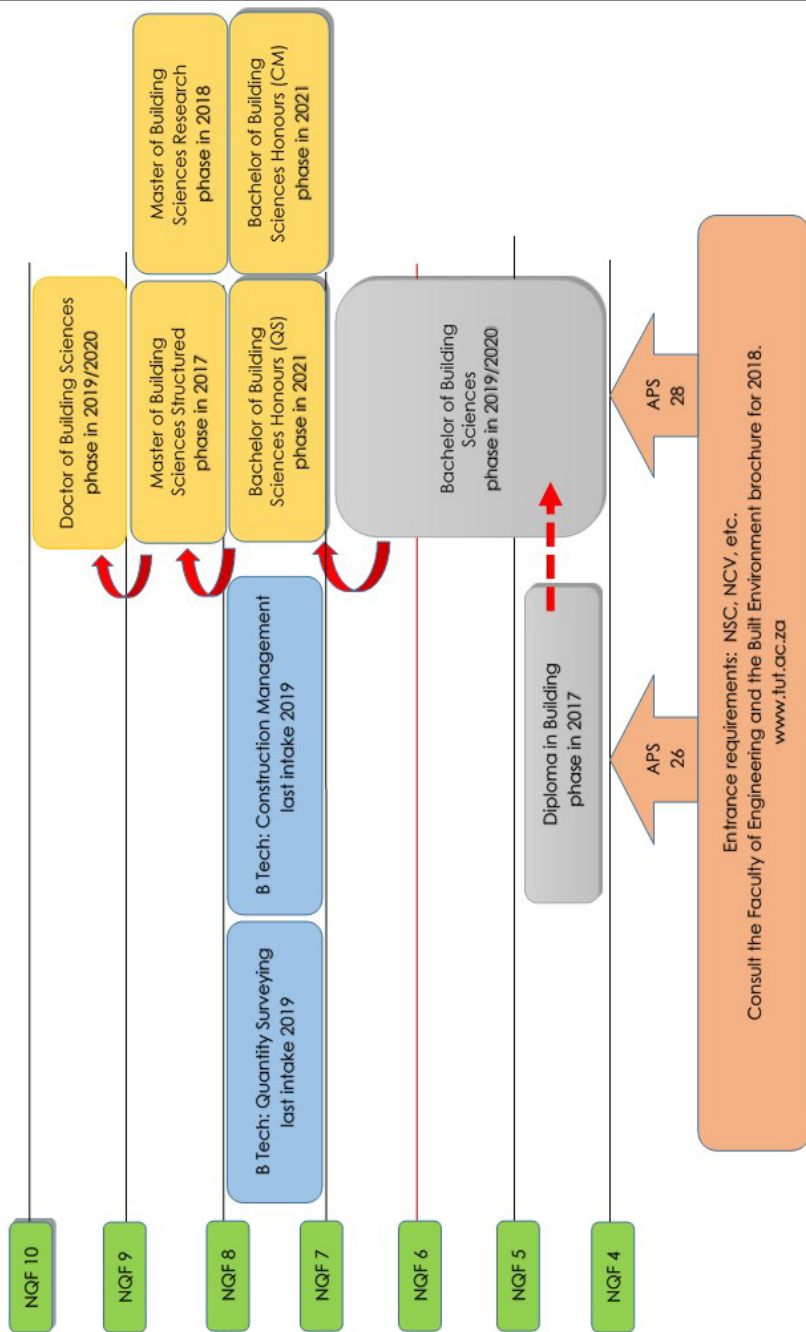
Diploma in Building					
Students who obtained their subject credits at an academic or technical school					
English	Life Orientation	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Two other subjects	APS total
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	3 (40 - 49%)	12	26

A National Senior Certificate with a bachelor's degree or a diploma endorsement or an equivalent qualification, with at least 4 for English, 4 for Life Orientation, 3 for Mathematics/Technical Mathematics and 3 for Physical Science/Technical Science. Total APS of 26.

Diploma in Building Students who obtained their subject credits at a TVET					
English	Life Orientation	Mathematics	Physical Science/ Applied Engineering Technology/ Materials	Three other subjects, (excluding Life Orientation)	APS total
4 (50 - 59%)	4 (50 - 59%)	4 (50 - 59%)	5 (60 - 69%)	14	31

A National Certificate (Vocational) (NCV) at NQF Level 4 with a bachelor's degree or a diploma endorsement or an equivalent qualification, with at least 4 for English, 4 for Life Orientation, 4 for Mathematics and 5 for Physical Science/ Applied Engineering Technology/Materials. Total APS of 31.

New Qualification Structure: Building Sciences



DEPARTMENT OF CIVIL ENGINEERING

Civil Engineering

Higher Certificate in Construction Engineering

The Higher Certificate in Construction Engineering offered by TUT is a new qualification designed to meet the requirements of the HEQSF Level 5 and the higher certificate qualification standards requirements of ECSA. There will be two options, namely one option specialising in Construction Material Testing and another stream specialising in Water and Wastewater Engineering Infrastructural Operation and Maintenance.

The Higher Certificate in Construction Engineering is designed to serve two purposes, namely to provide access to higher education in Civil Engineering; and to provide students with the educational basis for engineering support occupations that can solve narrowly-defined engineering problems as defined by the Engineering Council of South Africa (ECSA). This basic knowledge and practical skills can be applied in an operative occupation as *technical assistant* in the workplace. The qualification is primarily vocational or occupational. The qualification also serves to provide students with the basic introductory knowledge, cognitive and conceptual tools and practical techniques for further higher education studies. The knowledge emphasises general principles and application. This qualification signifies that the student has attained a basic level of higher education knowledge and competence in Construction Engineering and is capable of applying such knowledge and competence in an occupation or role in the workplace.

The fundamental purpose of the Higher Certificate in Construction Engineering is to train technical assistants that can be employed in various occupations to address the basic technical workforce needs of the country. The core of the programme is the integration of theory and practice spread over the duration of one year to ensure a balanced technical worker in industry. The purpose is also to equip students in a technical field with theoretical content, practical skills and know-how in the construction engineering environment. The duration of the Higher Certificate in Construction Engineering programme is a minimum of one year with a minimum of 140 credits at NQF Level 5, distributed over two semesters.

Bachelor of Engineering Technology in Civil Engineering

The Bachelor of Engineering Technology in Civil Engineering, offered by TUT, is a new qualification designed to meet the National Qualifications Framework (NQF) Level 7 and Engineering Council of South African (ECSA) professional requirements for an *engineering technologist*.

The purpose of the Bachelor of Engineering Technology in Civil Engineering qualification is to meet the generic standard for an *engineering technologist*. The purpose statement includes a fundamental commitment to the preparation of its students

as *engineering technologists* in the various fields of civil engineering so that it will meet the generic standard for an *engineering technologist* to solve broadly-defined problems. This qualification is designed to build the necessary knowledge, understanding, abilities and skills required for further learning towards becoming a competent practicing *engineering technologist* in an operative occupation as a Civil Engineering Technologist in the workplace. The fundamental focus of the degree is to train Civil Engineering Technologists that can operate in various occupations to address the advanced technical workforce needs of the country. The core of the programme is the integration of theory and practice (practical skills and attributes) spread over the duration of three years to ensure a balanced, highly skilled technologist in the civil engineering environment. This qualification can be completed in the minimum time of three years.

Intake for the qualifications: January

FOR MORE INFORMATION AND TO APPLY, CONTACT:



Daphney Ngoma

Tel: 012 382 5212

Fax: 012 382 5226

E-mail: ngomadm@tut.ac.za

Higher Certificate in Construction Engineering (Civil)				
Students who obtained their subject credits at an academic or technical school				
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

A National Senior Certificate, or an equivalent qualification, with at least 4 for English, 4 for Mathematics/Technical Mathematics and 3 for Physical Science/Technical Science. A total APS of 20 will be considered for the Higher Certificate.

Higher Certificate in Construction Engineering (Civil) Students who obtained their subject credits at a TVET college				
Required fundamental subjects		Required vocational subjects		APS total
English	Mathematics	Physical Science	Three other subjects (excluding Life Orientation)	
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	

A National Certificate (Vocational) (NCV) at NQF Level 4 with at least 4 for English, 4 for Mathematics, 3 for Physical Science and three additional vocational subjects. A total APS of 20 will be considered for the Higher Certificate.

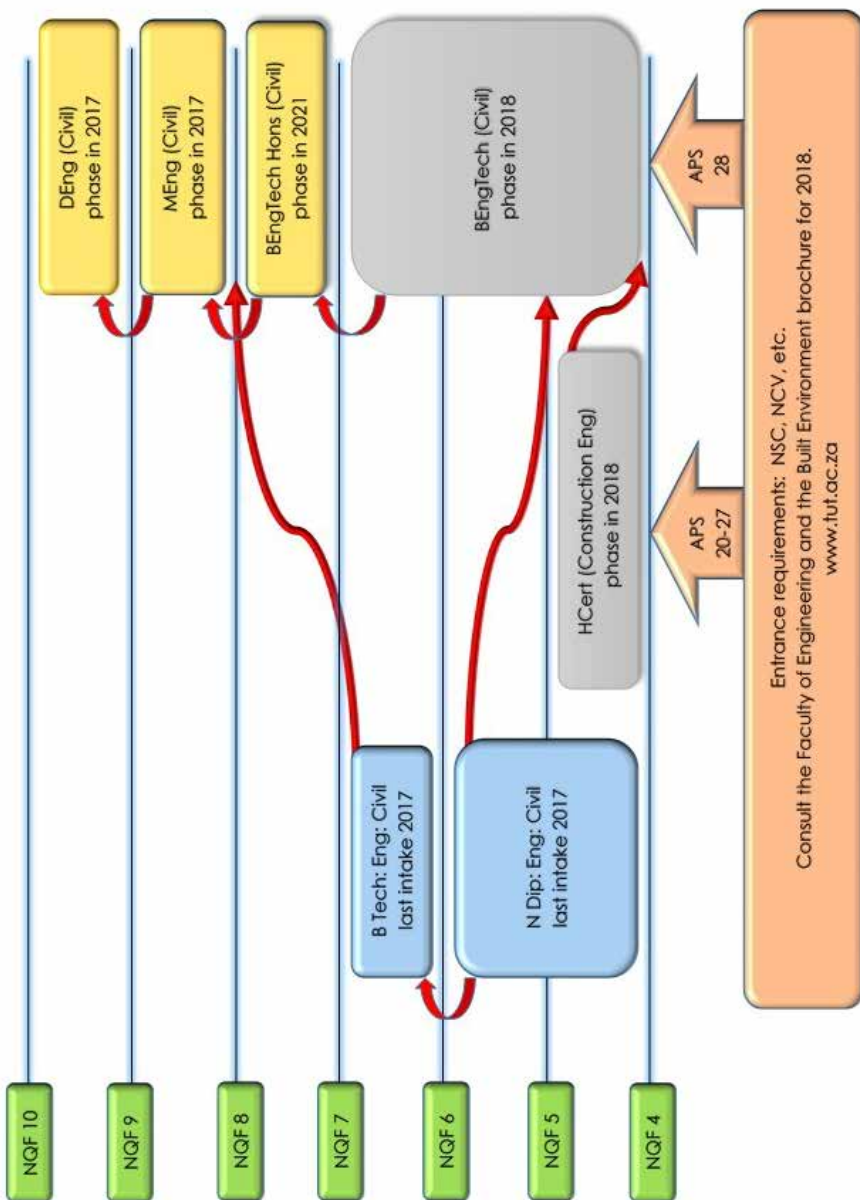
Bachelor of Engineering Technology in Civil Engineering Students who obtained their subject credits at an academic school				
English	Mathematics/Technical Mathematics	Physical Science/Technical Physical Science	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	5 (60 - 69%)	13	28

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

Bachelor of Engineering Technology in Civil Engineering Students who obtained their subject credits at a TVET college				
English	Mathematics	Physical Science/ Applied Engineering Technology	Three other subjects, (excluding Life Orientation) 3 x 6	APS total
5 (60 - 69%)	5 (60 - 69%)	6 (70 - 79%)	18	34

A National Certificate (Vocational) (NCV) at NQF Level 4 with at least 5 for English and Mathematics and 6 for Physical Science/Applied Engineering Technology. A total APS of 34 will be considered for the Bachelor Degree of Engineering Technology.

New Qualification Structure: Civil Engineering



DEPARTMENT OF ELECTRICAL ENGINEERING

Electrical Engineering

All students who wish to pursue a career in electrical engineering should first enrol for the Higher Certificate in Electrical Engineering and do the same subjects in the first two semesters. Students learn more about the industry during these semesters to make an informed choice regarding 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.

Intake for the qualification: January only.

FOR MORE INFORMATION AND TO APPLY, CONTACT:



Ofentse Mahlo - Pretoria Campus

Tel: 012 382 5159

Fax: 012 382 5688

Email: mahloo@tut.ac.za



Marlize van Niekerk - eMalahleni Campus

Tel: 013 653 3130

Fax: 013 653 3122

E-mail: vanniekerkme@tut.ac.za

Higher Certificate in Electrical Engineering				
Students who obtained their subject credits at an academic or technical school				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Two other subjects, (excluding Life Orientation)	APS total
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	20

A National Senior Certificate, or an equivalent qualification, with an achievement of 4 for English, 4 for Mathematics/Technical Mathematics, and 3 for Physical Science/Technical Science. A total APS of 20 will be considered for the Higher Certificate.

Higher Certificate in Electrical Engineering Students who obtained their subject credits at a TVET college				
Required fundamental subjects		Required vocational subjects		APS total
English	Mathematics	Physical Science	Three other subjects	
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	20

A National Certificate (Vocational) (NCV) at NQF Level 4 with an achievement of 4 for English, 4 for Mathematics, and 3 for Physical Science and three additional vocational subjects. A total APS of 20 will be considered for the Higher Certificate

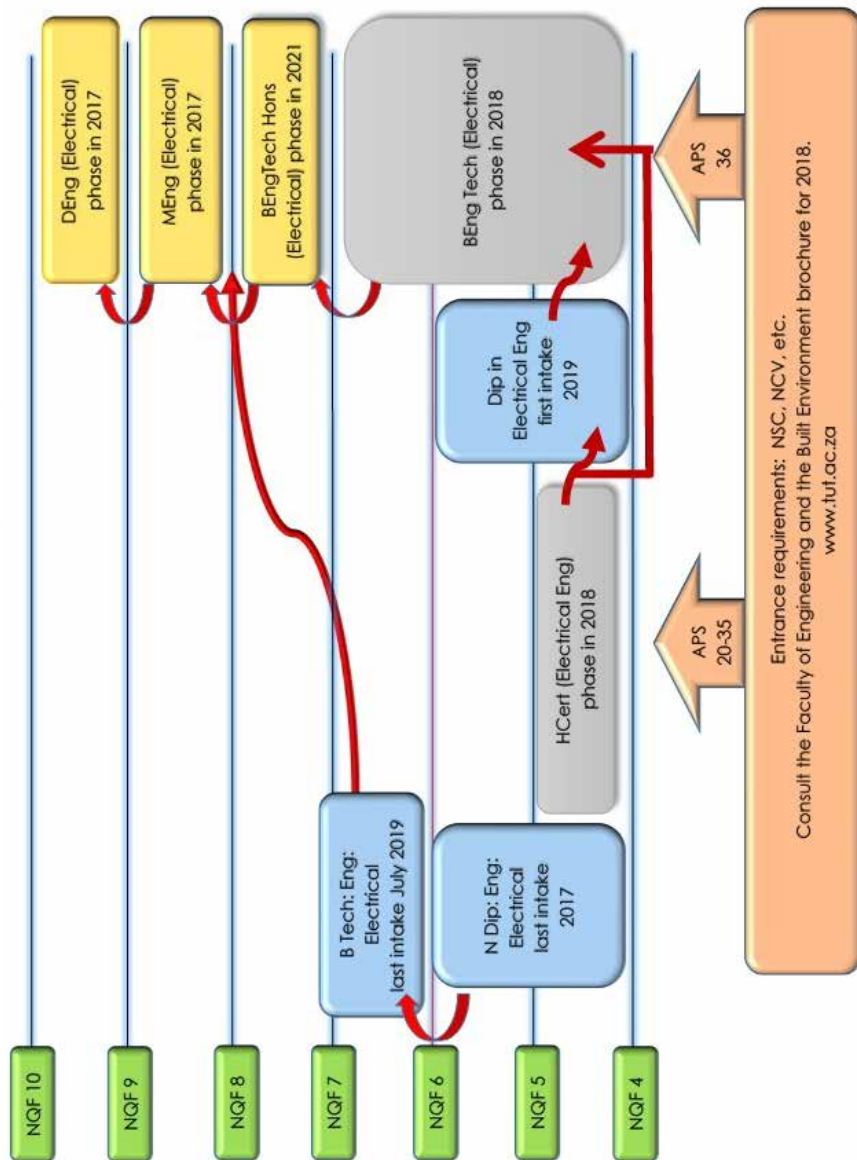
Bachelor of Engineering Technology: Electrical Engineering Students who obtained their subject credits at an academic or technical school				
English	Mathematics	Physical Science	Three other subjects, (excluding Life Orientation)	APS total
6 (70 - 79%)	6 (70 - 79%)	6 (70 - 79%)	18	36

A National Senior Certificate with an endorsement of a bachelor's degree or an equivalent qualification, with an achievement of 6 for English, 6 for Mathematics and 6 for Physical Science. A total APS of 36 will be considered for the Bachelor Degree of Engineering Technology. Applicants with APS of 28 - 35 may write an Academic Proficiency test.

Bachelor of Engineering Technology: Electrical Engineering Students who obtained their subject credits at a TVET college				
English	Mathematics	Physical Science/ Applied Engineering Technology	Three other subjects, (excluding Life Orientation)	APS total
6 (70 - 79%)	6 (70 - 79%)	6 (70 - 79%)	18	36

A National Certificate (Vocational) (NCV) at NQF Level 4 with an achievement of 6 for English, 6 for Mathematics and 6 for Physical Science/Applied Engineering Technology. A total APS of 36 will be considered for the Bachelor Degree of Engineering Technology. Applicants with APS of 28 - 35 may write an Academic Proficiency test.

New Qualification Structure: Electrical Engineering



DEPARTMENT OF GEOMATICS

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 engineering survey in the photogrammetric field, or in geographic information systems (GIS). All the fields of specialisation are mainly computer-orientated.

Intake for the qualification: January only.

FOR MORE INFORMATION AND TO APPLY, CONTACT:



Antoinette Viljoen

Tel: 012 382 5211

Fax: 012 382 5214

E-mail: viljoen@tut.ac.za

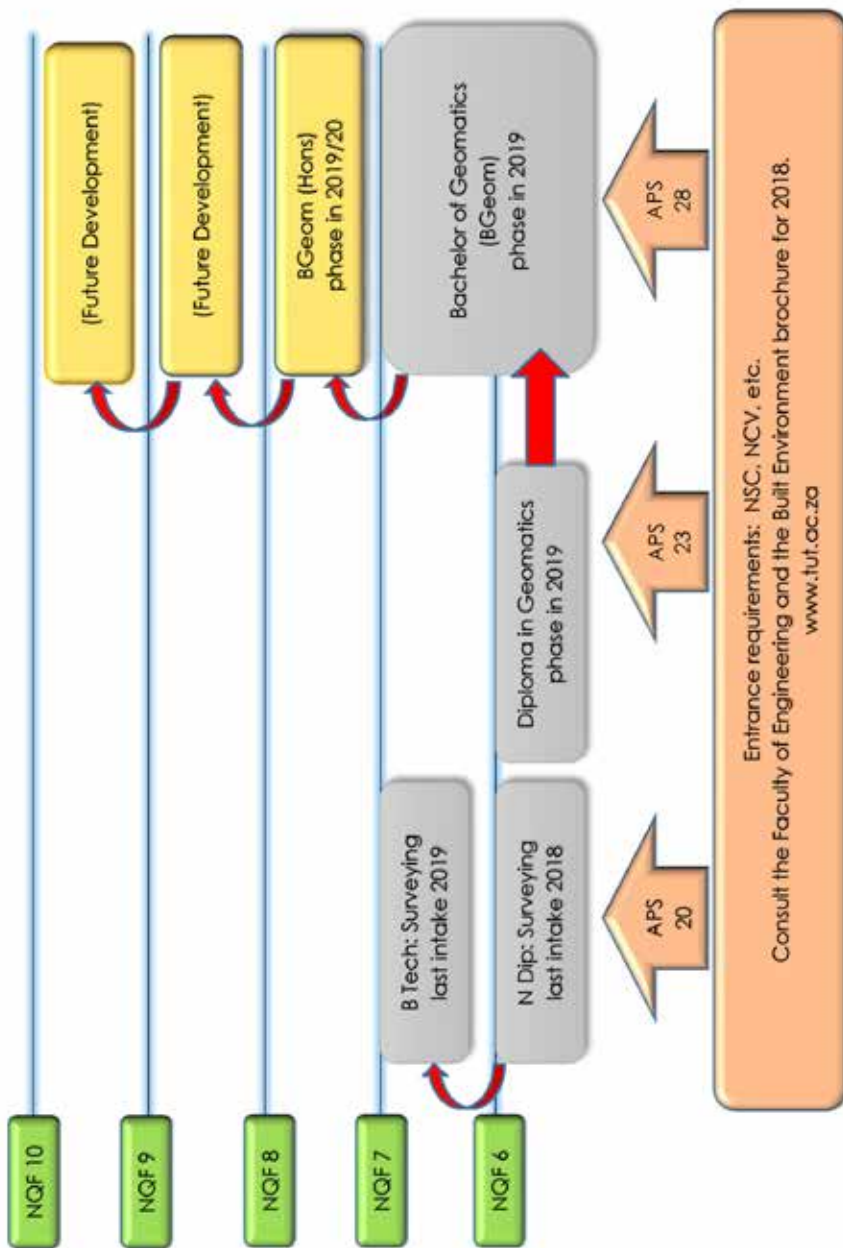
National Diploma in Surveying				
Students who obtained their subject credits at an academic or technical school				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, (excluding Life Orientation)	APS total
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	23

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/Technical Science. A total APS of 23 may be considered.

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

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 5 for Physical Science/Applied Engineering Technology and any two other vocational subjects. A total APS of 27 may be considered.

New Qualification Structure: Surveying



DEPARTMENT OF INDUSTRIAL ENGINEERING

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:



Bets van Eeden

Tel: 012 382 4403

Fax: 012 382 4847

Email: vaneedene@tut.ac.za

Higher Certificate in Industrial Engineering				
Students who obtained their subject credits at an academic or technical school				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Two other subjects	APS total
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	20

A National Senior Certificate, or an equivalent qualification, with an achievement of 4 for English, 4 for Mathematics/Technical Mathematics and 3 for Physical Science/Technical Science and any two recommended subjects. A total APS of 20 will be considered for the Higher Certificate.

Higher Certificate in Industrial Engineering Students who obtained their subject credits at a TVET college				
Required fundamental subjects		Required vocational subjects		APS total
English	Mathematics/ Technical Mathematics	Physical Science	Three other subjects	
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	

A National Certificate (Vocational) (NCV) at NQF Level 4 with an achievement of 4 for English, 4 for Mathematics/Technical Mathematics, and 3 for Physical Science and three additional vocational subjects. A total APS of 20 will be considered for the Higher Certificate.

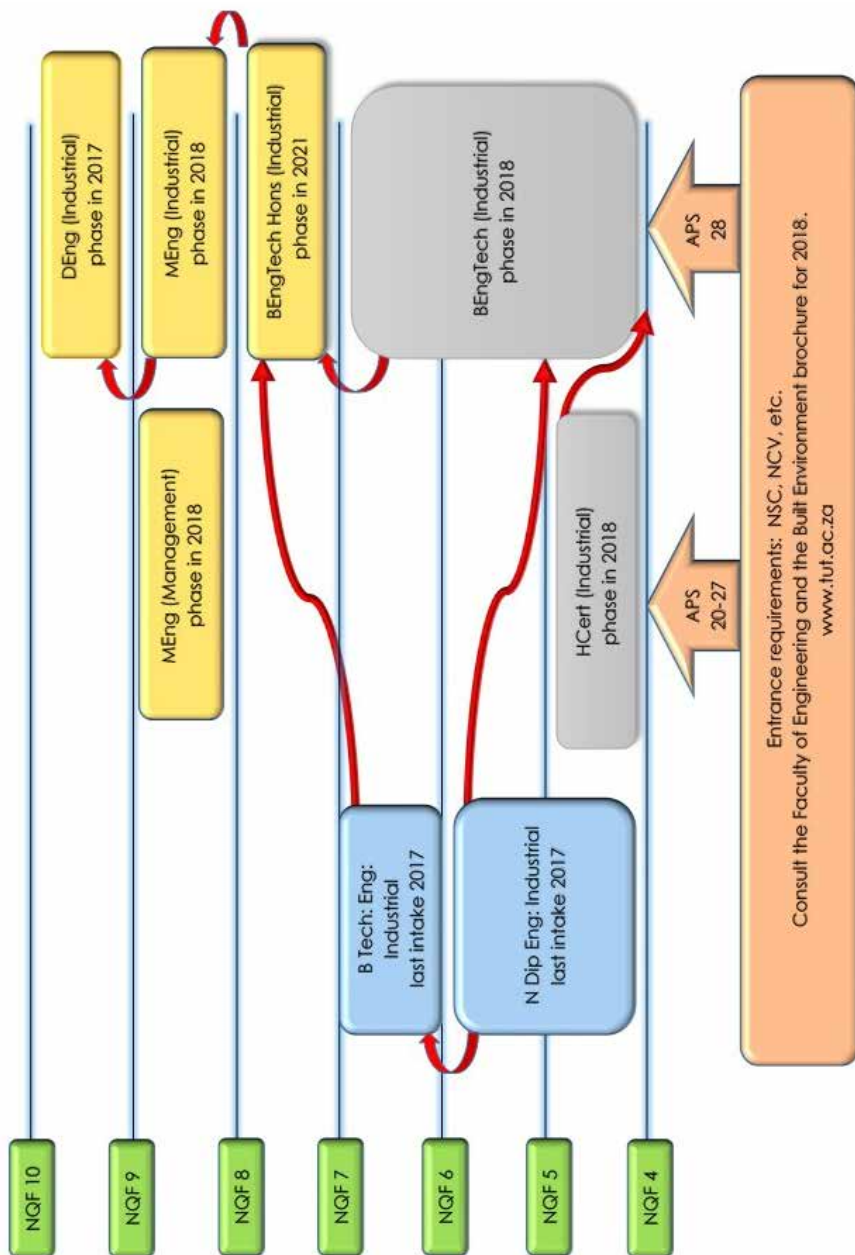
Bachelor of Engineering Technology: Industrial Engineering Students who obtained their subject credits at an academic school				
English	Mathematics	Physical Science	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	5 (60 - 69%)	13	28

A National Senior Certificate with an endorsement of a bachelor's degree or an equivalent qualification, with an achievement of 5 for English, 5 for Mathematics and 5 for Physical Science. A total APS of 28 will be considered for the Bachelor Degree of Engineering Technology.

Bachelor of Engineering Technology: Industrial Engineering Students who obtained their subject credits at a TVET college				
English	Mathematics	Physical Science/ Applied Engineering Technology	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	6 (70 - 79%)	18	34

A National Certificate (Vocational) (NCV) at NQF Level 4 with an achievement of 5 for English, 5 for Mathematics and 6 for Physical Science/Applied Engineering Technology. A total APS of 34 will be considered for the Bachelor Degree of Engineering Technology.

New Qualification Structure: Industrial Engineering



DEPARTMENT OF MECHANICAL ENGINEERING, MECHATRONICS AND INDUSTRIAL DESIGN

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*

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

FOR MORE INFORMATION AND TO APPLY, CONTACT:



Susan Wilbers

Tel: 012 382 2848

Fax: 012 382 5602

E-mail: wilbersms@tut.ac.za

Higher Certificate in Mechanical Engineering Students who obtained their subject credits at an academic or technical school				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Two other subjects	APS total
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	20

A National Senior Certificate, or an equivalent qualification, with an achievement of 4 for English, 4 for Mathematics/Technical Mathematics, and 3 for Physical Science/Technical Science and any two recommended subjects. A total APS of 20 will be considered for the Higher Certificate.

Higher Certificate in Mechanical Engineering Students who obtained their subject credits at a TVET college				
Required fundamental subjects		Required vocational subjects		APS total
English	Mathematics/ Technical Mathematics	Physical Science	Three other subjects	
4 (50 - 59%)	4 (50 - 59%)	3 (40 - 49%)	9	20

A National Certificate (Vocational) (NCV) at NQF Level 4 with an achievement of 4 for English, 4 for Mathematics/Technical Mathematics, and 3 for Physical Science and three additional vocational subjects. A total APS of 20 will be considered for the Higher Certificate.

Bachelor of Engineering Technology: Mechanical Engineering, Mechatronics Students who obtained their subject credits at an academic school				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	5 (60 - 69%)	13	28

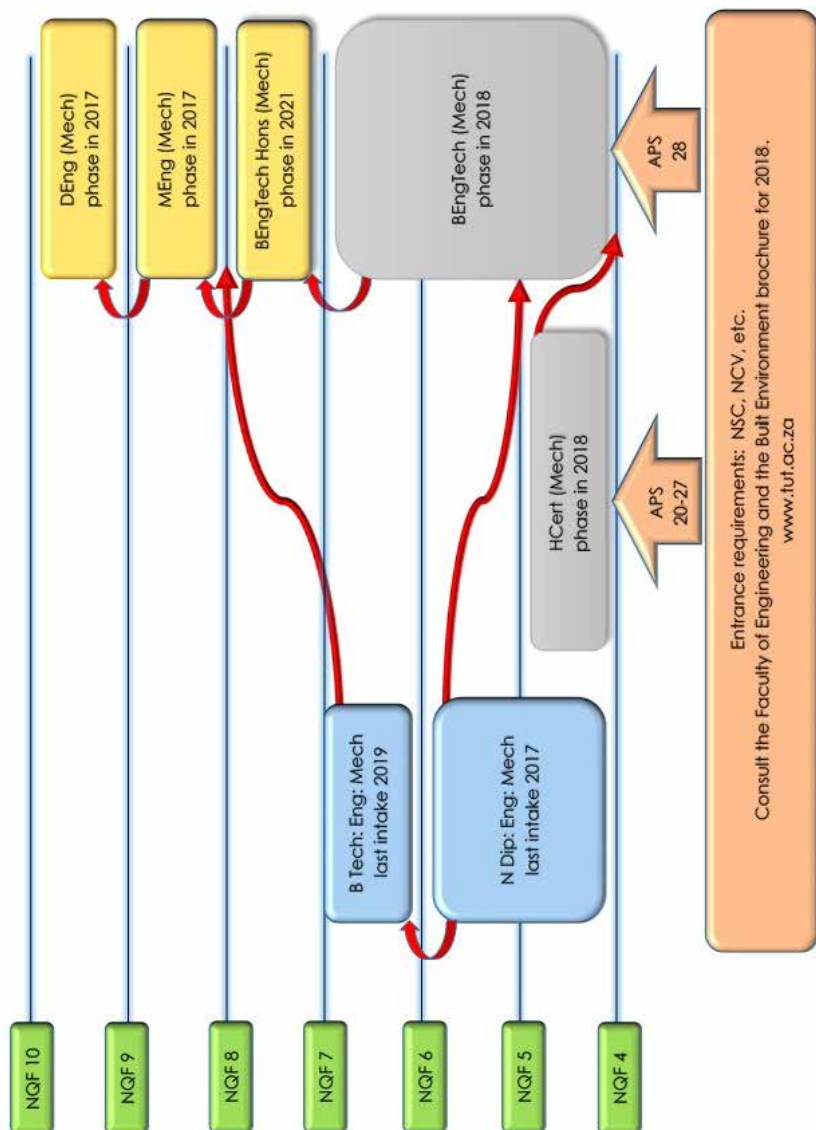
A National Senior Certificate with an endorsement of a bachelor's degree or an equivalent qualification, with an achievement of 5 for English, 5 for Mathematics/Technical Mathematics and 5 for Physical Science/Technical Science. A total APS of 28 will be considered for the Bachelor Degree of Engineering Technology.

Bachelor of Engineering Technology: Mechanical Engineering, Mechatronics
Students who obtained their subject credits at a TVET college

English	Mathematics	Physical Science/ Applied Engineering Technology	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	6 (70 - 79%)	18	34

A National Certificate (Vocational) (NCV) at NQF Level 4 with an achievement of 5 for English, 5 for Mathematics and 6 for Physical Science/Applied Engineering Technology. A total APS of 34 will be considered for the Bachelor Degree of Engineering Technology.

New Qualification Structure: Mechanical Engineering, Mechatronics



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:



Susan Wilbers

Tel: 012 382 2848

Fax: 012 382 5602

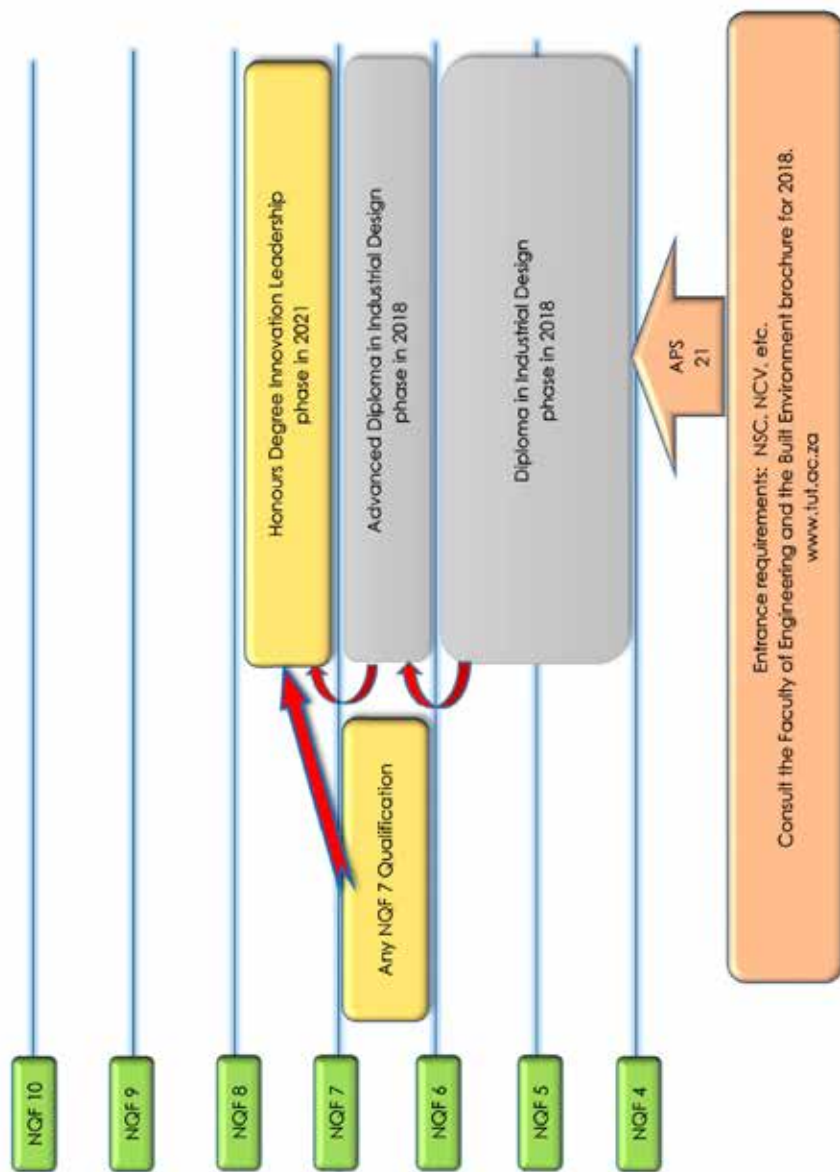
Email: wilbersms@tut.ac.za

Diploma in Industrial Design: Three-Dimensional Design		
Students who obtained their subject credits at an academic or technical school		
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 will be considered for a Diploma in Industrial Design.

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.

New Qualification Structure: Industrial Design



DEPARTMENT OF CHEMICAL, METALLURGICAL AND MATERIALS 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; mineral processing; water and effluent treatment; and 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

Tel: 012 382 4392/3550

Fax: 012 382 3532

E-mail: ngakarm@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 that are 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, namely 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

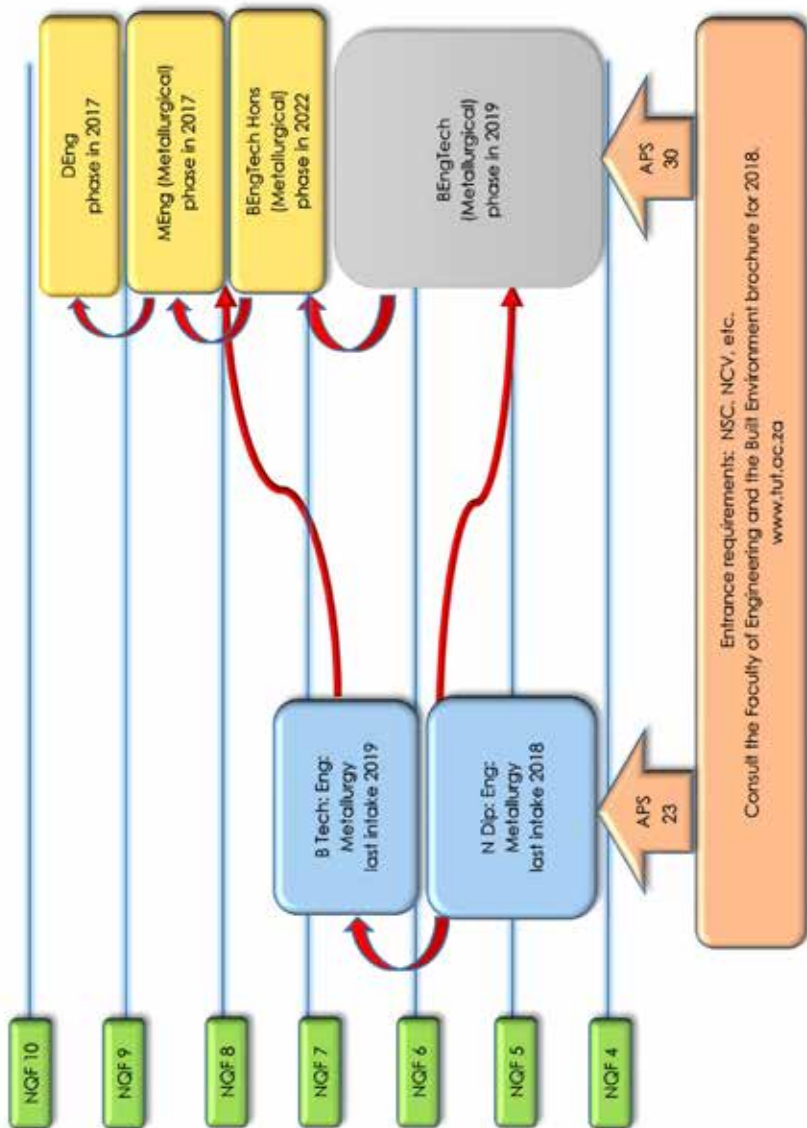
National Diploma in Metallurgical Engineering Students who obtained their subject credits at an academic or technical school				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	5 (60 - 69%)	13	28

A National Senior Certificate with an endorsement of a bachelor's degree or an equivalent qualification, with an achievement of 5 for English, 5 for Mathematics/ Technical Mathematics and 5 for Physical Science/Technical Science. Applicants with a final combined APS of 10 and more for Mathematics and Physical Science and a total APS of between 23 and 27 will write an Academic Placement Test before final acceptance. All applicants will then be ranked according to the APS achieved.

National Diploma in Metallurgical Engineering Students who obtained their subject credits at a TVET college				
English	Mathematics	Physical Science/ Applied Engineering Technology	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	6 (70 - 79%)	12	28

A National Certificate (Vocational) (NCV) at NQF Level 4 with an achievement of 5 for English and Mathematics and 6 for Physical Science/Applied Engineering Technology. Applicants with a final combined APS of 10 and more for Mathematics and Physical Science and a total APS of between 23 and 27 will write an Academic Placement Test before final acceptance. Then all applicants will be ranked according to the APS achieved.

New Qualification Structure: Metallurgical Engineering



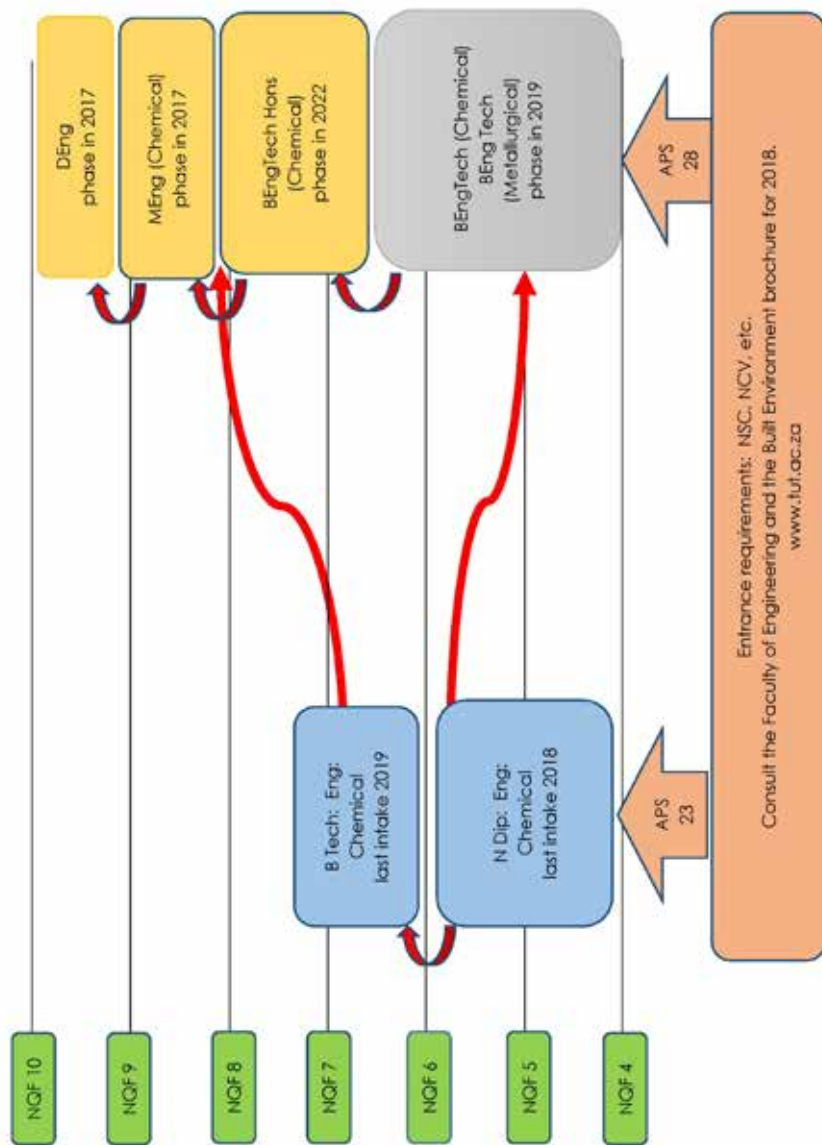
National Diploma in Chemical Engineering Students who obtained their subject credits at an academic or technical school				
English	Mathematics/ Technical Mathematics	Physical Science/ Technical Science	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	5 (60 - 69%)	13	28

A National Senior Certificate with an endorsement of a bachelor's degree or an equivalent qualification, with an achievement of 5 for English, 5 for Mathematics /Technical Mathematics and 5 for Physical Science/Technical Science. Applicants with a final combined APS of 10 and more for Mathematics and Physical Science and a total APS of between 23 of 27 will write an Academic Placement Test before final acceptance. All applicants will then be ranked according to the APS achieved.

National Diploma in Chemical Engineering Students who obtained their subject credits at a TVET college				
English	Mathematics	Physical Science/Applied Engineering Technology	Three other subjects, (excluding Life Orientation)	APS total
5 (60 - 69%)	5 (60 - 69%)	6 (70 - 79%)	12	28

A National Certificate (Vocational) (NCV) at NQF Level 4 with an achievement of 5 for English, 5 for Mathematics and 6 for Physical Science/Applied Engineering Technology. Applicants with a final combined APS of 10 and more for Mathematics and Physical Science and a total APS of between 23 of 27 will write an Academic Placement Test before final acceptance. All applicants will then be ranked according to the APS achieved.

New Qualification Structure: Chemical Engineering



Materials Engineering

The department offers a qualification in B Tech: Polymer Technology for students with a National Diploma in Polymer Technology. Students with the National Diploma qualifications in Analytical Chemistry, or Mechanical, Chemical and Metallurgical Engineering can also apply for this course. Students who do not have the necessary polymer background will be required to register for a semester subject, Polymer Technology I, which will run concurrently with the B Tech classes.

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:

- Production and processing of raw material;
- Manufacturing and processing of products;
- Development, characterisation and quality assurance of products and raw materials;
- Development of new plastic products and material; and
- Marketing and sales of raw materials and products.

Polymer Technology

This subject deals with three different aspects related to polymer technology, namely

1. *Processing Methods*

This section deals specifically with the three most common polymer manufacturing processes, namely extrusion, injection and blow moulding. The specific components on a production line and their function are covered in detail, enabling the student to be able to identify and explain troubleshooting of the product.

2. *Composite materials*

This section deals with the basic polymer composite theory, properties of materials used and the commonly used processing techniques used for the conversion of materials into finished products. It looks in great detail into various types of polymer matrices and additives that can be combined to form composite materials that exhibit better properties than the individual materials. Most composites are manufactured in order to improve mechanical and thermal properties of the materials for specific applications. Another topic of interest is the role of composite materials in the industry.

3. *Rheology of polymers*

Polymer rheology is an aspect of Polymer Physics that specifically deals with the deformation and flow of polymeric materials. This includes the types of flow experienced by polymer melts under heating and shearing conditions and viscometric flows. The activation energy of flow via the Arrhenius equation is an

important parameter that is needed to understand the minimum energy required to initiate flow. Generally, polymer rheology accounts for the behaviour of non-Newtonian fluids, by characterising the minimum number of functions that are needed to relate stresses with rate of change of strain or strain rate. While the experimental characterisation of a material's rheological behaviour is known as rheometry, the theoretical aspects of rheology are the relationship between the deformation/flow behaviour of material and its internal structure. This aspect of the course guides the students in the appreciation of how materials that are encountered every day behave under stress, strain rate and temperature, such as ketchup, honey, butter, yoghurt and emulsion paint and of course polymers during processing.

Polymer Technology Practical

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

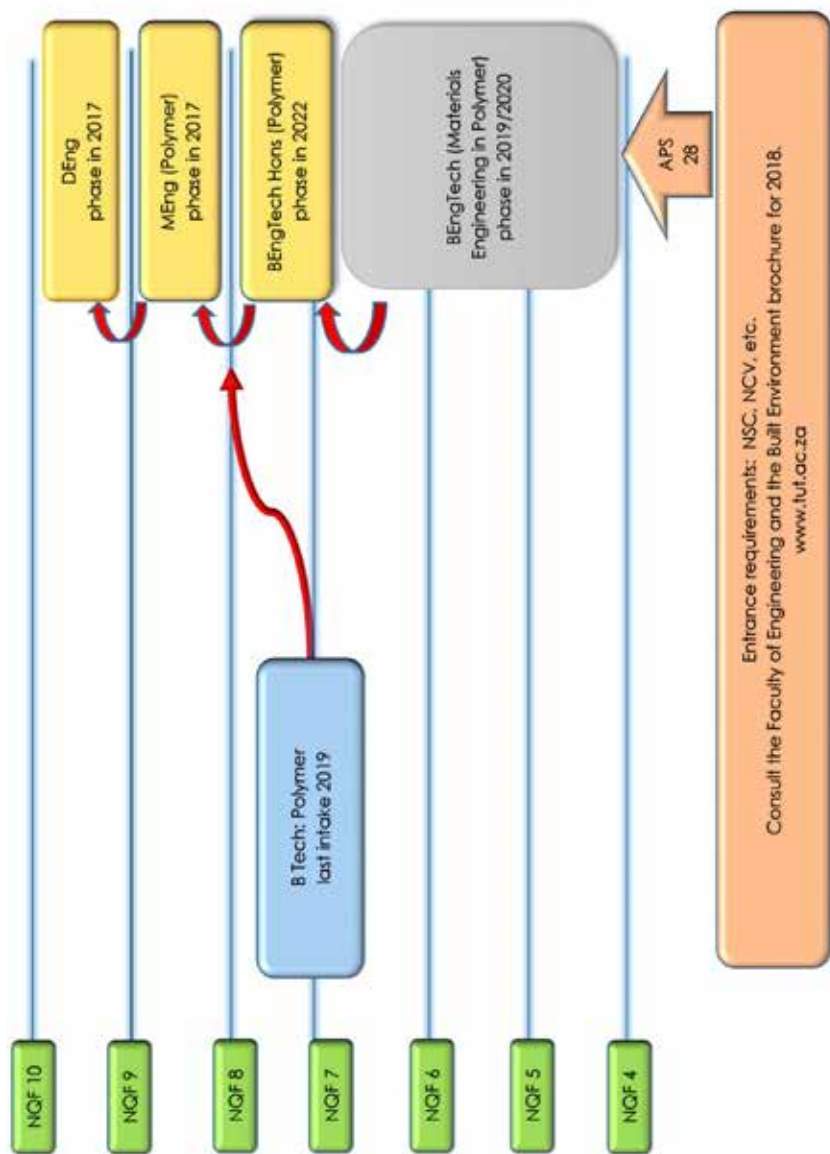
Tel: 012 382 3609

E-mail: erelling@tut.ac.za

Bachelor of Engineering Technology in Polymer Students who obtained their subject credits at an academic or technical school				
English	Mathematics	Physical Science	Three other subjects, (excluding Life Orientation)	APS total
4 (50-59%)	4 (50-59%)	4 (50-59%)	16	28

A National Senior Certificate or an equivalent qualification, with a 4 for English, 4 for Mathematics and 4 for Physical Sciences. A total APS of 28 will be considered for the Bachelor Degree of Engineering Technology.

New Qualification Structure: Materials Engineering in Polymer



Where is the emphasis?

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:

- *Higher Certificate*

With a Higher Certificate qualification, the undergraduate will be able to work in *engineering support occupations* such as draftspersons, installers and maintainers of engineering equipment and systems, engineering sales and marketing, site and production foreman, etc.

- *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 three years' practical experience after qualifying.

- *Career training*

In the B Eng Tech programme, emphasis is placed not only on specialised technical skills, but also on management skills. With a B Eng Tech degree and four 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 Eng Tech, 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 DEng 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 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

To be considered for funding in any academic year, the applicant must ensure to follow due processes and comply with the terms and conditions stipulated and applicable to each funding category. Failing to do so will result in the application not being considered. As a general rule, no late or incomplete applications will be accepted.

Please consult the Financial Aid website at www.tut.ac.za/Students/financial for updated and relevant information with regards to funding opportunities and application requirements.

Contact Detail

CAMPUS	TELEPHONE	E-MAIL
Arcadia Campus	012 382 6295	finaidpta@tut.ac.za
eMalahleni Campus	013 653 3121	finaidema@tut.ac.za
Ga-Rankuwa Campus	012 382 0616	finaidgar@tut.ac.za
Nelspruit Campus	013 745 3561	finaidmbom@tut.ac.za
Polokwane Campus	015 287 0776	finaidpol@tut.ac.za
Pretoria Campus	012 382 4465	finaidpta@tut.ac.za
Soshanguve Campus	012 382 9082	finaidsoosh@tut.ac.za

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.

What kind of transport is available?

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

During which hours are lectures presented?

Lectures are presented from 08:00 to 17:00.

What facilities are available?

Various specialist facilities with the 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

Call centre: 086 110 2421

Please note:

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

www.tut.ac.za



Follow us @tutengineering



Like us TUTEngineeringFaculty





[illegible]



[illegible]







Tshwane University of Technology
Faculty of Engineering and the Built Environment