

2012 PROSPECTUS

PART 3

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

ISSN 0258-7343

TSHWANE UNIVERSITY OF TECHNOLOGY





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PLEASE NOTE

1. Although the information in this Prospectus has been compiled as accurately as possible, the Council accepts no responsibility for any inaccuracies in this publication. This Prospectus is valid for 2012 only.
2. Life Orientation and an achievement level of 1 in a subject is not considered in the calculation of the Admission Point Score (APS).
3. Prospective students will not be admitted to any qualification without prior evaluation.
4. The indicated non-refundable administration fee and certified copies of your identity document, Senior Certificate/National Senior Certificate and all other relevant documents must accompany the completed application form or online application.
5. The closing date for applications for admission to first-semester and year courses is 15 August of the preceding year, except for certain courses and International applicants of which the closing date is 15 June. The closing date for selected second-semester courses is 15 May of the year concerned.

Important:

TUT admission requirements for entry-level programmes adhere to national legislation and therefore the following are required:

- BEd degrees: at least four subjects at a performance level 4.
- National Diplomas: at least four subjects at performance level 3.

Please verify specific and additional requirements per programme as indicated in the prospectus.

ACCEPTANCE IS SUBJECT TO AVAILABLE CAPACITY ACCORDING TO THE STUDENT ENROLMENT PLAN (SEP)

Alternative and international qualifications (e.g. HIGSCE, IGCSE, NSSC A&O Level, IB Higher and Standard Level, etc) are dealt with in a specific manner:

- While there is a legal imperative to submit the certificate of equivalence (issued by SAQA or the CHE) it is recommended that the application process be initiated while the application for certificate is in process.
- The Tshwane University of Technology cannot obtain this certificate on your behalf.



CONVERSION OF ALTERNATIVE/EQUIVALENT RECOGNISED CERTIFICATES

The following provides a guideline on how the University will evaluate the various certificates that may be offered as equivalent to the National Senior Certificate (SA). Where possible, the University will evaluate the listed qualifications as indicated, however the University retains the right to refer any application to the formal application processes through Senate.

APS	NSC	NC-V	HIGCSE	IGCSE/GCSE/ NSSC O-LEVEL		A-LEVEL	IB-HL	IB-SL	SAT
10						A	7		
9									
8						B	6		
7	7 (80 -100)	Outstanding Competent (80-100%)	1	A		C	5	7	80-100
6	6 (70 -79)	4-Highly Competent (70-79%)	2	B		D	4	6	70-79
5	5 (60-69)	3-Competent (60-69%)	3	C	A	E	3	5	60-69
4	4 (50-59)	3-Competent (50-59%)		D	B		2	4	50-59
3	3 (40-49)	Not yet Competent (40-49%)	4	E	C		1	3	40-49
2	2 (30-39)	Not achieved (0-39%)		F	D/E			2	30-39
1	1 (0-29)			G	F/G			1	0-29

NSC	National Senior Certificate
NC-V	National Certificate (Vocational)
IGCSE	International General Certificate of Secondary Education
HIGCSE	Higher International General Certificate of Secondary Education
SAT	Senior Academic Test/Senior Academic Proficiency Test
NSSC	Namibia Senior Secondary Certificate
O-LEVEL	Ordinary level
A-LEVEL	Advanced level
IB	International Baccalaureate Schools (higher and standard levels)

RECOGNITION OF PRIOR LEARNING, STATUS AND EQUIVALENCE

Candidates may also apply for recognition of prior learning or for admission via the Senate's discretionary route at the Office of the Registrar. The specific relevant documentation will be requested from these applicants, and these cases will be handled on an individual basis (refer to details on these options in the section on RPL in Part 1 of the Prospectus).



ENQUIRIES

Contact Centre

Tel: 086 1102 421

Fax: 012 382 5701

Admission Enquiries

Tel: 012 382 5750

The Registrar

Private Bag X680

PRETORIA 0001

Tel: 012 382 5911

Fax: 012 382 5114

ARCADIA CAMPUS

Private Bag X680

PRETORIA 0001

Tel: 012 382 5911

175 Nelson Mandela Drive

PRETORIA

Fax: 012 382 5114

ARTS CAMPUS

Private Bag X680

PRETORIA 0001

Tel: 012 382 5911

Cnr. Du Toit and Edmund streets

PRETORIA

Fax: 012 382 5114

EMALAHLENI CAMPUS

The Campus Director

PO Box 3211

EMALAHLENI 1035

Tel: 013 653 3100

19 Swartbos Avenue

EMALAHLENI

Fax: 013 653 3101

GA-RANKUWA CAMPUS

Private Bag X680

PRETORIA 0001

Tel: 012 382 0500

2827, Zone 2, Botsi Street

GA-RANKUWA

Fax: 012 382 0814

MBOMBELA CAMPUS (NELSPRUIT CAMPUS)

The Campus Director

Private Bag X11312

MBOMBELA 1200

Tel: 013 745 3500/3603

Madiba Drive

MBOMBELA

Fax: 013 745 3512

POLOKWANE CAMPUS

The Campus Director

Private Bag X9496

POLOKWANE 0700

Tel: 015 287 0700

Cnr. Market and Excelsior streets

POLOKWANE

Fax: 015 297 7609

PRETORIA CAMPUS

Private Bag X680

PRETORIA 0001

Tel: 012 382 5911

Staatsartillerie Road

PRETORIA WEST

Fax: 012 382 5114

SOSHANGUVE CAMPUS

Private Bag X680

PRETORIA 0001

Tel: 012 382 9000

2 Aubrey Matlala Road, Block K

SOSHANGUVE

Fax: 012 382 0966

ENQUIRIES RELATING TO FEES:

The Chief Financial Officer

Private Bag X680

PRETORIA 0001

Tel: 086 1102 422

Fax: 012 382 5701



FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

Acting Executive Dean:	Prof BJ van Wyk - N Dip (Telecommunication) (Dept of Education and Culture), NH Dip (Electrical Engineering) (Tech Pta), NH Dip (Post-School Education) (Wits Tech), B Tech (Electrical Engineering) (Tech Pta), BCom (Quantitative Management) (Unisa), M Tech (Electrical Engineering) (Tech Pta), MSc (Mathematics) (University of Southern Mississippi), DPhil (Electrical and Information Engineering) (University of the Witwatersrand)
Executive Secretary: Office:	Ms B Moshime Room 621, Building 3, Pretoria Campus
Acting Associate Dean:	Mr I Tlhabadira - NH Dip (Mechanical) (Vaal Tech), NH Dip (Post School Education) (TNG), B Tech (Mechanical) (TNG), BSc (Hons) (Mechanics) (UP), Certificate in Intellectual Property Law (Unisa), MSc (Applied Science) (Mechanics) (UP)
Executive Secretary: Office:	Ms Z Sibiya Room 622B, Building 3, Pretoria Campus
Assistant Registrar: Office:	Mrs AE van Wyk Room G125, Building 21, Pretoria Campus

VISION

To be a leading faculty at the cutting edge of technology and innovation that provides relevant, quality-driven professional career education of an international standard.

MISSION

- Being student- and stakeholder-centered and quality-driven in everything we do;
- Offering a portfolio of relevant, recognised and career-focused programmes that are locally relevant and internationally recognized;
- Producing well-rounded and socially responsible graduates attuned to the needs of the industry and economy in an environment conducive to teaching and learning with technology;
- Being a research and innovation hub responsive to challenges of the country and continent in clearly defined areas of strength;
- Generating, integrating and applying knowledge to stimulate socio-economic development by partnering with communities and industries in sustainable development; and
- Being a place of excellence with a proud, loyal, effective and highly competent workforce.



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SECTION A: DEPARTMENTS AND QUALIFICATIONS

SECTION A1: THE BUILT ENVIRONMENT PROGRAMMES

Please turn back to the Contents for an indication of which departments and qualifications form part of this section.

1. GENERAL FACULTY RULES

- a. *Experiential Learning I and II:*
Students may enrol for only one subject during any of the experiential learning periods, provided that the experiential learning provider agrees to such an arrangement in writing. If the subject is the last and outstanding subject and the student has written a final exam within the last two years, the student may apply for a Dean's examination.
- b. *Prerequisite subjects:*
Students will be required to pass all first-semester (Year 1) subjects before being allowed to continue with any third-semester (Year 2) subjects.
Students will be required to pass all second-semester (Year 1/2) subjects before being allowed to continue with any fourth-semester (Year 2/3) subjects.
- c. *Waiving of prerequisite subjects:*
Prerequisite subjects will only be waived in highly exceptional cases, based on a motivation by the Head of the Department and approved by the Executive Dean (prerequisite subjects published in Report 151 are excluded).
- d. *Class attendance/Assessments:*
Due to the serious shortage of available venues (large) for classes and/or assessments during the week, classes and/or assessments may take place on Friday afternoons and/or Saturdays.

2. CRITICAL CROSS-FIELD OUTCOMES

The National Diploma and the Baccalaureus Technologiae have the following critical cross-field outcomes:

- Identify and solve problems that display responsible decisions, using critical and creative thinking
- Work effectively with others as a member of a team, group, organisation and community
- Organise and manage one's activities responsibly and effectively
- Collect, analyse, organise and critically evaluate information
- Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written persuasion
- Use science and technology effectively and critically, showing responsibility towards the environment and health of others
- Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation
- Contribute to the full personal development of each learner and the social and economic development of society at large, by making it an underlying intention of the programme of learning to make an individual aware of:
 - Reflecting on and exploring a variety of strategies to learn more effectively
 - Participating as responsible citizens in the life of local, national and global communities
 - Being culturally and aesthetically sensitive across a range of contexts
 - Exploring education and career opportunities
 - Developing entrepreneurial opportunities



1. DEPARTMENT OF ARCHITECTURE

GENERIC REQUIREMENTS FOR ALL QUALIFICATIONS OFFERED BY THIS DEPARTMENT:

The subjects taught in each year have been put together in order to provide the student with the necessary platform of skills, knowledge and mindset to enable them to solve the problems that they will encounter during that year of study. It is one package designed to work together to promote horizontal integration. If any part of that package of knowledge, skills and mindset is missing or lacking, the platform to progress to the next level of complexity is flawed and will eventually have a detrimental effect on subsequent development.

The Head of the Department must give permission before a student may register for any subject.

Students wishing to enrol for only a partial number of subjects for a specific year are subject to the combinations and sequences as explained of the curriculum of each year.

Students should attempt to enrol for all subjects offered in a particular year for reasons of horizontal integration. A student who cannot enrol for all subjects in any particular year must contact the Head of Department.

The Department is of the opinion that any student who does not hand in any two consecutive assignments or does not hand in any three assignments has not shown sufficient attendance as contemplated in rules 14.3 and 14.4(a) of the Students' Rules and Regulations (Part 1). Such student will not be allowed entry to the final portfolio or oral examinations in these subjects. Such students will be considered to have deregistered these subjects in terms of rule 14.4(c) of the Students' Rules and Regulations (Part 1).

1.1 PERSONNEL INFORMATION

On 9 September 2011, this department had the following staff members:

Head of Department: Mr EP Pieters - BArch (UP)
Telephone numbers: 012 382 5252/5742

Departmental Administrator: Ms L Labuschagne

NAME	POST DESIGNATION	HIGHEST GENERIC QUALIFICATION(S)
Ms M Bolt	Senior Lecturer	BArch (UP)
Mr P Greyvensteyn	Senior Lecturer	MArch (Wits)
Mr CG Joubert	Senior Lecturer	M Tech (Architectural Technology) (TUT)
Mr MO Odebiyi	Lecturer	MSc (Architecture) (ABU)
Mr AL Roodt	Senior Lecturer	M Tech (Architectural Technology) (Tech Pta)
Mr S Schmidt	Senior Lecturer	BArch (UP)
Prof GS Steyn	Research Professor	PhD Architecture (UP)
Mr DJ Steynberg	Senior Lecturer	BArch (UP)
Mr J van Bergen	Senior Lecturer	Graduate Diploma (Histories and Theories) (AA)
Mr HN van der Linde	Lecturer	B Tech (Architectural Technology) (Tech Pta)
Mr M van Schoor	Lecturer	N Dip (Architectural Technology) (Tech Pta)



1.2 BACCALAUREUS TECHNOLOGIAE: ARCHITECTURE: PROFESSIONAL Qualification code: BTPS09

Campus where offered: Pretoria Campus

Purpose of the qualification:

To provide the student with the skills, knowledge and understanding necessary to follow a career as a competent Architectural Technologist. The programme also serves as an entry programme for the Magister Technologiae: Architecture: Professional.

REMARKS

a. *Admission requirement(s) and selection criteria:*

• FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:

Admission requirements:

A Senior Certificate or an equivalent qualification, with D symbols at the Higher Grade or C symbols at the Standard Grade for English and Mathematics.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **24** (six subjects).

APS	HG	SG
7	A	
6	B	A
5	C	B
4	D	C
3	E	D
2	F	E
1	G	F

Assessment procedure:

All Candidates after passing the initial administrative screening, will sit for additional assessment arranged with the Department of Architecture.

• FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:

Admission requirements:

A National Senior Certificate with an endorsement of a bachelor's degree or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language) and 3 for Mathematics or 5 for Mathematical Literacy.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23** (with Mathematics) or **25** (with Mathematical Literacy).

Assessment procedure:

All candidates will, after passing the initial administrative screening, sit for an additional assessment arranged by the Department of Architecture.

c. *Minimum duration:*
Four years

d. *Presentation:*
First three years: day classes, fourth year: day and block-based classes.

e. *Intake for the qualification:*
January only



- f. **Readmission:**
See Chapter 3 of Students' Rules and Regulations.
- g. **Accreditation by professional body:**
This qualification has been accredited by the South African Council for the Architecture Profession (SACAP).
- h. **Class timetables and class times:**
Students will be permitted to register for subjects in different year groups only if the timetables for those subjects do not coincide. Students should, therefore, take note of class timetables and class times before registering.
- i. **Subject credits:**
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 4,000.

FIRST YEAR

Subjects must be taken in the combinations and in the sequence indicated. The following rules will apply for the first year:

- * CSM110T and KME110T must be taken concurrently. These subjects must also be taken with ACH100T or they should have been passed before a student may continue with the subject.
- ** ACH100T and THD100T must be taken concurrently.
- *** CDO100T may not precede ACH100T.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
ABC100B	Applied Building Science I	(0,050)	
ACH100T	Architectural Design I**	(0,400)	
CAI110T	Computer-Aided Draughting I	(0,040)	
CDO100T	Contract Documentation I***	(0,120)	
COA110B	Computer Applications I	(0,040)	
COM150C	Communication I	(0,040)	
CSM110T	Construction Materials I*	(0,050)	
HAC100T	History of Architecture I	(0,050)	
KME110T	Construction Methods I*	(0,050)	
PTT100T	Presentation Techniques I	(0,120)	
THD100T	Theory of Design I**	(0,040)	

TOTAL CREDITS FOR THE FIRST YEAR: **1,000**

SECOND YEAR

Subjects must be taken in the combinations and in the sequence indicated. The following rules will apply to the second year:

- * CSM200T and KME210T must be taken concurrently. These subjects must also be taken with ACH200T or they should have been passed before a student may continue with the subject.
- ** ACH200T and THD200T must be taken concurrently.

ACH200T	Architectural Design II**	(0,400)	Architectural Design I
ARC200T	Architectural Technology Practice II	(0,250)	Architectural Design I Computer-Aided Draughting I Construction Materials I Construction Methods I Contract Documentation I Presentation Techniques I
CDO200T	Contract Documentation II	(0,150)	Contract Documentation I
CMI200T	Computer-Aided Design II	(0,050)	Computer-Aided Draughting I Computer Applications I



CSM200T	Construction Materials II*	(0,050)	Construction Materials I
KME210T	Construction Methods II*	(0,050)	Construction Methods I
THD200T	Theory of Design II**	(0,050)	History of Architecture I Theory of Design I

TOTAL CREDITS FOR THE SECOND YEAR: **1,000**

THIRD YEAR

Subjects must be taken in the combinations and in the sequence indicated. The following rules will apply to the third year:

- * CSM300T and KME310T must be taken concurrently. These subjects must also be taken with ACH300T and CDO300T or they should have been passed before a student may continue with the subjects.
- ** ACH300T, LDE310T and THD300T must be taken concurrently.
- *** CDO300T and SPQ300T must be taken concurrently.
- **** CAI310T must precede ACH300T.

ACH300T	Architectural Design III**	(0,400)	Architectural Design II
AHC300T	Architectural Practice III	(0,050)	
BSV300T	Building Services III	(0,050)	
CAI310T	Computer-Aided Draughting III****	(0,050)	Computer-Aided Design II
CDO300T	Contract Documentation III****	(0,130)	Contract Documentation II
CSM300T	Construction Materials III*	(0,050)	Construction Materials II
KME310T	Construction Methods III*	(0,050)	Construction Methods II
LDE310T	Landscape Design III**	(0,100)	Architectural Design II
SFA300T	Surveying for Architecture III	(0,040)	
SPQ300T	Specification and Quantities III****	(0,030)	
THD300T	Theory of Design III**	(0,050)	Theory of Design II

TOTAL CREDITS FOR THE THIRD YEAR: **1,000**

FOURTH YEAR

In order to continue with the fourth year, students will be required to have a minimum mark of 70% or a successful portfolio interview for the subject Architectural Design III. Students who do not meet the requirements will be re-registered for the Baccalaureus Technologiae: Architectural Technology (field of specialisation: Technology), which is not accredited by the South African Council for the Architectural Profession (SACAP).

Subjects must be taken in the combinations and in the sequence indicated. The following rules will apply to the fourth year:

- * CSM400T and KME400T must be taken concurrently.
- ** ACH400T, PUD400T, THD400T and STR400T must be taken concurrently or STR400T should be completed before a student will be permitted to register for ACH400T.

ACH400T	Architectural Design IV**	(0,400)	Architectural Design III
CSM400T	Construction Materials IV*	(0,100)	Construction Materials III
KME400T	Construction Methods IV*	(0,100)	Construction Methods III
LWC400T	Law and Contract Management IV	(0,100)	Architectural Practice III
PJG410T	Project Management IV	(0,080)	Architectural Practice III
PUD400T	Principles of Urban Design IV**	(0,100)	Landscape Design III
STR400T	Structures IV**	(0,080)	Applied Building Science I
THD400T	Theory of Design IV**	(0,040)	Theory of Design III

TOTAL CREDITS FOR THE FOURTH YEAR: **1,000**



1.3 MAGISTER TECHNOLOGIAE: ARCHITECTURE: PROFESSIONAL (Structured) Qualification code: MTPSS0

Campus where offered: Pretoria Campus

Purpose of the qualification:

To provide the student with the skills, knowledge and understanding necessary to follow a career as a competent Professional Architect.

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Architecture: Professional or an NQF Level 7 bachelor's/ honours (Professional) degree in Architecture obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.
- b. *Selection criteria:*
Admission is subject to selection.
- c. *Duration:*
A minimum of two years and a maximum of three years.
- d. *Presentation:*
Day and block-based classes
- e. *Intake for the qualification:*
January and July
- f. *Accreditation by professional body:*
This qualification has been accredited by the South African Council for the Architecture Profession (SACAP).
- g. *Subject credits:*
Subject credits are shown in brackets after each subject.

FIRST YEAR

Subjects must be taken in combinations and in the sequence indicated. The following rules will apply to the first year:

- * CHH500T and NSY500T must be taken concurrently.
- ** CSM500T and KME500T must be taken concurrently.
- *** ACH500T and THD500T must be taken concurrently.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
ACH500T	Architectural Design V***	(0,150)	
AHC500T	Architectural Practice V	(0,040)	
ARA500T	Advanced Computer Applications V	(0,020)	
BMN500T	Business Management V	(0,040)	
CHH500T	Computer Hardware V*	(0,010)	
CSM500T	Construction Materials V**	(0,040)	



KME500T	Construction Methods V**	(0,040)
NSY500T	Network Systems V*	(0,020)
THD500T	Theory of Design V***	(0,040)

TOTAL CREDITS FOR THE FIRST YEAR: **0,400**

SECOND YEAR

Subjects must be taken in the combinations and in the sequence indicated. The following rules will apply to the second year:

* CDO500T and SFN500T must be taken concurrently.

** RMD500T must precede ATG510T.

ATG510T	Research Report: Architecture: Professional V	(0,500)	Architectural Design IV
ATG510R	Research Report: Architecture: Professional V (re-registration)	(0,000)	
CDO500T	Contract Documentation V*	(0,060)	
CDO500R	Contract Documentation V* (re-registration)	(0,000)	
RMD500D	Research Methodology**	(0,020)	
SFN500T	Specification V*	(0,020)	
SFN500R	Specification V (re-registration)*	(0,000)	

TOTAL CREDITS FOR THE SECOND YEAR: **0,600**

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

1.4 BACCALAUREUS TECHNOLOGIAE: ARCHITECTURAL TECHNOLOGY (Field of specialisation: Technology) Qualification code: BTAQ95

Campus where offered: Pretoria Campus

Purpose of the qualification:

To provide the student who wishes to specialise in the technological aspects of architecture with the skills, knowledge and understanding necessary to follow a career as a competent Architectural Technologist. The programme also serves as an entry programme for the Magister Technologiae: Architectural (Technology).

REMARKS

- Admission requirement(s):**
A National Diploma: Architectural Technology, an equivalent qualification or the first three years of the Baccalaureus Technologiae: Architecture: Professional. However, this does not apply to students who registered for the National Diploma for the first time before 2008, and who have not since interrupted their studies.
- Selection criteria:**
Admission is subject to selection.
- Minimum duration:**
One year
- Presentation:**
Day classes. (Certain subjects will be offered on a block basis as determined by the Department.)



- e. *Intake for the qualification:*
January only
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- g. *Subject credits:*
Subject credits are shown in brackets after each subject.

Key to asterisks

- * Information does not correspond to information in Report 151.
(Deviations approved by Senate in March 2009.)

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

YEAR SUBJECTS

Subjects must be taken in the combinations and in the sequence indicated. The following rules will apply to the first year:

- ** ARA400T, CDG40PT and CDG40QT must be taken concurrently.
- *** CDL40PT and CDL40QT must be taken concurrently.
- **** STW40PT and STW40QT must be taken concurrently.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
ARA400T	Advanced Computer Applications IV**	(0,100)	Computer-Aided Draughting III
CDG400T	Computer-Aided Draughting IV		
CDG40PT	Computer-Aided Draughting: Computer Hardware IV**	(0,050)	Computer-Aided Draughting III
CDG40QT	Computer-Aided Draughting: Network Systems IV**	(0,050)	Computer-Aided Draughting III
CDL400T	Construction and Detailing IV		
CDL40PT	Construction and Detailing: Construction Methods IV***	(0,050)	Construction Methods III
CDL40QT	Construction and Detailing: Construction Materials IV***	(0,050)	Construction Materials III
LWC400T	Law and Contract Management IV*	(0,050)	Architectural Practice III
OPF400T	Office Practice IV		
OPF40PT	Office Practice: Architectural Practice IV	(0,050)	Architectural Practice III
OPF40QT	Office Practice: Business Management IV	(0,050)	Architectural Practice III
PJG410T	Project Management IV*	(0,050)	Architectural Practice III
STW400T	Studio Work IV		
STW40PT	Studio Work: Contract Documentation IV****	(0,300)	Contract Documentation III
STW40QT	Studio Work: Specification IV****	(0,200)*	Specification and Quantities III
TOTAL CREDITS FOR THE QUALIFICATION:		1,000	



**1.5 MAGISTER TECHNOLOGIAE: ARCHITECTURAL TECHNOLOGY
(Field of specialisation: Technology)
(Structured)
Qualification code: MTAD96**

Campus where offered: Pretoria Campus

Purpose of the qualification:

To provide the student who wishes to specialise in the technological aspects of architecture with the skills, knowledge and understanding necessary to follow a career as a competent Architectural Technologist.

REMARKS

a. *Admission requirement(s):*

A Baccalaureus Technologiae: Architectural Technology or an NQF Level 7 bachelor's or honours degree in Architecture obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

b. *Duration:*

A minimum of one year and a maximum of three years.

c. *Presentation:*

Day and block-based classes

d. *Intake for the qualification:*

January and July

e. *Subject credits:*

Subject credits are shown in brackets after each subject.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

YEAR SUBJECTS

Subjects must be taken in the combinations and in the sequence indicated. ATG50PT must precede ATG50QT and the following rule will apply to the qualification:

* ARM50PT and ARM50QT must be taken concurrently.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
ARM500T	Architectural Management V		
ARM50PT	Architectural Management: Construction Methods V*	(0,200)	Construction and Detailing: Construction Methods IV
ARM50QT	Architectural Management: Construction Materials V*	(0,200)	Construction and Detailing: Construction Materials IV
ATG500T	Research Report: Architectural Technology: Technology V		
ATG50PT	Research Report: Architectural Technology: Technology: Research Methodology V	(0,100)	



ATG50PR	Research Report: Architectural Technology: Technology: Research Methodology V (re-registration)	(0,000)
ATG50QT	Research Report: Architectural Technology: Technology: Technology V	(0,500)
ATG50QR	Research Report: Architectural Technology: Technology: Technology V (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000



2. DEPARTMENT OF BUILDING SCIENCES

PURPOSE OF QUALIFICATIONS OFFERED IN THIS DEPARTMENT:

Professional disciplines in an industry like the Built Environment are vital and can be considered to be the single most important factor that sustains the substantial contribution to the national economy of a country. TUT as a major role player in tertiary education is committed to offer programmes in various fields of the building industry.

2.1 PERSONNEL INFORMATION

On 9 September 2011, this department had the following staff members:

Head of Department: Mr WP Jansen van Rensburg - BSc (QS) (UP), PrQS
Telephone number: 012 382 5242

Departmental Administrator: Ms K de Villiers

NAME	POST DESIGNATION	HIGHEST GENERIC QUALIFICATION(S)
Ms R Geertsema	Lecturer	M Tech (Construction Management) (TUT)
Mr B Ilori	Lecturer	MSc (Project Management) (UP)
Mr GJ Meintjes	Senior Lecturer	MSc (Project Management) (UP), PrQS
Mr E Mwanaumo	Lecturer	MSc (Project Management) (UP), PrQS, MCIOB
Mr J Okumbe	Lecturer	MSc (Quantity Surveying) (UOFS), PrQS
Ms V Ranjit	Lecturer	MSc (International Construction Management) (University of Bath, England)
Mr NTS van der Walt	Senior Lecturer	BSc (QS) (UP), PrQS

2.2 NATIONAL DIPLOMA: BUILDING

Qualification code: NDBU04

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

For 2012: A Senior Certificate or an equivalent qualification, with D symbols at the Higher Grade or C symbols at the Standard Grade for English and Mathematics.

As from 2013: A Senior Certificate or an equivalent qualification, with D symbols (50 – 59%) at the Higher Grade or C symbols (60 – 69%) at the Standard Grade for English and Mathematics and E symbols (40 – 49%) at the Higher Grade or D symbols (50 – 59%) at the Standard Grade for Physical Sciences.

Candidates who do not meet the requirements for Mathematics and/or Physical Sciences may enrol for Mathematics N4 and/or Engineering Sciences N4 at any further education and training (FET) college, and if these are successfully passed at a performance level of at least 60%, they may re-apply for admission at the University.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) with a minimum of 23.



Assessment procedure:

Candidates with an APS of 30 and more will automatically be accepted for the qualification. Candidates with an APS of 23 to 29 will be required to undergo additional assessment (TUT potential assessment) to gain access to the National Diploma. A maximum of 120 new students per year will be admitted.

- **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:**

Admission requirement(s):

For 2012: 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) and 3 for Mathematics.

As from 2013: 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) and 4 for Mathematics and 3 for Physical Sciences.

Candidates who do not meet the requirements for Mathematics and/or Physical Sciences, may enroll for Mathematics N4 and/or Engineering Sciences N4 at any further education and training (FET) college, and if these are successfully passed at a performance level of at least 60%, they may re-apply for admission at the University.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) with a minimum of **23**.

Assessment procedure:

Candidates with an APS of 30 and more will automatically be accepted for the qualification. Candidates with an APS of 23 to 29 will be required to undergo additional assessment (TUT potential assessment) to gain access to the National Diploma. A maximum of 120 new students per year will be admitted.

- **FOR STUDENTS WHO OBTAINED A QUALIFICATION FROM FURTHER EDUCATION AND TRAINING (FET) COLLEGES:**

Candidates will be exempted from relevant subjects on NQF Level 5 of the National Diploma (Semester 1 and 2) that amount to not more than 50% of the theoretical component of the qualification.

Applicants must apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar, to obtain credits for equivalent Building subjects. Applicants must enrol and complete the other 50% or more of the theoretical component of the Diploma and will graduate with a diploma from the Tshwane University of Technology.

CANDIDATES WHO MEET THE FOLLOWING MINIMUM REQUIREMENTS WILL BE CONSIDERED FOR ADMISSION TO THE NATIONAL DIPLOMA:**Candidates with a National Certificate (Vocational) at NQF Level 4:**

For 2012: A National Certificate (Vocational) at Level 4 with at least a competent 50-69% achievement for English and Mathematics.

As from 2013: A National Certificate (Vocational) at Level 4 with at least a competent 50% achievement for English and Mathematics and 60% for Physical Sciences and two other subjects.

Candidates with a National N Certificate (Nated 191: N3/N4 courses) at NQF level 4/5:

A National N Certificate at Level 4/5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Candidates with a National N Certificate (Nated 191: N5/N6 courses) at NQF level 5:

A National N Certificate at Level 5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.



Candidates with a National N Diploma (Nated 191: N6 with a Trade Certificate) at NQF level 6:

A National N Diploma (Nated 191: N6 with a Trade Certificate) with at least a 50% achievement for all subjects completed on N4/N5/N6 Certificates at NQF level 5 (Including Mathematics and Engineering Science).

Candidates will be exempted for all subjects on NQF level 5 of the National Diploma (Semester 1 and 2) that amounts to 50% of the qualification, and they will also be exempted for Experiential Learning I by submission of the Trade Certificate at NQF level 5/6.

- **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**
 - Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits, which were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
 - Enrol for existing diploma (semester courses) and request exemption of subjects at the Office of the Registrar for equivalent T-course credits, which were obtained from any other Technikon in South Africa
 - i. If the number of exemptions of subjects on the existing diploma (T- course) is equal or less than 50% of the total credits for the existing diploma the applicant will have to complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma the applicant may apply for RPL Status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology Programme (which will commence in 2013). Applicants must apply at least 6 months prior to admission.
- b. *Minimum duration:*
Three years
- c. *Presentation:*
Day classes
- d. *Intake for this qualification:*
January and July
- e. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- f. *Experiential Learning I and II:*
See Section A1 of this publication and Chapter 5 of Students' Rules and Regulations. Students are required to provide acceptable proof of employment before registration.
- g. *Accreditation by professional body:*
This qualification has been accredited by the South African Council for Quantity Surveying Profession (SACQSP).
- h. *Subject groups:*
Students will be divided into two groups. Subjects from both Subject Group A and Subject Group B must be completed in the allocated time. The grouping of subjects is determined by the Head of the Department to enable students to maintain sufficiently high standards.
- i. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks

- * Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005.)



SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

FIRST OR SECOND SEMESTER

SUBJECT GROUP A: MANAGEMENT, APPLIED AND COMMUNICATION (MAC):

The subjects listed below are offered in both semesters. A first-time student may register for a total number of subjects not exceeding 0,051 credits.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
ABC101T	Applied Building Science I	(0,166)*	
CMN101T	Construction Management I	(0,167)	
COM151T	Communication I	(0,083)	

SUBJECT GROUP B: TECHNOLOGY, SITE SURVEYING, QUANTITY SURVEYING (TSQ):

The subjects listed below are offered in both semesters. A first-time student may only register for a total number of subjects not exceeding 0,051 credits.

COA111C	Computer Applications I	(0,083)	
CTY111T	Construction Technology I	(0,167)	
QSU101T	Quantity Surveying I	(0,167)	
SSU101T	Site Surveying I		
SSU10XT	Site Surveying: Applications I	(0,084)	
SSU10YT	Site Surveying: Practical I	(0,083)	

TOTAL CREDITS FOR THE FIRST YEAR: **1,000**

SECOND YEAR

During the practical year, students must submit a report, in the form of an assignment, on actual experience in each of the following subjects:

CMN200T	Construction Management II	(0,166)*	Construction Management I
CMN201R	Construction Management II (re-registration) (semester subject)	(0,000)	
CTY210T	Construction Technology II	(0,167)	Construction Technology I
CTY211R	Construction Technology II (re-registration) (semester subject)	(0,000)	
QSU210T	Quantity Surveying II	(0,167)	Quantity Surveying I
QSU211R	Quantity Surveying II (re-registration) (semester subject)	(0,000)	

Students must compile and maintain a logbook of work completed, which must be certified by the supervisor at the approved employer.

FIRST OR SECOND SEMESTER

EXP1BDG	Experiential Learning I	(0,250)	
EXP2BDG	Experiential Learning II	(0,250)	Experiential Learning I

TOTAL CREDITS FOR THE SECOND YEAR: **1,000**



THIRD YEAR

FIRST OR SECOND SEMESTER

SUBJECT GROUP A: MANAGEMENT, ACCOUNTING, CONCRETE AND STRUCTURES (MAC):

The subjects listed below are offered in both semesters. A first-time student may register for a total number of subjects not exceeding 0,051 credits.

CMN301T	Construction Management III	(0,166)*	Construction Management II
CSA311T	Construction Accounting III	(0,166)*	
SEK301T	Structures and Concrete III		
SEK30XT	Structures and Concrete: Structures III	(0,083)	Applied Building Science I
SEK30YT	Structures and Concrete: Concrete III	(0,084)	Applied Building Science I

SUBJECT GROUP B: TECHNOLOGY, QUANTITY SURVEYING AND PRICE ANALYSIS AND ESTIMATING (TSQ):

The subjects listed below are offered in both semesters. A student may not register for more than three first-time subjects per semester.

CTY311T	Construction Technology III	(0,167)	Construction Technology II
PAY311T	Price Analysis and Estimating III	(0,167)	Quantity Surveying II
QSU311T	Quantity Surveying III	(0,167)	Quantity Surveying II

TOTAL CREDITS FOR THE THIRD YEAR: **1,000**

2.3 BACCALAUREUS TECHNOLOGIAE: CONSTRUCTION MANAGEMENT

Qualification code: BTCU02

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Building or a NQF Level 6 (old NQF and the new HEQF) qualification in Construction Economics (or closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.



- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Day or evening classes, subject to sufficient students.
- e. *Intake for this qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- g. *Subject credits:*
Subject credits are shown in brackets after each subject.

Key to asterisks

- * Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005.)

FIRST OR SECOND SEMESTER

A student may register for a maximum of only three first-time subjects per semester. The subjects presented in each semester will depend on the number of students per group.

CODE	SUBJECT	CREDIT
BEP401T	Building Entrepreneurship IV	(0,166)*
CEC401T	Construction Economics IV	(0,166)*
CLP401T	Construction Law and Procedures IV	(0,167)
CMN411T	Construction Management IV	(0,167)
DLM401T	Development Management IV	(0,167)
MMG401T	Maintenance Management IV	(0,167)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

2.4 MAGISTER TECHNOLOGIAE: CONSTRUCTION MANAGEMENT

Qualification code: MTCUS0/MTCU95

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalareus Technologiae: Construction Management or an NQF Level 7 qualification from an accredited South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.



- b. **Selection criteria:**
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. **Duration:**
A minimum of one year and a maximum of three years.
- d. **Presentation:**
Research or day classes (for structured option only). The structured option will only be offered if there are sufficient students.
- e. **Intake for the qualification:**
January and July
- f. **Dissertation:**
This instructional programme comprises a research project with a dissertation. In the dissertation, the candidates should prove that they understand a particular problem in the industry in which they have completed research, are able to analyse it and set it out logically to arrive at logical conclusions or a diagnosis, and to make proposals for solutions to the problem or for the elimination of the problem. The dissertation should comply with the usual general technical requirements and rules regarding scope, quality and layout.
- g. **Subject credits:**
Subject credits are shown in brackets after each subject.

ATTENDANCE

ONE OF THE FOLLOWING OPTIONS:

OPTION 1: STRUCTURED (MTCUS0)

CODE	SUBJECT	CREDIT
CEC500T	Construction Economics V	(0,100)
CMN520T	Construction Management V	(0,200)
CRU500T	Research Report: Construction Management V	(0,500)
CRU500R	Research Report: Construction Management V (re-registration)	(0,000)
CRU501R	Research Report: Construction Management V (re-registration)	(0,000)
DLM500T	Development Management V	(0,100)
RMD110H	Research Methodology	(0,100)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

OPTION 2: RESEARCH (MTCU95)

CMN510T	Dissertation: Construction Management	(1,000)
CMN510R	Dissertation: Construction Management (re-registration)	(0,000)
CMN511R	Dissertation: Construction Management (re-registration)	(0,000)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**



2.5 BACCALAUREUS TECHNOLOGIAE: QUANTITY SURVEYING

Qualification code: BTQS02

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Building or an NQF Level 6 (old NQF and the new HEQF) qualification in Construction Economics or closely related field, obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding, may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Day or evening classes, subject to sufficient students.
- e. *Intake for this qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the South African Council for Quantity Surveying Profession (SACQSP).
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

Key to asterisks

- * Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005.)



FIRST OR SECOND SEMESTER

A student may register for a maximum of only three first-time subjects per semester. The subjects presented in each semester will depend on the number of students per group.

CODE	SUBJECT	CREDIT
BEP401T	Building Entrepreneurship IV	(0,166)*
CEC401T	Construction Economics IV	(0,166)*
CLP401T	Construction Law and Procedures IV	(0,167)
DLM401T	Development Management IV	(0,167)
MKV401T	Market Valuations IV	(0,167)
QSU421T	Quantity Surveying IV	(0,167)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

2.6 MAGISTER TECHNOLOGIAE: QUANTITY SURVEYING

Qualification code: MTQSS0/MTQS95

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Quantity Surveying or an NQF Level 7 qualification from an accredited South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of one year and a maximum of three years.
- d. *Presentation:*
Research or day classes (for structured option only). The structured option will only be offered if there are sufficient students.
- e. *Intake for the qualification:*
January and July
- f. *Dissertation:*
This programme comprises a research project with a dissertation. In the dissertation, the candidates should prove that they understand a particular problem in the industry in which they have done research, are able to analyse it and set it out logically to arrive at logical conclusions or a diagnosis, and to make proposals for solutions to the problem or for the elimination of the problem. The dissertation should comply with the usual general technical requirements and rules regarding scope, quality and layout.
- g. *Subject credits:*
Subject credits are shown in brackets after each subject.



ATTENDANCE

ONE OF THE FOLLOWING OPTIONS:

OPTION 1: STRUCTURED (MTQSS0)

CODE	SUBJECT	CREDIT
CEC500T	Construction Economics V	(0,100)
DLM500T	Development Management V	(0,100)
QSU510T	Quantity Surveying V	(0,200)
QSV500T	Research Report: Quantity Surveying V	(0,500)
QSV500R	Research Report: Quantity Surveying V (re-registration)	(0,000)
QSV501R	Research Report: Quantity Surveying V (re-registration)	(0,000)
RMD110H	Research Methodology	(0,100)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000

OPTION 2: RESEARCH (MTQS95)

QSU500T	Dissertation: Quantity Surveying	(1,000)
QSU500R	Dissertation: Quantity Surveying (re-registration)	(0,000)
QSU501R	Dissertation: Quantity Surveying (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000



SECTION A2: ENGINEERING PROGRAMMES

Please turn back to the Contents for an indication of which departments and qualifications form part of this section.

1. GENERAL FACULTY RULES

- a. *Experiential Learning I and II:*
Students may enrol for only one subject during any of the experiential learning periods, provided that the experiential learning provider agrees to such an arrangement in writing. If the subject is the last and outstanding subject and the student has written final exam within the last two years, the student may apply for a Dean's examination.
- b. *Prerequisite subjects:*
Students will be required to pass all first-semester (Year 1) subjects before being allowed to continue with any third-semester (Year 2) subjects.
Students will be required to pass all second-semester (Year 1/2) subjects before being allowed to continue with any fourth-semester (Year 2/3) subjects.
- c. *Waiving of prerequisite subjects:*
Prerequisite will only be waived in highly exceptional cases, based on a motivation by the Head of the Department and approved by the Executive Dean (prerequisite subjects published in Report 151 are excluded).
- d. *Class attendance/Assessments:*
Due to the serious shortage of available venues (large) for classes and/or assessments during the week, classes and/or assessments may take place on Friday afternoons and/or Saturdays.

2. QUALIFICATIONS OFFERED IN ENGINEERING

The following qualifications are offered:

- National Diploma and Baccalaureus Technologiae: Engineering: Chemical
- National Diploma and Baccalaureus Technologiae: Engineering: Civil
- National Diploma and Baccalaureus Technologiae: Engineering: Electrical
- National Diploma and Baccalaureus Technologiae: Engineering: Industrial
- National Diploma and Baccalaureus Technologiae: Engineering: Mechanical
- National Diploma and Baccalaureus Technologiae: Engineering: Mechatronics

3. GENERIC STIPULATIONS WITH REGARDS TO THE NATIONAL DIPLOMA: ENGINEERING (refer to registered qualification standard SAQA ID: 49744)

- 3.1 **The purpose of the National Diploma: Engineering:**
To train technicians in the field of engineering who will meet the criteria for registration as a Professional Engineering Technician by the Engineering Council of South Africa (ECSA). An undergraduate student achieving a qualification will be skilled and competent to solve well-defined problems and to apply the principles of engineering by using both the theoretical and practical knowledge and proven techniques in the execution of technical tasks as per the ethical and professional standards required by the engineering profession in the industry.
- 3.2 **A person achieving this type of qualification will be able to:**
 - Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills to well defined problems in the field of engineering while operating within the relevant standards and codes.
 - Demonstrate a comprehensive general engineering knowledge, as well as systematic knowledge, of the main terms, procedures, principles and operations of one of the disciplines of engineering.
 - Gather evidence from the relevant sources and journals using advanced retrieval skills, and organise, synthesise and present the information professionally in a mode appropriate to the audience.



- Apply the knowledge gained to new situations, both concrete and abstract, in the workplace/community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements taking into account the relevant technical, economic, social and environmental factors.
- Work independently, as a member of a team, and as a team leader.
- Relate engineering activity to health, safety and environment, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa (ECSA) as a Candidate Engineering Technician.
- Demonstrate the capacity to explore and exploit educational, and career opportunities, and to develop himself/herself professionally.

3.3 Generic outcomes of the National Diploma: Engineering:

- **Exit-level outcome 1: Problem-solving**
Apply engineering principles to systematically diagnose and solve well-defined engineering problems.
- **Exit-level outcome 2: Application of scientific and engineering knowledge**
Demonstrate the application of mathematical, scientific and engineering knowledge in an engineering environment.
- **Exit-level outcome 3: Engineering design**
Perform procedural design of well-defined components, systems, works, products or processes to meet desired needs within applicable standards, codes of practice and legislation.
- **Exit-level outcome 4: Communication**
Communicate technical, supervisory and general management information effectively, both orally and in writing, by using appropriate language and terminology, structure, style and graphical support.
- **Exit-level outcome 5: Engineering management**
Apply self-management principles and concepts to the development of projects and/or operations in an engineering environment.
- **Exit-level outcome 6: Application of complementary knowledge**
Demonstrate a critical awareness of the impact of engineering activity on the social, industrial and physical environment, and of the need to act professionally within own limits of competence.

4. GENERIC STIPULATIONS WITH REGARDS TO THE BACCALAUREUS TECHNOLOGIAE: ENGINEERING (Refer to registered qualification standard SAQA ID: 49509)

4.1 The purpose of the Baccalaureus Technologiae: Engineering:

The purpose of this type of qualification is to develop the necessary knowledge, understanding and skills required for a learner's further learning towards becoming a competent practicing engineering technologist. It is intended to subsequently empower a candidate engineering technologist to demonstrate the capability of applying required knowledge, understanding, skills, attitudes and values in the different work environments in South Africa. It is also designed to add value to the qualifying learner in terms of enrichment of the person, status and recognition.

4.2 A person achieving this type of qualification will be able to:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills to the solution of broadly defined problems in the field of engineering while operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge, of the main terms, procedures, principles and operations of one of the disciplines of engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the knowledge gained to new situations, both concrete and abstract, in the workplace/community.



- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements taking into account the relevant technical, economic, social and environmental factors.
- Work independently, as a member of a team, and as a team leader.
- Relate engineering activity to health, safety and environment, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa (ECSA) as a Candidate Engineering Technologists.
- Demonstrate the capacity to explore and exploit educational, and career opportunities, and to develop himself/herself professionally.
- Proceed to postgraduate studies, both course-based and research-based.

4.3 Generic exit-level outcomes of the Baccalaureus Technologiae: Engineering:

- **Exit-level outcome 1: Problem-solving**
Apply engineering principles to systematically diagnose and solve broadly defined engineering problems.
- **Exit-level outcome 2: Application of scientific and engineering knowledge**
Demonstrate the application of mathematical, scientific and engineering knowledge in an engineering environment.
- **Exit-level outcome 3: Engineering design**
Perform procedural and non-procedural design of broadly defined components, systems, works, products or processes to meet desired needs within applicable standards, codes of practice and legislation.
- **Exit-level outcome 4: Communication**
Communicate technical, supervisory and general management information effectively, both orally and in writing, by using appropriate language and terminology, structure, style and graphical support.
- **Exit-level outcome 5: Engineering management**
Apply engineering management principles and concepts to engineering activities.
- **Exit-level outcome 6: Project development**
Identify, analyse, conduct and manage a project.
- **Exit-level outcome 7: Application of complementary knowledge**
Demonstrate a critical awareness of the impact of engineering activity on the social, industrial and physical environment, and of the need to act professionally within own limits of competence.

5. CRITICAL CROSS-FIELD OUTCOMES

5.1 The National Diploma and the Baccalaureus Technologiae: Engineering have the following critical cross-field outcomes:

- Identify and solve problems that display responsible decisions, using critical and creative thinking
- Work effectively with others as a member of a team, group, organisation and community
- Organise and manage one's activities responsibly and effectively
- Collect, analyse, organise and critically evaluate information
- Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written persuasion
- Use science and technology effectively and critically, showing responsibility towards the environment and health of others
- Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation
- Contributing to the full personal development of each learner and the social and economic development of society at large, by making it an underlying intention of the programme of learning to make an individual aware of:
 - Reflecting on and exploring a variety of strategies to learn more effectively.
 - Participating as responsible citizens in the life of local, national and global communities.
 - Being culturally and aesthetically sensitive across a range of contexts.
 - Exploring education and career opportunities.
 - Develop entrepreneurial opportunities.



6. REGISTRATION WITH ECSA

Successful registration with the Engineering Council of South Africa (ECSA) is based on two pillars:

Stage 1

Accredited Academic Qualification obtained from registered academic providers. This university is a registered provider with the Department of Higher Education and Training. All engineering programmes were taken through a rigorous accreditation process during 2009 to obtain their accreditation status. The National Diploma includes an experiential learning component in industry through appropriate cooperative agreements with specific companies in the industrial and service sectors in South Africa. Each programme-specific accreditation status will be published under each programme's information.

Stage 2

Industrial experience of three years for diploma students (candidate technicians), and four years for degree students (candidate technologists), under the supervision of an ECSA registered professional in the workplace, after the completion of the academic qualification. All students may register with ECSA as candidate technicians after they have registered for their second year of study. (After completion of the first- and second-semester subjects of the first year).

After a student has successfully completed these two stages in his/her career, he/she may apply for professional registration at ECSA. Registration with ECSA gives the qualification international status and recognition in other countries through the current Sydney and Dublin Accords.



3. DEPARTMENT OF CHEMICAL AND METALLURGICAL ENGINEERING

3.1 PERSONNEL INFORMATION

On 9 September 2011, this department had the following staff members:

Head of Department: Mr M Ranyaoa - MSc (Engineering) (Chemical) (Sofia University, Bulgaria)
Telephone numbers: 012 382 3550/3581/4392
Departmental Administrators: Ms NN Nthite and Ms RM Ngaka

NAME	POST DESIGNATION	HIGHEST GENERIC QUALIFICATION(S)
Dr D Delpont	Lecturer	D Tech (Chemistry) (TUT)
Mr V Hlongwane	Lab Technician	N Dip (Engineering) (Chemical) (CPUT)
Mr KK Kgatle	Lecturer	B Tech (Engineering) (Chemical) (Wits)
Dr A Kolesnikov	Principal Lecturer	PhD (Engineering) (Chemical) (Moscow Institute of Chemical Engineering, Russia)
Dr RKK Mbaya	Lecturer	D Tech (Engineering) (Chemical) (TUT)
Ms LM Moropeng	Junior Lecturer	M Tech (Engineering) (Chemical) (TUT)
Mr M Mosesane	Lab Technician	B Tech (Engineering) (Chemical) (TUT)
Dr OO Ogunniyi	Lecturer	PhD (Engineering) (Metallurgy) (UP)
Dr PA Olubambi	Senior Lecturer	PhD (Engineering) (Metallurgy) (Wits)
Prof M Onyango	Professor	DEng (Engineering) (Chemical) (Nagoya University, Japan)
Ms API Popoola	Acting Sectional Head	M Tech (Engineering) (Metallurgy) (TUT)
Mr K Premllal	Lecturer	M Tech (Engineering) (Chemical) (TUT)
Ms LC Tshabalala	Technologist	B Tech (Engineering) (Metallurgy) (TUT)

3.2 NATIONAL DIPLOMA: ENGINEERING: CHEMICAL Qualification code: NDCE03

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s) and selection criteria:*

- **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with D symbols (50 – 59%) at the Higher Grade or C symbols (60 – 69%) at the Standard Grade for English and Mathematics and an E symbol (40 – 49%) at the Higher Grade or a D symbol (50 – 59%) at the Standard Grade for Physical Science.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.



Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

• **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:**

Admission requirement(s):

A National Senior Certificate with an endorsement of a bachelor's degree or a diploma or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least 23.

Candidates who do not meet the requirements for Mathematics and/or Physical Sciences, may enrol for Mathematics N4 and/or Engineering Sciences N4 at any further education and training (FET) college, and if these are successfully passed at a performance level of at least 60%, they may reapply for admission to the University.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

• **FOR STUDENTS WHO OBTAINED A QUALIFICATION FROM FURTHER EDUCATION AND TRAINING (FET) COLLEGES:**

CANDIDATES WHO MEET THE FOLLOWING MINIMUM REQUIREMENTS WILL BE CONSIDERED FOR ADMISSION TO THE NATIONAL DIPLOMA:

Candidates with a National Certificate (Vocational) at NQF Level 4:

A National Certificate (Vocational) at Level 4 with at least a competent (50%) achievement for English and Mathematics and at least (60%) for Physical Sciences.

Candidates with a National N Certificate (Nated 191: N3/N4 courses) at NQF Level 4/5:

A National N Certificate at Level 4/5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.



Candidates with a National N Certificate (Nated 191: N5/N6 courses) at NQF Level 5:

A National N Certificate at Level 5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Applicants may also apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain subjects credits for equivalent Engineering subjects (including Mathematics and Engineering Science) successfully passed at N5/N6 level with at least a 60% achievement.

Candidates with a National N Diploma (Nated 191: N6 with a Trade Certificate) at NQF Level 6:

A National N Diploma (Nated 191: N6 with a Trade Certificate) with at least a 50% achievement for all subjects completed on N4/N5/N6 Certificates at NQF Level 5 (including Mathematics and Engineering Science).

Candidates will be exempted from all subjects on NQF Level 5 of the National Diploma (Semester 1 and 2) that amount to 50% of the qualification, and they will also be exempted from Experiential Learning I on submission of the Trade Certificate at NQF Level 5/6.

Applicants must apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain credits for equivalent engineering subjects. Applicants will enrol and complete the other 50% of the diploma, and graduate with a diploma from the Tshwane University of Technology.

• **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**

- Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits that were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
- Enrol for existing diploma (semester courses) and request exemption of subjects at the Office of the Registrar for equivalent T-course credits that were obtained from any other technikon in South Africa.
 - i. If the number of exemptions of subjects on the existing diploma (T-course) is equal or less than 50% of the total credits for the existing diploma, the applicant will have to complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma, the applicant may apply for RPL status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology programme that will commence in 2013. Applicants must apply at least six (6) months prior to admission.
- b. *Minimum duration:*
Three years
- c. *Presentation:*
Day classes
- d. *Class attendance:*
Subjects are offered on location (Arcadia and Pretoria campuses) as determined by the Head of the Department.
- e. *Intake for the qualification:*
January only
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).



- h. Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- i. Personal protective equipment:*
Students are required to wear laboratory coats and other applicable protective gear during practicals. Students must purchase safety equipment and clothing themselves.
- j. Textbooks:*
Additional textbooks and other educational material will be required.
- k. Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- l. Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
CET201T	Chemical Engineering Technology II		
CET20XT	Chemical Engineering Technology: Chemical Principles II	(0,050)	
CHE141B	Chemistry IA	(0,133)	
COS101T	Communication Skills I	(0,043)	
CSK101B	Computer Skills I	(0,083)	
DCE111T	Drawing: Chemical Engineering I	(0,108)	
MAT171T	Mathematics I	(0,083)	
PHU161B	Physics IA	(0,133)	
TOTAL CREDITS FOR THE SEMESTER:		0,633	

SECOND SEMESTER

CET201T	Chemical Engineering Technology II		
CET20YT	Chemical Engineering Technology: Metallurgical Principles II	(0,050)	Chemical Engineering Technology: Chemical Principles II or Chemical Engineering Technology: Chemical Principles (Extended) II Chemistry IA or Chemistry (Extended) IA Mathematics I or Mathematics (Extended) I Physics IA or Physics (Extended) IA
EPH201T	Engineering Physics II	(0,068)	Physics IA or Physics (Extended) IA
ICH231T	Inorganic Chemistry II	(0,083)	Chemistry IA or Chemistry (Extended) IA
MAT271T	Mathematics II	(0,083)	Mathematics I or Mathematics (Extended) I



OCH221T	Organic Chemistry II	(0,083)	Chemistry IA or Chemistry (Extended) IA
PCB221T	Physical Chemistry II	(0,083)	Chemistry IA or Chemistry (Extended) IA
TOTAL CREDITS FOR THE SEMESTER:		0,450	
TOTAL CREDITS FOR THE FIRST YEAR:		1,083	

SECOND YEAR

FIRST SEMESTER

CET33AT	Chemical Engineering Technology IIIA	(0,100)	Chemical Engineering Technology II
CMP33AT	Chemical Plant IIIA	(0,083)	
CPI201T	Chemical Process Industries II	(0,083)	Inorganic Chemistry II Organic Chemistry II
MSK121T	Management Skills I	(0,136)	
TCE301T	Thermodynamics: Chemical Engineering III	(0,083)	Physical Chemistry II
TOTAL CREDITS FOR THE SEMESTER:		0,485	

SECOND SEMESTER

CET33BT	Chemical Engineering Technology IIIB	(0,100)	Chemical Engineering Technology IIIA
CMP33BT	Chemical Plant IIIB	(0,083)	Chemical Plant IIIA
CPP301T	Chemical Process Design: Principles III	(0,083)	Chemical Process Industries II Drawing: Chemical Engineering I or Drawing: Chemical Engineering (Extended) I Mathematics II
PCT301T	Process Control III	(0,083)	Mathematics II
TDA301T	Thermodynamics: Applied III	(0,083)	Thermodynamics: Chemical Engineering III
TOTAL CREDITS FOR THE SEMESTER:		0,432	
TOTAL CREDITS FOR THE SECOND YEAR:		0,917	

THIRD YEAR

FIRST OR SECOND SEMESTER

EXP1ECH	Experiential Learning I	(0,500)	
EXP2ECH	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE THIRD YEAR:		1,000	



3.3 NATIONAL DIPLOMA: ENGINEERING: CHEMICAL (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION) Qualification code: NDCEF0

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s) and selection criteria:*
See qualification NDCE03.
- b. *Minimum duration:*
Three and a half years.
- c. *Presentation:*
Day classes
- d. *Class attendance:*
Subjects are offered on location (Arcadia and Pretoria campuses) as determined by the Head of the Department.
- e. *Intake for the qualification:*
July only
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- h. *Personal protective equipment:*
Students are required to wear laboratory coats and other applicable protective gear during practicals. Students will be provided with all required safety equipment and clothing.
- i. *Textbooks:*
Additional textbooks and other educational material will be required.
- j. *Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- k. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

CODE	SUBJECT	CREDIT
CET201T	Chemical Engineering Technology II	
FPCET01	Chemical Engineering Technology: Chemical Principles (Extended) II	(0,050)
FPCHE03	Chemistry (Extended) IA	(0,133)
FPCOS03	Communication Skills (Extended) I	(0,043)
FPCSK02	Computer Skills (Extended) I	(0,083)



FPDCE01	Drawing: Chemical Engineering (Extended) I	(0,108)
FPMAT04	Mathematics (Extended) I	(0,083)
FPPHU03	Physics (Extended) IA	(0,133)

TOTAL CREDITS FOR THE FIRST YEAR: **0,633**

As from the second year, students will continue with the subjects of the second semester of the qualification NDCE03. Please note: Students will still register for the qualification code NDCEF0 until they have completed the qualification.

3.4 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CHEMICAL Qualification code: BTCE02

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Engineering: Chemical or a NQF Level 6 (old NQF and the new HEQF) qualification in Chemical Engineering or closely related field, obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.
- National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).
- Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.
- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Day classes
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.



- g. Practicals:*
It is compulsory for students to attend 100% of the practical sessions. Students must pass the practical component of a subject to be admitted to the examination.
- h. Personal protective equipment:*
Students are required to wear laboratory coats and other applicable protective gear during practicals. Students will be provided with all required safety equipment and clothing.
- i. Textbooks:*
Additional textbooks and other educational material will be required.
- j. Subject credits:*
Subject credits are shown in brackets after each subject.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST SEMESTER

CODE	SUBJECT	CREDIT
CET401T	Chemical Engineering Technology IV	
CET40YT	Chemical Engineering Technology: Heat and Mass Transfer IV	(0,100)
CET40ZT	Chemical Engineering Technology: Unit Operations IV	(0,100)
CPD401T	Chemical Process Design IV	
CPD40XT	Chemical Process Design: Equipment Design IV	(0,100)
MTE301T	Mathematics: Chemical Engineering III	(0,100)
PJC401T	Project: Chemical Engineering IV (offered in both semesters)	(0,100)
PJC401R	Project: Chemical Engineering IV (re-registration)	(0,000)
REA401T	Reactor Technology IV	(0,100)
TOTAL CREDITS FOR THE SEMESTER:		0,600

SECOND SEMESTER

CET401T	Chemical Engineering Technology IV	
CET40XT	Chemical Engineering Technology: Fluid Flow IV	(0,100)
CPD401T	Chemical Process Design IV	
CPD40YT	Chemical Process Design: Plant Design IV	(0,100)
PCI401T	Production Engineering: Chemical Industry IV	(0,100)
PCT401B	Process Control IV	(0,100)
TOTAL CREDITS FOR THE SEMESTER:		0,400
TOTAL CREDITS FOR THE QUALIFICATION:		1,000



3.5 MAGISTER TECHNOLOGIAE: ENGINEERING: CHEMICAL Qualification code: MTCE95

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Chemical or an NQF Level 7 qualification in Chemical Engineering (or a related field) obtained from a South African university.
- Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of one year and a maximum of three years.
- d. *Presentation:*
Research
- e. *Intake for the qualification:*
January and July
- f. *Structure:*
The qualification consists of a research project that must be recorded in the form of a dissertation.
- g. *Re-registration:*
Students must re-register for this qualification every year.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
ECH500T	Dissertation: Engineering: Chemical	(1,000)
ECH500R	Dissertation: Engineering: Chemical (re-registration)	(0,000)
ECH501R	Dissertation: Engineering: Chemical (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000



3.6 DOCTOR TECHNOLOGIAE: ENGINEERING: CHEMICAL

Qualification code: DTCE96

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Magister Technologiae: Engineering: Chemical or an NQF Level 8 qualification in Chemical Engineering (or a related field) obtained from a South African university.
- Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of two years and a maximum of five years.
- d. *Presentation:*
Research
- e. *Intake for the qualification:*
January and July
- f. *Structure:*
The qualification consists of a research project that must be recorded in the form of a thesis.
- g. *Re-registration:*
Students must re-register for this qualification every year.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
ECH700T	Thesis: Engineering: Chemical	(2,000)
ECH700R	Thesis: Engineering: Chemical (re-registration)	(0,000)
ECH701R	Thesis: Engineering: Chemical (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		2,000



3.7 NATIONAL DIPLOMA: ENGINEERING: METALLURGY

Qualification code: NDMY03

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s) and selection criteria:*

• **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with D symbols (50 – 59%) at the Higher Grade or C symbols (60 – 69%) at the Standard Grade for English and Mathematics and an E symbol (40 – 49%) at the Higher Grade or a D symbol (50 – 59%) at the Standard Grade for Physical Science.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

• **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:**

Admission requirement(s):

A National Senior Certificate with an endorsement of a bachelor's degree or a diploma or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Candidates who do not meet the requirements for Mathematics and/or Physical Sciences, may enrol for Mathematics N4 and/or Engineering Sciences N4 at any further education and training (FET) college, and if these are successfully passed at a performance level of at least 60%, they may reapply for admission to the University.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).



- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.
- **FOR STUDENTS WHO OBTAINED A QUALIFICATION FROM FURTHER EDUCATION AND TRAINING (FET) COLLEGES:**

CANDIDATES WHO MEET THE FOLLOWING MINIMUM REQUIREMENTS WILL BE CONSIDERED FOR ADMISSION TO THE NATIONAL DIPLOMA:

Candidates with a National Certificate (Vocational) at NQF Level 4:
A National Certificate (Vocational) at Level 4 with at least a competent (50%) achievement for English and Mathematics and at least (60%) for Physical Sciences.

Candidates with a National N Certificate (Nated 191: N3/N4 courses) at NQF Level 4/5:
A National N Certificate at Level 4/5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Candidates with a National N Certificate (Nated 191: N5/N6 courses) at NQF Level 5:
A National N Certificate at Level 5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Applicants may also apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain subjects credits for equivalent Engineering subjects (including Mathematics and Engineering Science) successfully passed at N5/N6 level with at least a 60% achievement.

Candidates with a National N Diploma (Nated 191: N6 with a Trade Certificate) at NQF Level 6:
A National N Diploma (Nated 191: N6 with a Trade Certificate) with at least a 50% achievement for all subjects completed on N4/N5/N6 Certificates at NQF Level 5 (including Mathematics and Engineering Science).

Candidates will be exempted from all subjects on NQF Level 5 of the National Diploma (Semester 1 and 2) that amount to 50% of the qualification, and they will also be exempted from Experiential Learning I on submission of the Trade Certificate at NQF Level 5/6.

Applicants must apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain credits for equivalent engineering subjects. Applicants will enrol and complete the other 50% of the diploma, and graduate with a diploma from the Tshwane University of Technology.
- **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**
 - Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits that were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
 - Enrol for existing diploma (semester courses) and request exemption of subjects at the Office of the Registrar for equivalent T-course credits that were obtained from any other technikon in South Africa.
 - i. If the number of exemptions of subjects on the existing diploma (T-course) is equal or less than 50% of the total credits for the existing diploma, the applicant will have to complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma, the applicant may apply for RPL status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology programme that will commence in 2013. Applicants must apply at least six (6) months prior to admission.



- b. *Minimum duration:*
Three years
- c. *Presentation:*
Day classes
- d. *Class attendance:*
Subjects are offered on location (Arcadia and Pretoria campuses) as determined by the Head of the Department.
- e. *Intake for the qualification:*
January only
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- i. *Personal protective equipment:*
Students are required to wear laboratory coats and other applicable protective gear during practicals. Students must purchase safety equipment and clothing themselves.
- j. *Textbooks:*
Additional textbooks and other educational material will be required.
- k. *Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- l. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks:

- * Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005 and November 2008.)
- ** Students may choose to take Management Skills I or Entrepreneurial Skills I.
- *** The subject is not compulsory for obtaining the qualification. However, the Department strongly recommends that students take this subject to prepare and equip them for the labour market.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
CHE141B	Chemistry IA	(0,083)	
CSK101B	Computer Skills I	(0,042)	
MAT171T	Mathematics I	(0,083)	
MEY101T	Metallurgy I	(0,084)	
MNP201T	Mineral Processing II		
MNP20XT	Mineral Processing: Chemical Principles II	(0,041)	
PHU161B	Physics IA	(0,083)	
TOTAL CREDITS FOR THE SEMESTER:		0,416	



SECOND SEMESTER

COS101T	Communication Skills I	(0,042)	
MAT271T	Mathematics II	(0,083)	Mathematics I
MCI201T	Metallurgical Chemistry II	(0,083)	Chemistry IA
MDR101C	Mechanical Engineering Drawing I	(0,083)	
MNP201T	Mineral Processing II		
MNP20YT	Mineral Processing: Metallurgical Principles II	(0,042)	Chemistry IA Mathematics I Mineral Processing: Chemical Principles II
PML101T	Physical Metallurgy I	(0,085)	Metallurgy I
SMM201T	Strength of Materials II	(0,083)	Mathematics I Physics IA
TOTAL CREDITS FOR THE SEMESTER:		0,501	
TOTAL CREDITS FOR THE FIRST YEAR:		0,917	

SECOND YEAR

FIRST SEMESTER

ANP201T	Applied Mineral Processing II	(0,068)*	Metallurgical Chemistry II Metallurgy I
ENF201T	Extraction of Non-Ferrous Metals II	(0,067)*	Metallurgical Chemistry II
FAT201T	Ferro-Alloy Technology II	(0,067)*	Metallurgical Chemistry II Physical Metallurgy I
MGH201T	Metallurgical Thermodynamics II	(0,068)*	Metallurgical Chemistry II
MSK121T	Management Skills I**	(0,083)	
MTE301T	Mathematics: Chemical Engineering III***	(0,000)*	Mathematics II
PMU201T	Practical Metallurgy II	(0,080)*	Metallurgy I Physical Metallurgy I
RFC201T	Refractories II	(0,067)*	
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

ANP301T	Applied Mineral Processing III	(0,100)*	Applied Mineral Processing II
CRS301T	Corrosion III	(0,100)*	Chemistry IA
ENF311T	Extraction of Non-Ferrous Metals III	(0,100)*	Extraction of Non-Ferrous Metals II
EPS101T	Entrepreneurial Skills**	(0,083)	
FAT311T	Ferro-Alloy Technology III	(0,100)*	Ferro-Alloy Technology II
QCL221T	Quality Control II	(0,083)	Mathematics I
RFC321T	Refractories III	(0,100)*	Refractories II
TOTAL CREDITS FOR THE SEMESTER:		0,583	
TOTAL CREDITS FOR THE SECOND YEAR:		1,083	

THIRD YEAR

FIRST OR SECOND SEMESTER

EXP1MET	Experiential Learning I	(0,500)	
EXP2MET	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE THIRD YEAR:		1,000	



3.8 NATIONAL DIPLOMA: ENGINEERING: METALLURGY (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION) Qualification code: NDMYF0

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s) and selection criteria:*
See qualification NDMY03.
- b. *Minimum duration:*
Three and a half years.
- c. *Presentation:*
Day classes
- d. *Class attendance:*
Subjects are offered on location (Arcadia and Pretoria campuses) as determined by the Head of the Department.
- e. *Intake for the qualification:*
January only
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- h. *Personal protective equipment:*
Students are required to wear laboratory coats and other applicable protective gear during practicals. Students must purchase safety equipment and clothing themselves.
- i. *Textbooks:*
Additional textbooks and other educational material will be required.
- j. *Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- k. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks:

- * The subject is not compulsory for obtaining the qualification. However, the Department strongly recommends that students take this subject to prepare and equip them for the labour market.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
FPCHE03	Chemistry (Extended) IA	(0,083)	
FPCOS03	Communication Skills (Extended) I	(0,044)	
FPCSK02	Computer Skills (Extended) I	(0,044)	
FPMAT04	Mathematics (Extended) I	(0,083)	
FPMDR01	Mechanical Engineering Drawing (Extended) I	(0,083)	



FPMEY01	Metallurgy (Extended) I	(0,067)	
MNP201T	Mineral Processing II		
FPMNP01	Mineral Processing: Chemical Principles (Extended) II	(0,045)	
FPPHU03	Physics (Extended) IA	(0,068)	

TOTAL CREDITS FOR THE FIRST YEAR: **0,517**

SECOND YEAR

FIRST SEMESTER

MAT271T	Mathematics II	(0,083)	Mathematics (Extended) I
MCI201T	Metallurgical Chemistry II	(0,083)	Chemistry (Extended) IA
MNP201T	Mineral Processing II		
MNP20YT	Mineral Processing: Metallurgical Principles II	(0,042)	Chemistry (Extended) IA Mathematics (Extended) I Mineral Processing: Chemical Principles (Extended) II
PML101T	Physical Metallurgy I	(0,083)	Metallurgy (Extended) I
SMM201T	Strength of Materials II	(0,083)	Mathematics (Extended) I Physics (Extended) IA

plus one of the following subjects:

EPS101T	Entrepreneurial Skills	(0,083)	
MSK121T	Management Skills I	(0,083)	

TOTAL CREDITS FOR THE SEMESTER: 0,457

SECOND SEMESTER

ANP201T	Applied Mineral Processing II	(0,083)	Metallurgy (Extended) I Metallurgical Chemistry II
ENF201T	Extraction of Non-Ferrous Metals II	(0,083)	Metallurgical Chemistry II
FAT201T	Ferro-Alloy Technology II	(0,083)	Metallurgical Chemistry II Physical Metallurgy I
MGH201T	Metallurgical Thermodynamics II	(0,083)	Metallurgical Chemistry II
MTE301T	Mathematics: Chemical Engineering III*	(0,000)	Mathematics II
PMU201T	Practical Metallurgy II	(0,083)	Metallurgy (Extended) I Physical Metallurgy I
RFC201T	Refractories II	(0,083)	

TOTAL CREDITS FOR THE SEMESTER: 0,498

TOTAL CREDITS FOR THE SECOND YEAR: **0,955**

THIRD YEAR

FIRST SEMESTER

ANP301T	Applied Mineral Processing III	(0,088)	Applied Mineral Processing II
CRS301T	Corrosion III	(0,088)	Chemistry (Extended) IA
ENF311T	Extraction of Non-Ferrous Metals III	(0,088)	Extraction of Non-Ferrous Metals II
FAT311T	Ferro-Alloy Technology III	(0,088)	Ferro-Alloy Technology II
QCL221T	Quality Control II	(0,088)	Mathematics (Extended) I
RFC321T	Refractories III	(0,088)	Refractories II

TOTAL CREDITS FOR THE SEMESTER: 0,528



SECOND SEMESTER

EXP1MET	Experiential Learning I	(0,500)
TOTAL CREDITS FOR THE SEMESTER:		0,500
TOTAL CREDITS FOR THE THIRD YEAR:		1,028

FOURTH YEAR

FIRST SEMESTER

EXP2MET	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE FOURTH YEAR:		0,500	

3.9 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: METALLURGY Qualification code: BTMY02

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Engineering: Metallurgy (with Hydrometallurgy or Mineral Processing) or a NQF Level 6 (old NQF and the new HEQF) qualification in Metallurgical Engineering or closely related field, obtained from an accredited South African university. Preference will be given to applicant with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding, may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Day classes



- e. *Intake for the qualification:*
January only
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Practicals:*
It is compulsory for students to attend 100% of the practicals. Students must pass the practical component of a subject to be admitted to the examination.
- h. *Personal protective equipment:*
Students are required to wear laboratory coats and other applicable protective gear during practicals. Students must purchase safety equipment and clothing themselves.
- i. *Textbooks:*
Additional textbooks and other educational material will be required.

Key to asterisk:

- * Information does not correspond to information in Report 151.
(Deviations approved by the Senate in May 2007.)

ATTENDANCE

FIRST SEMESTER

CODE	SUBJECT	CREDIT
PJM401T	Project: Metallurgy IV (offered in both semesters)	(0,250)
PJM401R	Project: Metallurgy IV (re-registration)	(0,000)

plus three* of the following subjects (second-semester subjects included):

ANP401T	Applied Mineral Processing IV	(0,250)
ENF401T	Extraction of Non-Ferrous Metals IV	(0,250)

SECOND SEMESTER

FAT411T	Ferro-Alloy Technology IV	(0,250)
MGH301T	Metallurgical Thermodynamics III*	(0,250)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

3.10 MAGISTER TECHNOLOGIAE: ENGINEERING: METALLURGY

Qualification code: MTMY96

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Metallurgy or an NQF Level 7 qualification in Metallurgical Engineering (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.



- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of one year and a maximum of three years.
- d. *Presentation:*
Research
- e. *Intake for the qualification:*
January and July
- f. *Structure:*
The qualification consists of a research project that must be recorded in the form of a dissertation.
- g. *Re-registration:*
Students must re-register for this qualification every year.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
MEY500T	Dissertation: Engineering: Metallurgy	(1,000)
MEY500R	Dissertation: Engineering: Metallurgy (re-registration)	(0,000)
MEY501R	Dissertation: Engineering: Metallurgy (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000

3.11 DOCTOR TECHNOLOGIAE: ENGINEERING: METALLURGY

Qualification code: DTM96

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Magister Technologiae: Engineering: Metallurgy or an NQF Level 8 qualification in Metallurgical Engineering (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of two years and a maximum of five years.
- d. *Presentation:*
Research



- e. *Intake for the qualification:*
January and July
- f. *Structure:*
The qualification consists of a research project that must be recorded in the form of a thesis.
- g. *Re-registration:*
Students must re-register for this qualification every year.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
MEY700T	Thesis: Engineering: Metallurgy	(2,000)
MEY700R	Thesis: Engineering: Metallurgy (re-registration)	(0,000)
MEY701R	Thesis: Engineering: Metallurgy (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		2,000

3.12 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: REFRACTORIES

Qualification code: BTER01

Campus where offered: Arcadia Campus

REMARKS

Please note: This qualification will be offered only if there are a sufficient number of students.

- a. *Admission requirement(s):*
A National Diploma: Engineering: Metallurgy, National Diploma: Ceramics Technology or a NQF Level 6 (old NQF and the new HEQF) qualification in Metallurgical Engineering or a closely related field, obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding, may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.



- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission and that, due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Day classes
- e. *Intake for the qualification:*
January only
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Subject credits:*
Subject credits are shown in brackets after each subject.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

ATTENDANCE

FIRST SEMESTER

CODE	SUBJECT	CREDIT
REF40AT	Refractories Engineering IVA	(0,200)
RFP401T	Refractories Engineering Practice IV (offered in both semesters)	(0,200)
RFP401R	Refractories Engineering Practice IV (re-registration)	(0,000)
RMR201T	Research Methodology: Natural Sciences	
RMR20XT	Research Methodology: Natural Sciences: Refractories	(0,050)
TOTAL CREDITS FOR THE SEMESTER:		0,450

SECOND SEMESTER

ARF401T	Applied Refractories IV	(0,300)
REF40BT	Refractories Engineering IVB	(0,200)
RMR201T	Research Methodology: Natural Sciences	
RMR20YT	Research Methodology: Natural Sciences: Statistics	(0,050)
TOTAL CREDITS FOR THE SEMESTER:		0,550
TOTAL CREDITS FOR THE QUALIFICATION:		1,000



4. DEPARTMENT OF CIVIL ENGINEERING

4.1 PERSONNEL INFORMATION

On 9 September 2011, this department had the following staff members:

Head of Department: Prof JM Ndambuki - PhD (Engineering) (Civil) (Delft Univ)
Telephone numbers: 012 382 5212/5225

Departmental administrators: Ms DM Ngoma, Ms S van der Merwe and Ms GO Mabena

NAME	POST DESIGNATION	HIGHEST GENERIC QUALIFICATION(S)
Dr CE Ackerman	Senior Lecturer	D Tech (Engineering) (Civil) (TUT)
Mr RFA Berkers	Lecturer	M Tech (Engineering) (Civil) (Tech Pta)
Ms DA Branga-Peicu	Senior Lecturer	MSc (Water Engineering) (Institutul de Constructii Bucuresti – Facultate de Hidrotehnica)
Mr DJJ Coetzee	Laboratory Manager	N Dip (Engineering) (Civil) (Tech Pta)
Mr FS Crofts	Principal Lecturer	BEng (Civil) (UP), GDE (Wits)
Mr CJ de Jager	Senior Lecturer	BEng (Civil) (UP)
Dr WK Kupolati	Senior Lecturer	PhD (Engineering) (Civil) (Univ of Ibadan, Nigeria)
Mr M Makaleng	Laboratory Technician	N Dip (Engineering) (Civil) (TUT)
Mr LEN Maloba	Laboratory Technician	N Dip (Computer Studies) (TUT)
Mr RJ Moloisane	Lecturer	M Tech (Engineering) (Civil) (<i>cum laude</i>) (Tech Pta), MSc (Civil) (UP)
Dr GM Ochieng	Section Head and Senior Lecturer	D Tech (Engineering) (Civil) (TUT)
Mr SE Seanego	Senior Lecturer	BSc (Hons) (Structural Engineering) (UP)
Dr J Snyman	Senior Lecturer	D Tech (Engineering) (Civil) (TUT)
Mr OR Tshephe	Lecturer	NH Dip (Engineering) (Civil) (Tech Pta)
Dr WA van Wyngaard	Principal Lecturer	D Tech (Engineering) (Civil) (Tech Pta)
Mr JC van Zyl	Principal Lecturer	MEng (Engineering) (Civil) (US)

4.2 NATIONAL DIPLOMA: ENGINEERING: CIVIL

Qualification code: NDCI03

Campus where offered: Pretoria Campus

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with D symbols (50 – 59%) at the Higher Grade or C symbols (60 – 69%) at the Standard Grade for English and Mathematics and an E symbol (40 – 49%) at the Higher Grade or a D symbol (50 – 59%) at the Standard Grade for Physical Science.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.



Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

• **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:**

Admission requirement(s):

A National Senior Certificate with an endorsement of a bachelor's degree or a diploma or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Candidates who do not meet the requirements for Mathematics and/or Physical Sciences, may enrol for Mathematics N4 and/or Engineering Sciences N4 at any further education and training (FET) college, and if these are successfully passed at a performance level of at least 60%, they may reapply for admission to the University.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

• **FOR STUDENTS WHO OBTAINED A QUALIFICATION FROM FURTHER EDUCATION AND TRAINING (FET) COLLEGES:**

CANDIDATES WHO MEET THE FOLLOWING MINIMUM REQUIREMENTS WILL BE CONSIDERED FOR ADMISSION TO THE NATIONAL DIPLOMA:

Candidates with a National Certificate (Vocational) at NQF Level 4:

A National Certificate (Vocational) at Level 4 with at least a competent (50%) achievement for English and Mathematics and at least (60%) for Physical Sciences.

Candidates with a National N Certificate (Nated 191: N3/N4 courses) at NQF Level 4/5:

A National N Certificate at Level 4/5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Candidates with a National N Certificate (Nated 191: N5/N6 courses) at NQF Level 5:

A National N Certificate at Level 5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.



Applicants may also apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain subjects credits for equivalent Engineering subjects (including Mathematics and Engineering Science) successfully passed at N5/N6 level with at least a 60% achievement.

Candidates with a National N Diploma (Nated 191: N6 with a Trade Certificate) at NQF Level 6:

A National N Diploma (Nated 191: N6 with a Trade Certificate) with at least a 50% achievement for all subjects completed on N4/N5/N6 Certificates at NQF Level 5 (including Mathematics and Engineering Science).

Candidates will be exempted from all subjects on NQF Level 5 of the National Diploma (Semester 1 and 2) that amount to 50% of the qualification, and they will also be exempted from Experiential Learning I on submission of the Trade Certificate at NQF Level 5/6.

Applicants must apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain credits for equivalent engineering subjects. Applicants will enrol and complete the other 50% of the diploma, and graduate with a diploma from the Tshwane University of Technology.

- **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**
 - Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits that were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
 - Enrol for existing diploma (semester courses) and request exemption of subjects at the Office of the Registrar for equivalent T-course credits that were obtained from any other technikon in South Africa.
 - i. If the number of exemptions of subjects on the existing diploma (T-course) is equal or less than 50% of the total credits for the existing diploma, the applicant will have to complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma, the applicant may apply for RPL status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology programme that will commence in 2013. Applicants must apply at least six (6) months prior to admission.
- b. *Minimum duration:*
Three years
- c. *Presentation:*
Day classes
- d. *Intake for the qualification:*
January and July
- e. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- f. *Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations. Experiential learning is usually undertaken during the second study year. However, students who do not find employment will be permitted to continue with the third study year and complete their experiential learning afterwards.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.



- i. **Subject credits:**
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks

* Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005.)

** Students who register for Reinforced Concrete and Masonry Design III should register for Structural Analysis III concurrently.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
AME111T	Applied Mechanics I	(0,085)*	
CSK101E	Computer Skills I	(0,083)	
CSM101T	Construction Materials I	(0,083)	
DRW101T	Drawing I	(0,083)	
MAT171T	Mathematics I	(0,083)	
SUR111T	Surveying I		
SUR11YT	Surveying: Theory I	(0,056)	
SUR11ZT	Surveying: Practical I	(0,027)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

COS101T	Communication Skills I	(0,043)*	
DRW201T	Drawing II	(0,083)	Drawing I or Drawing (Extended) I
KME101T	Construction Methods I	(0,083)	
MAT271T	Mathematics II	(0,083)	Mathematics I or Mathematics (Extended I) I
MNC101T	Management: Civil I	(0,083)	
SUC201T	Surveying: Civil II		
SUC20XT	Surveying: Civil: Theory II	(0,021)	Surveying I or Surveying (Extended) I
SUC20YT	Surveying: Civil: Practical II	(0,021)	Surveying I or Surveying (Extended) I
TSC211T	Theory of Structures II	(0,083)	Applied Mechanics I or Applied Mechanics (Extended) I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE FIRST YEAR:		1,000	

SECOND YEAR

FIRST SEMESTER

EXP1ECI	Experiential Learning I	(0,500)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

EXP2ECI	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE SECOND YEAR:		1,000	



THIRD YEAR

FIRST SEMESTER

GTE201T	Geotechnical Engineering II	(0,083)	Construction Materials I
MNC201T	Management: Civil II	(0,083)	Management: Civil I
SAS201T	Structural Analysis II	(0,043)*	Theory of Structures II
SST301T	Structural Steel and Timber Design III	(0,083)	Theory of Structures II
TEN201T	Transportation Engineering II	(0,083)	Drawing I or Drawing (Extended) I
WEN201T	Water Engineering II	(0,125)	Applied Mechanics I or Applied Mechanics (Extended) I
			Mathematics I or Mathematics (Extended) I

TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER

DOC301T	Documentation III	(0,083)	Management: Civil II
GTE301T	Geotechnical Engineering III	(0,083)	Geotechnical Engineering II
RCM301T	Reinforced Concrete and Masonry Design III**	(0,083)	Drawing II
			Structural Analysis II
			Theory of Structures II
SAS301T	Structural Analysis III**	(0,043)*	Structural Analysis II
TEN301T	Transportation Engineering III	(0,083)	Transportation Engineering II
WEN301T	Water Engineering III	(0,125)	Water Engineering II

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE THIRD YEAR: 1,000

4.3 NATIONAL DIPLOMA: ENGINEERING: CIVIL (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION) Qualification code: NDCIF0

Campus where offered: Pretoria Campus

REMARKS

- Admission requirement(s) and selection criteria:*
See qualification NDCI03.
- Minimum duration:*
Three and a half years.
- Presentation:*
Day classes
- Intake for the qualification:*
January only
- Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations. Experiential learning is usually undertaken during the second study year. However, students who do not find employment will be permitted to continue with the third study year and complete their experiential learning afterwards.



- g. **Practicals:**
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- h. **Subject credits:**
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

CODE	SUBJECT	CREDIT
FPAME01	Applied Mechanics (Extended) I	(0,085)
FPCOS03	Communication Skills (Extended) I	(0,043)
FPCSK02	Computer Skills (Extended) I	(0,083)
FPCSM01	Construction Materials (Extended) I	(0,083)
FPDRW01	Drawing (Extended) I	(0,083)
FPMAT04	Mathematics (Extended) I	(0,083)
FPSUR01	Surveying (Extended) I	
FPSURYT	Surveying: Theory (Extended) I	(0,056)
FPSURZT	Surveying: Practical (Extended) I	(0,027)

TOTAL CREDITS FOR THE FIRST YEAR: **0,543**

Students will be required to pass all core first-year extended subjects, namely Applied Mechanics (Extended) I, Mathematics (Extended) I and Surveying (Extended) I, before they will be allowed to continue with any second-semester subjects.

As from the second year, students will continue with the subjects of the second semester of the qualification NDCI03, except for Communication Skills I. Please note: Students will still register for the qualification code NDCIF0 until they have completed the qualification.

4.4 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: CONSTRUCTION MANAGEMENT Qualification code: BTKG02

Campus where offered: Pretoria Campus

Specialist purpose of the qualification:

To become a competent civil engineering technologist. The qualified graduate will be able to provide construction management expertise in the planning, design, construction and maintenance team of a civil engineering-related project.

REMARKS

- a. **Admission requirement(s):**
A National Diploma: Engineering: Civil or a NQF Level 6 (old NQF and the new HEQF) qualification in Civil Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

As from 2013, apart from meeting the above requirements, a candidate must have obtained a 60% aggregate in Management: Civil I and II.



National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered, based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Block-based classes offered over a period of two years.
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

Please note:

Students must pass eight subjects. A minimum of five compulsory subjects in their particular field of specialisation should be taken, with the balance made up of subjects offered in the other fields of specialisation. Optional/elective subjects taken from the other fields must be closely related/relevant to the qualification. Subjects are offered as determined by the Head of the Department. The total credits of the Level IV subjects may not be less than 0,500.

Students who register for the subject Construction Materials Technology IV are not permitted to register for Concrete Technology IV or Asphalt Technology IV.

ATTENDANCE

FIRST SEMESTER (2012)

CODE	SUBJECT	CREDIT
IRN201B	Industrial Relations and Negotiation II	(0,125)
MPP401B	Management Principles and Practice IV	(0,125)

SECOND SEMESTER (2012)

No subjects in this field of specialisation will be presented in this semester.



FIRST SEMESTER (2013)

CLC101T	Commercial Law: Civil	(0,125)
FMN301T	Financial Management III	(0,125)

SECOND SEMESTER (2013)

PJG401T	Project Management: Civil IV	(0,125)
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TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

4.5 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: ENVIRONMENTAL ENGINEERING Qualification code: BTOI02

Campus where offered: Pretoria Campus

Specialist purpose of the qualification:

A practitioner in environmental engineering uses the principles of science and environmental engineering principles to prevent and solve environmental problems.

REMARKS

a. *Admission requirement(s):*

A National Diploma: Engineering: Civil or an NQF Level 6 (old NQF and the new HEQF) qualification in Civil Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

As from 2013, apart from meeting the above requirements, a candidate must have obtained a 60% aggregate in Water Engineering II and III.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered, based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

b. *Selection criteria:*

Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.

c. *Minimum duration:*

One year

d. *Presentation:*

Block-based classes offered over a period of two years.



- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

Please note:

Students must obtain one credit. The Department strongly advises students who wish to register with the Engineering Council of South Africa (ECSA) to pass all the prescribed subjects indicated in this field of specialisation.

Students who prefer not to register with ECSA must take a minimum of six subjects in this particular field of specialisation, with the balance (the remaining two) made up of subjects offered in the other fields of specialisation. Subjects are offered as determined by the Head of the Department. The total credits of the Level IV subjects may not be less than 0,500.

Students who register for the subject Construction Materials Technology IV are not permitted to register for Concrete Technology IV or Asphalt Technology IV.

ATTENDANCE

FIRST SEMESTER (2012)

CODE	SUBJECT	CREDIT
ENN401T	Environmental Management for Engineers: Civil IV	(0,125)
WAT401T	Water Resource Management: Civil IV	(0,125)

SECOND SEMESTER (2012)

SOI401T	Soil and Ground Water Pollution: Civil IV	(0,125)
SWM401T	Solid Waste Management IV	(0,125)

FIRST SEMESTER (2013)

SIA401T	Social Environmental Studies: Civil IV	(0,250)
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SECOND SEMESTER (2013)

ENR401T	Environmental Engineering: Civil IV	(0,250)
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TOTAL CREDITS FOR THE QUALIFICATION:	1,000
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4.6 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: GEOTECHNICAL ENGINEERING

Qualification code: BTGO02

Campus where offered: Pretoria Campus

Specialist purpose of the qualification:

A practitioner in geotechnical engineering identifies and solves problems involving soil, rock and groundwater. Designing structures in and below the ground, using the principles of earth science and engineering, forms part of their work.

REMARKS

a. *Admission requirement(s):*

A National Diploma: Engineering: Civil or an NQF Level 6 (old NQF and the new HEQF) qualification in Civil Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

As from 2013, apart from meeting the above requirements, a candidate must have obtained a 60% aggregate in Construction Materials I, Geotechnical Engineering II and III.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding, may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

b. *Selection criteria:*

Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.

c. *Minimum duration:*

One year

d. *Presentation:*

Block-based classes offered over a period of two years.

e. *Intake for the qualification:*

January and July

f. *Readmission:*

See Chapter 3 of the Students' Rules and Regulations.

g. *Accreditation by professional body:*

This qualification has been accredited by the Engineering Council of South Africa (ECSA).

h. *Subject credits:*

Subject credits are shown in brackets after each subject.



Please note:

Students must pass eight subjects. A minimum of five compulsory subjects in their particular field of specialisation should be taken, with the balance made up of subjects offered in the other fields of specialisation. Optional/elective subjects taken from the other fields must be closely related/relevant to the qualification. Subjects are offered as determined by the Head of the Department. The total credits of the Level IV subjects may not be less than 0,500.

Students who register for the subject: Construction Materials Technology IV are not permitted to register for Concrete Technology IV or Asphalt Technology IV.

ATTENDANCE

FIRST SEMESTER (2012)

CODE	SUBJECT	CREDIT
HGE301B	Hydrogeology III	(0,125)
KMT401T	Construction Materials Technology IV	(0,125)

SECOND SEMESTER (2012)

FDE401T	Foundation Engineering IV	(0,125)
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FIRST SEMESTER (2013)

EWD401T	Earthworks Design IV	(0,125)
GEC401T	Geology: Civil IV	(0,125)

SECOND SEMESTER (2013)

AGM401T	Applied Geomechanics IV	(0,125)
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TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

**4.7 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL:
STRUCTURAL ENGINEERING
Qualification code: BTSQ02**

Campus where offered: Pretoria Campus

Specialist purpose of the qualification:

A practitioner in structural engineering deals with the analysis and design of structures that support or resist loads.

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Engineering: Civil or an NQF Level 6 (old NQF and the new HEQF) qualification in Civil Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

As from 2013, apart from meeting the above requirements, a candidate must have obtained a 60% aggregate in Reinforced Concrete and Masonry Design III, Structural Analyses II and III, Structural Steel and Timber Design II and III.



National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered, based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Block-based classes offered over a period of two years.
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

Please note:

Students must take a minimum of five core subjects, namely Reinforced Concrete Design IV, Foundation Engineering IV, Structural Analysis IV, Theory of Structures IV, and Structural Steel Design IV, with the balance made up of subjects offered in the other fields of specialisation. Please note that if students register for the subject Construction Materials Technology IV, they are not permitted to register for Concrete Technology IV or Asphalt Technology IV.

For ease of professional registration as a Professional Structural Engineering Technologist, it is strongly recommended that the students take all eight the mandatory subjects from the field of Structural Engineering.

ATTENDANCE

FIRST SEMESTER (2012)

CODE	SUBJECT	CREDIT
RCD401T	Reinforced Concrete Design IV	(0,125)
STD401T	Structural Timber Design IV	(0,125)

SECOND SEMESTER (2012)

FDE401T	Foundation Engineering IV	(0,125)
PCG401T	Pre-Stressed Concrete Design IV	(0,125)



FIRST SEMESTER (2013)

SAS401T	Structural Analysis IV	(0,125)
TSC411T	Theory of Structures IV	(0,125)

SECOND SEMESTER (2013)

SSE401T	Structural Steel Design IV	(0,125)
STM401T	Structural Masonry Design IV	(0,125)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

4.8 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: TRANSPORTATION ENGINEERING Qualification code: BT002

Campus where offered: Pretoria Campus

Specialist purpose of the qualification:

To become a competent civil engineering technologist. The qualified graduate will be able to provide transportation engineering expertise in the planning, design, construction and maintenance team of a civil engineering-related project. A practitioner in transportation engineering performs engineering work, involving the planning, functional design, operation, management and maintenance of transportation systems.

REMARKS

a. *Admission requirement(s):*

A National Diploma: Engineering: Civil or an NQF Level 6 (old NQF and the new HEQF) qualification in Civil Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

As from 2013, apart from meeting the above requirements, a candidate must have obtained a 60% aggregate in Documentation III and Transportation Engineering II and III.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered, based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

b. *Selection criteria:*

Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.



- c. *Minimum duration:*
One year
- d. *Presentation:*
Block-based classes offered over a period of two years.
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

Please note:

Students must pass eight subjects. A minimum of five compulsory subjects in their particular field of specialisation should be taken, with the balance made up of subjects offered in the other fields of specialisation. Optional/elective subjects taken from the other fields must be closely related/relevant to the qualification. Subjects are offered as determined by the Head of the Department. The total credits of the Level IV subjects may not be less than 0,500.

Students who register for the subject: Construction Materials Technology IV are not permitted to register for Concrete Technology IV or Asphalt Technology IV.

ATTENDANCE

FIRST SEMESTER (2012)

CODE	SUBJECT	CREDIT
GDE401T	Geometric Design IV	(0,125)

SECOND SEMESTER (2012)

CCN401T	Concrete Technology IV	(0,125)
TFE401T	Traffic Engineering IV	(0,125)

FIRST SEMESTER (2013)

TSP401T	Transportation Planning IV	(0,125)
TTN401T	Transportation Technology IV	(0,125)

SECOND SEMESTER (2013)

AHT401T	Asphalt Technology IV	(0,125)
PTY401T	Pavement Technology IV	(0,125)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**



4.9 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: URBAN ENGINEERING

Qualification code: BTUB02

Campus where offered: Pretoria Campus

Specialist purpose of the qualification:

A practitioner in urban engineering combines the elements of environmental engineering, water engineering and transportation engineering.

REMARKS

a. *Admission requirement(s):*

A National Diploma: Engineering: Civil or an NQF Level 6 (old NQF and the new HEQF) qualification in Civil Engineering (or a closely related field) obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

As from 2013, apart from meeting the above requirements, a candidate must have obtained a 60% aggregate in Documentation III and Transportation Engineering II and III.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered, based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

b. *Selection criteria:*

Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.

c. *Minimum duration:*

One year

d. *Presentation:*

Block-based classes offered over a period of two years.

e. *Intake for the qualification:*

January and July

f. *Readmission:*

See Chapter 3 of the Students' Rules and Regulations.

g. *Accreditation by professional body:*

This qualification has been accredited by the Engineering Council of South Africa (ECSA).

h. *Subject credits:*

Subject credits are shown in brackets after each subject.



Please note:

Students must pass eight subjects. A minimum of five compulsory subjects in their particular field of specialisation should be taken, with the balance made up of subjects offered in the other fields of specialisation. Optional/elective subjects taken from the other fields must be closely related/relevant to the qualification. Subjects are offered as determined by the Head of the Department. The total credits of the Level IV subjects may not be less than 0,500.

Students who register for the subject: Construction Materials Technology IV are not permitted to register for Concrete Technology IV or Asphalt Technology IV.

ATTENDANCE

FIRST SEMESTER (2012)

CODE	SUBJECT	CREDIT
GDE401T	Geometric Design IV	(0,125)
KMT401T	Construction Materials Technology IV	(0,125)

SECOND SEMESTER (2012)

SWM401T	Solid Waste Management IV	(0,125)
UPD401T	Urban Planning and Design IV	(0,125)

FIRST SEMESTER (2013)

No subjects will be presented in this field of specialisation in this semester.

SECOND SEMESTER (2013)

PTY401T	Pavement Technology IV	(0,125)
RDA401T	Reticulation Design and Management IV	(0,125)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

4.10 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: WATER ENGINEERING

Qualification code: BTCW02

Campus where offered: Pretoria Campus

Specialist purpose of the qualification:

To become a competent civil engineering technologist. The qualified graduate will be able to provide water engineering expertise in the planning, design, construction and maintenance team of a civil engineering-related project.

REMARKS

a. *Admission requirement(s):*

A National Diploma: Engineering: Civil or an NQF Level 6 (old NQF and the new HEQF) qualification in Civil Engineering (or a closely related field) obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

As from 2013, apart from meeting the above requirements, a candidate must have obtained a 60% aggregate in Water Engineering II and III.



National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered, based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Block-based classes offered over a period of two years.
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of the Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

Please note:

Students must pass eight subjects. A minimum of five compulsory subjects in their particular field of specialisation should be taken, with the balance made up of subjects offered in the other fields of specialisation. Optional/elective subjects taken from the other fields must be closely related/relevant to the qualification. Subjects are offered as determined by the Head of the Department. The total credits of the Level IV subjects may not be less than 0,500.

Students who register for the subject Construction Materials Technology IV are not permitted to register for Concrete Technology IV or Asphalt Technology IV.

ATTENDANCE

FIRST SEMESTER (2012)

CODE	SUBJECT	CREDIT
HDL401T	Hydraulics IV	(0,125)
HYD401T	Hydrology IV	(0,125)

SECOND SEMESTER (2012)

IRR401T	Irrigation IV	(0,125)
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FIRST SEMESTER (2013)

WTT401T	Water Treatment Technology IV	(0,125)
WWT401T	Wastewater Treatment Technology IV	(0,125)

SECOND SEMESTER (2013)

PDE401T	Principles of Dam Engineering IV	(0,125)
RDA401T	Reticulation Design and Management IV	(0,125)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

4.11 MAGISTER TECHNOLOGIAE: ENGINEERING: CIVIL Qualification code: MTCI95

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Civil or an NQF Level 7 qualification in Civil Engineering (or a related field) obtained from a South African university.
- Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of one year and a maximum of three years.
- d. *Presentation:*
Research
- e. *Intake for the qualification:*
January and July
- f. *Content:*
This programme comprises a research project with a dissertation, subject to the candidate having already passed Research Methodology. In the dissertation, the candidates should prove that they understand a particular problem in the industry to which their research applies and are able to analyse it, set it out logically, arrive at logical conclusions or a diagnosis and make proposals for improvements or the elimination of the problem. The dissertation should comply with the usual general technical requirements and rules regarding scope, quality and layout.
- g. *Other requirement(s):*
Candidates who apply for admission to this qualification must provide the Head of the Department with a protocol (research proposal) for discussion.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.



CODE	SUBJECT	CREDIT
CVE500T	Dissertation: Engineering: Civil	(1,000)
CVE500R	Dissertation: Engineering: Civil (re-registration)	(0,000)
CVE501R	Dissertation: Engineering: Civil (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000

4.12 DOCTOR TECHNOLOGIAE: ENGINEERING: CIVIL Qualification code: DTC196

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Magister Technologiae: Engineering: Civil or an NQF Level 8 qualification in Civil Engineering (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of two years and a maximum of five years.
- d. *Presentation:*
Research
- e. *Intake for the qualification:*
January and July
- f. *Content:*
This programme comprises an advanced research project with a thesis. The thesis should provide proof of the students' original creative thinking and problem-solving abilities, and prove that they can make a real contribution in solving a particular problem in the industry to which the research applies. The dissertation should comply with the usual general technical requirements and rules regarding scope, quality and layout.
- g. *Other requirement(s):*
Candidates who apply for admission to this qualification must provide the Head of the Department with a protocol (research proposal) for discussion.

CODE	SUBJECT	CREDIT
CVE700T	Thesis: Engineering: Civil	(2,000)
CVE700R	Thesis: Engineering: Civil (re-registration)	(0,000)
CVE701R	Thesis: Engineering: Civil (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		2,000



5. DEPARTMENT OF ELECTRICAL ENGINEERING

5.1 PERSONNEL INFORMATION

On 9 September 2011, this department had the following staff members:

Head of Department: Prof AA Jimoh - PhD (Engineering) (Electrical) (McMaster University, Canada)

Telephone numbers: 012 382 5737/4820/5012

Departmental Administrators: Ms O Mahlo and Ms B Msiza

NAME	POST DESIGNATION	HIGHEST GENERIC QUALIFICATION(S)
Mr R Abdoola	Lecturer	M Tech (Engineering) (Electrical) (Digital Technology) (TUT), MSc (Electronic Engineering) (ESIEE Paris, France)
Mrs BT Abe	Lecturer (eMalahleni Campus)	MEng (Engineering) (Electrical) (Federal University of Technology, Akure, Nigeria)
Mr TA Adegbola	Lecturer	M Tech (Engineering) (Mechanical) (TUT), MSc (Systems Engineering) (Lagos University)
Prof JT Agee	Associate Professor	PhD (Control Systems) (Abubakar Tafawa Balewa University, Bauchi, Nigeria)
Dr AO Akumu	Senior Lecturer	DEng (High Voltage Engineering) (Ehime University) (Japan)
Mr RC Aylward	Principal Lecturer	M Tech (Engineering) (Electrical) (Digital Technology) (TUT)
Mr L Botha	Senior Lecturer	B Tech (Engineering) (Electrical) (TUT)
Dr NP Cele	Senior Lecturer	DPhil (Physics) (Material Sciences) (University of Zululand)
Mr AC de Villiers	Lecturer	BEng (Hons) (RF and Electromagnetism) (UP)
Mr J de Vries	Technician	M Tech (Engineering) (Electrical) (Digital Technology) (TUT)
Prof OD Dintchev	Principal Lecturer	MSc (Electrical) (Wits)
Prof K Djouani	Professor	PhD (Control) (Paris XII University, Paris, France)
Mr GS Donev	Senior Lecturer	MEng (Engineering) (Electrical) (Bulgaria)
Ms H Drew	Departmental Administrator (F'SATI/ Postgraduate)	B Tech (Office Management and Technology) (TUT)
Mr PJ Ehlers	Senior Lecturer (eMalahleni Campus)	BEng (Hons) (Engineering) (Electrical) (UP)
Mr HD Esterhuizen	Senior Lecturer	M Tech (Engineering) (Electrical) (Tech Pta)
Prof Y Hamam	Scientific Director (F'SATI)	PhD (Electrical Engineering) (University of Manchester) (UK)
Mr JH Hofmeyr	Lecturer	B Tech (Engineering) (Electrical) (High-Frequency Technology) (TUT)
Dr JA Jordaan	Senior Lecturer (eMalahleni Campus)	D Tech (Engineering) (Electrical) (TUT)
Mr AB Khalaf	Senior Lecturer	M Tech (Engineering) (Electrical) (Clinical Engineering) (TUT)
Mr J Khumalo	Power Technician (eMalahleni Campus)	N Dip (Engineering) (Electrical) (TUT)



Mr LJJ Kruger	Technician	N Dip (Engineering) (Electrical) (Process Instrumentation) (Tech Pta)
Mr AM Kurien	Section Head (DEE) and Deputy Director (F'SATI)	M Tech (Engineering) (Electrical) (Telecommunication Technology) (Tech Pta/ F'SATIE)
Mr H Le Roux	Technician	B Tech (Engineering) (Electrical) (Digital Technology) (TUT)
Mr JJ Louw	Senior Lecturer	MBA (Technical Management) (UP)
Mr LA Makwange	Lecturer	N Dip (Engineering) (Electrical) (Cape Peninsula Tech)
Mr E Malan	Section Head and Lecturer	B Tech (Engineering) (Electrical) (TUT)
Mr L Malatjie	Technician	B Tech (IT) (Software Development) (TUT)
Mr MXSD Mankazana	Lecturer	NH Dip (Engineering) (Electrical) (Cape Peninsula Tech)
Mr DT Matshiba	Lecturer	B Tech (Engineering) (Electrical) (TUT)
Mr L Matsho	Technical Assistant	Grade 10
Mr GL Moepi	Technician	N Dip (Engineering) (Computer Systems) (TNG)
Ms V Mokgokong	Administrative Assistant	Senior Certificate
Mr TA Mokoena	Lecturer	B Tech (Engineering) (Electrical) (Telecommunication Technology) (Tech Pta)
Mr MC Mostert	Lecturer	B Tech (Engineering) (Electrical) (TUT)
Mr AJJ Mouton	Senior Lecturer	M Tech (Engineering) (Electrical) (Digital Technology) (TUT)
Mr W Mubatanhema	Lecturer (eMalahleni Campus)	MSc (System, Control and Power Engineering) (Osaka University, Japan)
Prof JL Munda	Associate Professor and Director (Centre for Energy and Electric Power)	DEng (Engineering) (Electrical) (Ryukyu, Japan)
Prof M Mzyece	Associate Professor	PhD (Electronic and Electrical Engineering) (University of Strathclyde, Glasgow, Scotland)
Prof DV Nicolae	Associate Professor	D Tech (Engineering) (Electrical) (VUT)
Mr HJ Nel	Technician	N6 Cert (Electrician) (Technical College) (Olifantsfontein)
Mr FA Nnachi	Lecturer (Mbombela Campus)	M Tech (Electrical Engineering) (TUT), MSc (Electrical Engineering) (ESIEE Paris) (FSATIE)
Mr GPA Noel	Lecturer	MSc (Telecommunications) (ENST, Paris, France)
Mr Ntsandeni	Lecturer	B Tech (Engineering) (Electrical) (Telecommunication Technology) (Wits Tech), MBA (TUT)
Mr T Okhai	Lecturer	M Tech (Engineering) (Electrical) (Clinical) (TUT)
Mr LI Onwuegbuna	Lecturer	MSc (Electromagnetic) (Wits)
Mr OJ Oyedapo	Lecturer	MSc (Electronics) (UP)
Mr C Pietersen	Electronic Technician (eMalahleni Campus)	N Dip (Engineering) (Electrical) (TUT)
Mr O Popoola	Energy Project Engineer (Centre for Energy and Electric Power)	M Tech (Engineering) (Electrical) (TUT)



Mr JC Pretorius	Section Head and Lecturer (Mbombela Campus)	BEng (Hons) (Electrons) (UP)
Prof G Qi	Associate Professor	PhD (Control Theory and Control Engineering) (Nankai University, China)
Mr CG Richards	Section Head and Lecturer (eMalahleni Campus)	MSc (Electronic Engineering) (<i>École Supérieure d'Ingénieurs en Électronique et Électrotechnique</i>) (Paris)
Prof FLL Rocaries	Director (F'SATI)	PhD (Civil Engineering) (Université de Perpignan, France)
Mr J Sebastian	Lecturer	BEng (Hons) (Micro-Electronic) (UP)
Mr NL Sebothoma	Lecturer	NH Dip (Engineering) (Electrical) (Vaal Triangle Tech)
Ms M Seleke	Departmental Administrator	N Dip (Marketing) (Unibo)
Mr S Sewpersad	Technician	N Dip (Engineering) (Electrical) (Digital Technology) (Tech Pta)
Mr DR Shongwe	Technician	N Dip (Engineering) (Electrical) (TNT)
Mr A Sibanda	Lecturer	M Phil (Electronics Engineering) (NUST, Zimbabwe)
Mr M Siti	Lecturer	MSc (Electrical) (UP)
Ms MJ Smit	Senior Financial Controller	N Dip (Internal Auditing) (Tech Pta)
Prof LW Snyman	Professor	PhD (Physics) (UPE)
Mr N Steyn	Lecturer	M Tech (Engineering) (Electrical) (Process Instrumentation) (TUT)
Mr GM Strydom	Senior Lecturer (eMalahleni Campus)	BSc (Engineering) (Electrical) (UP), Pr Ing
Ms H Swanepoel	Departmental Administrator (F'SATI/ Postgraduate)	B Tech (Office Management and Technology) (TUT)
Ms Y Sun	Lecturer	MSc (Measurement Technology and Automatic Devices) (Tianjin University of Science and Technology)
Mr S Themba	Lecturer	B Tech (Engineering) (Electrical) (TUT)
Mr IT Toudjeu	Lecturer	M Tech (Electrical Engineering) (TUT), MSc (Electronic Engineering) (ESIEE)
Mr P Tshubwana	Junior Lecturer (eMalahleni Campus)	B Tech (Engineering) (Electrical) (Power Engineering) (TUT)
Mr CP van der Merwe	Lecturer	BSc (Engineering) (Electrical) (Electrotechnical Engineering) (UP)
Mr JM van Dyk	Technician	NTD (Centurion Technical College)
Ms M van Niekerk	Departmental Administrator (eMalahleni Campus)	N Dip (Office Management and Technology) (TUT)
Ms C Viljoen	Departmental Assistant (Mbombela Campus)	N Dip (Office Management and Technology) (Tech Pta)
Mr AJ Visser	Lecturer	MSc (Engineering) (Electrical) (University of Stellenbosch)
Mr DP Zikalala	Junior Lecturer	B Tech (Engineering) (Electrical) (Power Engineering) (TUT)



Mr T Wanjekeche	Lecturer (eMalaheni Campus)	MSc (Engineering) (Electrical) (University of China)
Mr A Whiteford	Technical Assistant	N Dip (Engineering) (Electrical) (Clinical) (TUT)
Mr CS Xayimpi	Assistant Technician	N Dip (Engineering) (Electrical) (WSU)
Mr AA Yusuff	Lecturer	MSc (Electrical Engineering) (Lagos University, Nigeria)

OFFERING OF QUALIFICATIONS

On completion of three years of study (two years theoretical and one year practical), the student will receive the National Diploma: Engineering: Electrical. Detailed descriptions of careers related to each specialisation field are given. The National Diploma includes an experiential learning component in industry through appropriate cooperative agreements with specific companies in the industrial and service sectors in South Africa.

After completing a further year of study, the Baccalaureus Technologiae: Engineering: Electrical will be awarded. Provision is made for students to orient themselves towards a particular field of specialisation.

Students can enrol for various postgraduate degrees at the Magister Technologiae (research and structured) and Doctor Technologiae level. The Graduate School in Electrical and Electronic Engineering (GSEEE) currently coordinates all postgraduate qualifications (M Tech, MSc, D Tech) and it is managed by the Department of Electrical Engineering. A Master of Science (MSc) in Electronics and a Master of Science (MSc) in Power Engineering is also offered in association with ESIEE, Paris and Amiens respectively, both in France. Credits can be obtained towards these degrees while being enrolled for the Magister and Doctor Technologiae in Electrical Engineering at TUT. Simultaneous credits (double accreditation) can thus be obtained for some qualifications at this level.

5.2 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL

Qualification code: NDEE12

Campus where offered: eMalaheni and Pretoria Campuses

REMARKS

a. *Admission requirement(s) and selection criteria:*

• **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with D symbols (50 – 59%) at the Higher Grade or C symbols (60 – 69%) at the Standard Grade for English and Mathematics and an E symbol (40 – 49%) at the Higher Grade or a D symbol (50 – 59%) at the Standard Grade for Physical Science.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test, to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.



- **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:**

Admission requirement(s):

A National Senior Certificate with an endorsement of a bachelor's degree or a diploma or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Candidates who do not meet the requirements for Mathematics and/or Physical Sciences may enrol for Mathematics N4 and/or Engineering Sciences N4 at any further education and training (FET) college, and if these are successfully passed at a performance level of at least 60%, they may reapply for admission to the University.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least 23.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test, to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission into the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

- **FOR STUDENTS WHO OBTAINED A QUALIFICATION FROM FURTHER EDUCATION AND TRAINING (FET) COLLEGES:**

CANDIDATES WHO MEET THE FOLLOWING MINIMUM REQUIREMENTS WILL BE CONSIDERED FOR ADMISSION TO THE NATIONAL DIPLOMA:

Candidates with a National Certificate (Vocational) at NQF Level 4:

A National Certificate (Vocational) at Level 4 with at least a competent (50%) achievement for English and Mathematics and at least (60%) for Physical Sciences.

Candidates with a National N Certificate (Nated 191: N3/N4 courses) at NQF Level 4/5:

A National N Certificate at Level 4/5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Candidates with a National N Certificate (Nated 191: N5/N6 courses) at NQF Level 5:

A National N Certificate at Level 5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Applicants may also apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain subjects credits for equivalent Engineering subjects (including Mathematics and Engineering Science) successfully passed at N5/N6 level with at least a 60% achievement.

Candidates with a National N Diploma (Nated 191: N6 with a Trade Certificate) at NQF Level 6:

A National N Diploma (Nated 191: N6 with a Trade Certificate) with at least a 50% achievement for all subjects completed on N4/N5/N6 Certificates at NQF Level 5 (including Mathematics and Engineering Science).



Candidates will be exempted from all subjects on NQF Level 5 of the National Diploma (Semester 1 and 2) that amount to 50% of the qualification, and they will also be exempted from Experiential Learning I on submission of the Trade Certificate at NQF Level 5/6.

Applicants must apply for Recognition of Prior Learning (subject RPL) at the Office of the Registrar to obtain credits for equivalent engineering subjects. Applicants will enrol and complete the other 50% of the diploma, and graduate with a diploma from the Tshwane University of Technology.

- **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**
 - Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits that were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
 - Enrol for existing diploma (semester courses) and request exemption from subjects at the Office of the Registrar for equivalent T-course credits that were obtained from any other technikon in South Africa.
 - i. If the number of exemptions of subjects on the existing diploma (T-course) is equal or less than 50% of the total credits for the existing diploma, the applicant will have to complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma, the applicant may apply for RPL status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology programme that will commence in 2013. Applicants must apply at least six (6) months prior to admission.
- b. *Minimum duration:*
Three years
- c. *Presentation:*
Day or evening classes, subject to a sufficient number of students.
- d. *Intake for the qualification:*
January and July
- e. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- f. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- g. *Government Certificate of Competence:*
See Section A3 of this publication. **Please note:** Students will be required to register for the additional Mechanical subjects as a secondary registration. Please confirm with the Head of the Department before registration.
- h. *Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- i. *Predicate marks for exam subjects:*
An average predicate mark of 40% is required in order for a student to be admitted to write the main examination.

The predicate mark will consist of a weighted combination of the following different assessments with minimum requirements:

- At least two semester tests with a minimum average of 40%
- Practical work and/or experiments with a minimum average of 50%
- Class tests
- Assignments



- j. **Practicals:**
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- k. **Subject credits:**
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.
- Key to asterisks:
* MEQ33XT and MEQ33YT must be taken concurrently and will count as one subject.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
FIRST SEMESTER			
COS101T	Communication Skills I	(0,050)	
CSK101C	Computer Skills I	(0,050)	
EEN111T	Electrical Engineering I	(0,100)	
ELC111T	Electronics I	(0,100)	
ESL111T	Engineering Science I	(0,100)	
MAT171T	Mathematics I	(0,100)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	
SECOND SEMESTER			
DSY131T	Digital Systems I	(0,100)	
EEN211T	Electrical Engineering II	(0,100)	Electrical Engineering I or Electrical Engineering (Extended) I
ELC211T	Electronics II	(0,100)	Electronics I or Electronics (Extended) I
MAT271T	Mathematics II	(0,100)	Mathematics I or Mathematics (Extended) I
SFD201T	Software Design II	(0,100)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE FIRST YEAR:		1,000	

SECOND YEAR

EXP1EEH	Experiential Learning I		
EXP1EPT	Experiential Learning: Workshop I	(0,050)	
FIRST SEMESTER			
DSY231T	Digital Systems II	(0,100)	Digital Systems I
MAT351T	Mathematics III	(0,100)	Mathematics II
plus one of the following subjects			
EEN311T	Electrical Engineering III	(0,100)	Electrical Engineering II
ELC331T	Electronics III	(0,100)	Electronics II



plus one of the following subjects (consult the subject selection guide at the end of this qualification). Subjects are offered at the learning site determined by the department:

BIS101T	Bio-Systems I	(0,100)	
EMA241T	Electrical Machines II	(0,100)	Electrical Engineering II
ETC221T	Electronic Communication II	(0,100)	Electronics II
PCM221T	Process Instrumentation II	(0,100)	Engineering Science I or Engineering Science (Extended) I

plus one of the following subjects consult the subject selection guide at the end of this qualification). Subjects are offered at the learning site determined by the department:

ELD331T	Electrical Distribution III	(0,100)	Electrical Engineering II
MEQ211T	Medical Equipment II	(0,100)	
SFD301T	Software Design III	(0,100)	Software Design II

TOTAL CREDITS FOR THE SEMESTER: 0,550

SECOND SEMESTER

One of the following modules:

DPJ301T	Design Project III		
DPJ30YT	Design Project: Light Current III	(0,100)	Digital Systems II Electronics III
DPJ30ZT	Design Project: Heavy Current III	(0,100)	Electrical Engineering III Electronics II

plus one of the following subjects consult the subject selection guide at the end of this qualification). Subjects are offered at the learning site determined by the department:

CSY321T	Control Systems III	(0,100)	Mathematics III
MWC301T	Microwave Communication III	(0,100)	Electronic Communication II

plus one of the following subjects consult the subject selection guide at the end of this qualification). Subjects are offered at the learning site determined by the department:

DSY341T	Digital Systems III	(0,100)	Digital Systems II
EMA341T	Electrical Machines III	(0,100)	Electrical Machines II
RAE311T	Radio Engineering III	(0,100)	Electronic Communication II

plus one of the following subjects consult the subject selection guide at the end of this qualification). Subjects are offered at the learning site determined by the department:

EPC321T	Electrical Protection III	(0,100)	Electrical Engineering II
ETC301T	Electronic Communication III	(0,100)	Electronic Communication II
MEQ331T	Medical Equipment III		
MEQ33XT	Medical Equipment: Equipment III*	(0,100)	Bio-Systems I Digital Systems II Medical Equipment II
PCM321T	Process Instrumentation III	(0,100)	Process Instrumentation II



plus one of the following subjects consult the subject selection guide at the end of this qualification). Subjects are offered at the learning site determined by the department:

LOD311T	Logic Design III	(0,100)	Digital Systems II
MEQ331T	Medical Equipment III		
MEQ33YT	Medical Equipment: Systems III*	(0,100)	Bio-Systems I Digital Systems II Medical Equipment II
PWE311T	Power Electronics III	(0,100)	Electronics II
TLV311T	Television III	(0,100)	Electronic Communication II
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE SECOND YEAR:		1,050	

THIRD YEAR

FIRST SEMESTER

EXP1EEH	Experiential Learning I		
EXP1EYT	Experiential Learning: Practice I	(0,450)	
TOTAL CREDITS FOR THE SEMESTER:		0,450	

SECOND SEMESTER

EXP2EEH	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE THIRD YEAR:		0,950	

SUBJECT SELECTION GUIDE

To orient to a specific field in Electrical Engineering, the following is a guide to the optional subjects (timetable will give priority to subjects as set out in the subject selection guide):

- **CLINICAL ENGINEERING**

Field description:

A career in clinical engineering relates to the maintenance, implementation and management of electrical and electronic equipment used in hospitals for the medical care and treatment of patients. The career involves 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.

FIRST SEMESTER

Digital Systems II, Mathematics III, Bio-Systems I, Electronics III, Medical Equipment II.

SECOND SEMESTER

Design Project, Control Systems III, Digital Systems III, Medical Equipment: Equipment III and Medical Equipment: Systems III.

- **DIGITAL TECHNOLOGY**

Field description:

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 the 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.



FIRST SEMESTER

Digital Systems II, Mathematics III, Electronic Communication II, Electronics III, Software Design III.

SECOND SEMESTER

Design Project, Control Systems III, Digital Systems III, Electronic Communication III, Logic Design III.

- **ELECTRONIC ENGINEERING**

Field description:

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.

FIRST SEMESTER

Digital Systems II, Mathematics III, Electronic Communication II, Electronics III, Software Design III.

SECOND SEMESTER

Design Project, Control Systems III, Digital Systems III, Electronic Communication III and Power Electronics III.

- **POWER ENGINEERING**

Field description:

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.

FIRST SEMESTER

Digital Systems II, Mathematics III, Electrical Distribution III, Electrical Engineering III, Electrical Machines II.

SECOND SEMESTER

Design Project, Control Systems III, Electrical Machines III, Electrical Protection III, Power Electronics III.

- **PROCESS INSTRUMENTATION**

Field description:

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.

FIRST SEMESTER

Digital Systems II, Mathematics III, Electronics III, Process Instrumentation II, Software Design III.

SECOND SEMESTER

Design Project, Control Systems III, Digital Systems III, Power Electronics III and Process Instrumentation III.

- **TELECOMMUNICATION ENGINEERING**

Field description:

Students who have completed their studies will be skilled and competent in the marketing, development and repair of electronic systems for the world market. Students will also be able to design, program, integrate, implement, commission and maintain 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, cell phone companies and telematic design companies.



FIRST SEMESTER

Digital Systems II, Mathematics III, Electronic Communication II, Electronics III, Software Design III.

SECOND SEMESTER

Design Project, Electronic Communication III, Microwave Communication III, Radio Engineering III and Television III.

- **OWN CHOICE**

Please note: Students who choose this option must ensure that their subject choices will enable them to do the Baccalaureus Technologiae: Engineering: Electrical, should they wish to.

Description:

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 desired new specialisation fields 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.

FIRST SEMESTER

Digital Systems II, Mathematics III, Electronic III or Electrical Engineering III and two subjects from those provided in the optional subject list for year two, semester one.

SECOND SEMESTER

Design Project and any four subjects from those provided in the optional subject list for year two, semester two.

5.3 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION) Qualification code: NDEEF2

Campus where offered: eMalahleni and Pretoria campuses

REMARKS

- Admission requirement(s) and selection criteria:*
See qualification NDEE12.
- Minimum duration:*
Three and a half years
- Presentation:*
Day classes
- Intake for the qualification:*
January only
- Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- Additional costs:*
While it is the University's policy to keep class fees and additional costs as low as possible, it should be stated that students will be expected to supply and purchase their own writing paper, pencils and pens, the required textbooks, multimeters, breadboards and calculators. Personal computers are highly recommended.
- Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.



- h. *Predicate marks for exam subjects:*
An average predicate mark of 40% is required in order for a student to be admitted to write the main examination.
- The predicate mark will consist of a weighted combination of the following different assessments with minimum requirements:
- At least two semester tests with a minimum average of 40%
 - Practical work and/or experiments with a minimum average of 50%
 - Class tests
 - Assignments
- i. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- j. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

FIRST YEAR

CODE	SUBJECT	CREDIT
FPCOS03	Communication Skills (Extended) I	(0,050)
FPCSK02	Computer Skills (Extended) I	(0,050)
FPEEN01	Electrical Engineering (Extended) I	(0,100)
FPELC01	Electronics (Extended) I	(0,100)
FPESL01	Engineering Science (Extended) I	(0,100)
FPMAT04	Mathematics (Extended) I	(0,100)

TOTAL CREDITS FOR THE FIRST YEAR: **0,500**

Students will be required to pass all core first-year extended subjects, namely Mathematics (Extended) I, Electrical Engineering (Extended) I and Electronics (Extended) I, before they will be allowed to continue with any second-semester subjects.

As from the second year, students will continue with the subjects of the second semester of the qualification NDEE12. Please note: Students will still register for the qualification code NDEEF2 until they have completed the qualification.

5.4 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: ELECTRICAL Qualification code: BTEE01

Campuses where offered: eMalaheni and Pretoria campuses

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Engineering: Electrical or a NQF Level 6 (old NQF and the new HEQF) qualification in Electrical Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding, may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).



Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty and academic department reserve the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
eMalahleni Campus (evening classes offered over a period of two years).
Pretoria Campus (one year of day classes or two years of block-based classes on Saturdays).
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Recommendation:*
It is recommended that the student register for this qualification at the beginning of the academic year, work on his or her project proposal and theoretical background study, and only commence with the practical part of the qualification in the second semester (on completion of the four theoretical subjects in the first semester).
- i. *Re-registration:*
A student may re-register for the subject Industrial Project IV only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the Project only and not to re-do it when it is failed.
- j. *Subject credits:*
Subject credits are shown in brackets after each subject.

Key to asterisks:

* Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005.)

** MEQ40XT and MEQ40YT must be taken concurrently and will count as one subject.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST OR SECOND SEMESTER

The subjects below are offered in semesters, as determined by the Department.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
EGM411T	Engineering Management IV	(0,100)	
EMT451T	Engineering Mathematics IV	(0,100)	Mathematics III
IPR413T	Industrial Project IV	(0,300)	Design Project III
IPR413R	Industrial Project IV (re-registration)	(0,000)	Industrial Project IV



plus one of the following subjects:

CSY401T	Control Systems IV	(0,100)	Control Systems III
SPR401T	Signal Processing IV	(0,100)	Mathematics III

plus four of the following subjects (to orient to a specific field in Electrical Engineering, students should consult the subject selection guide at the end of this qualification). Subjects are offered at the location determined by the Department:

CNW401T	Computer Networks IV	(0,100)	
CSY401T	Control Systems IV (if not already passed)	(0,100)	Control Systems III
CTM401T	Clinical Engineering Technology Management IV	(0,100)	
DCS401T	Digital Control Systems IV	(0,100)	Control Systems IV Engineering Mathematics IV
DSP401T	Digital Signal Processing IV	(0,100)	Signal Processing IV
ELC411T	Electronics IV	(0,100)	Electronics III
EMA411T	Electrical Machines IV	(0,100)	Electrical Machines III
ENT401B	Entrepreneurship IV	(0,100)*	
EPC401T	Electrical Protection IV	(0,100)	Electrical Protection III
ETC401T	Electronic Communication IV	(0,100)	Signal Processing IV
HVE401T	High-Voltage Engineering IV	(0,100)	Electrical Engineering III
MCS401T	Micro-Controller Systems IV	(0,100)	
MEQ401T	Medical Equipment IV		
MEQ40XT	Medical Equipment: Equipment IV**	(0,100)	Medical Equipment: Equipment III
MEQ40YT	Medical Equipment: Systems IV**	(0,100)	Medical Equipment: Systems III
MSD401T	Microsystems Design IV	(0,100)	
MWE401T	Microwave Engineering IV	(0,100)	
NMS401T	Numerical Methods and Statistics IV	(0,100)	Mathematics III
NSY401T	Network Systems IV	(0,100)	
OET401T	Opto-Electronics IV	(0,100)	Electronics III
PCM401T	Process Instrumentation IV	(0,100)	Process Instrumentation III
PWE411T	Power Electronics IV	(0,100)	Power Electronics III
PWS401T	Power Systems IV	(0,100)	Electrical Engineering III
RAE411T	Radio Engineering IV	(0,100)	Radio Engineering III
SCO401T	Satellite Communications IV	(0,100)	
SFE401T	Software Engineering IV	(0,100)	
SPR401T	Signal Processing IV (if not already passed)	(0,100)	Mathematics III
TVE401T	Television Engineering IV	(0,100)	Television III
TOTAL CREDITS FOR THE QUALIFICATION:		1,000	

SUBJECT SELECTION GUIDE

To orient to a specific field in Electrical Engineering, the following is a guide to the optional subjects:

- **CLINICAL ENGINEERING**
Clinical Engineering Technology Management IV, Electronics IV, Medical Equipment: Equipment IV, Medical Equipment: Systems IV and Signal Processing IV.
- **DIGITAL TECHNOLOGY**
Control Systems IV or Signal Processing IV.

plus four of the following subjects:

Computer Networks IV, Control Systems IV, Digital Control Systems IV, Digital Signal Processing IV, Micro-Controller Systems IV, Microsystems Design IV, Microwave Engineering IV, Numerical Methods and Statistics IV, Network Systems IV, Opto-Electronics IV, Signal Processing IV and Software Engineering IV.



- **ELECTRONIC ENGINEERING**
Electronics IV and Signal Processing IV.

plus three of the following subjects:
Control Systems IV, Digital Control Systems IV, Digital Signal Processing IV, Entrepreneurship IV, Numerical Methods and Statistics IV and Opto-Electronics IV.
- **POWER ENGINEERING**
Control Systems IV.

plus four of the following subjects:
Electrical Machines IV, Entrepreneurship IV, Electrical Protection IV, High-Voltage Engineering IV, Numerical Methods and Statistics IV, Power Electronics IV and Power Systems IV.
- **PROCESS INSTRUMENTATION**
Control Systems IV and Process Instrumentation IV.

plus three of the following subjects:
Digital Control Systems IV, Digital Signal Processing IV, Electronics IV, Entrepreneurship IV, Numerical Methods and Statistics IV, Network Systems IV, Opto-Electronics IV, Signal Processing IV and Software Engineering IV.
- **TELECOMMUNICATION TECHNOLOGY**
Electronic Communication IV and Signal Processing IV.

plus three of the following subjects:
Computer Networks IV, Control Systems IV, Digital Control Systems IV, Digital Signal Processing IV, Electronics IV, Entrepreneurship IV, Micro-Controller Systems IV, Microsystems Design IV, Microwave Engineering IV, Numerical Methods and Statistics IV, Network Systems IV, Opto-Electronics IV, Radio Engineering IV, Satellite Communications IV and Software Engineering IV.
- **OWN CHOICE**
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 a student who has completed his or her studies to be skilled and competent in a stream leading to desired new specialisation field as required by their industry. Possible employers are those companies using cutting-edge technologies such as electronic system companies, power electronic and power application companies that operate in all electrical engineering fields.

Control Systems IV or Signal Processing IV plus four of the optional subjects from the optional subject list.

5.5 MAGISTER TECHNOLOGIAE: ENGINEERING: ELECTRICAL (Structured)

Qualification code: MTEES0

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Electrical with an aggregate of 60% for the final year of study with Engineering Mathematics IV and at least one of the following subjects: Signal Processing IV, and/or Control Systems IV, or an NQF Level 7 qualification in Electrical Engineering (or a related field) with an aggregate of 60% for the final year of study obtained from an accredited South African university.



Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

- b. *Recommended subject(s):*
Software Engineering IV and at least two specialisation subjects.
- c. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- d. *Minimum duration:*
A minimum of one year and a maximum of three years.
- e. *Presentation:*
Block-based classes
- f. *Intake for the qualification:*
January and July
- g. *Subject groups (fields of specialisation):*
Students will be given a choice of one of the following subject groups:
 - Control and image Processing
 - Power Engineering
 - Telecommunication Technology
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.
- i. *Articulation to MSc qualifications:*
Articulation to the MSc programme offered in partnership with ESIEE (France) and Managed by F'SATIE at the Tshwane University of Technology may be done. Please contact the Head of the Department for further details.

Key to asterisks:

- * Information does not correspond to information in Report 151.
(Deviations approved by the Senate in March 2009.)

SUBJECT GROUP 1: CONTROL AND IMAGE PROCESSING

FIRST OR SECOND SEMESTER

CODE	SUBJECT	CREDIT
CSY501T	Control Systems V	(0,100)
EAN501T	Engineering Analysis V	(0,100)
MII501T	Machine Intelligence V	(0,100)
RCS500T	Research Report: Engineering: Electrical: Control Systems V (year subject)	(0,500)
RCS500R	Research Report: Engineering: Electrical: Control Systems V (re-registration)	(0,000)
RCS501R	Research Report: Engineering: Electrical: Control Systems V (re-registration)	(0,000)
RMD501C	Research Methodology	(0,050)
SII501T	Scientific Computing V	(0,050)



plus one of the following subjects:

EDD501T	Embedded Systems V	(0,100)
IAS501T	Image Analysis Systems V	(0,100)
RTS501T	Real-Time Systems V	(0,100)
SEI501T	Special Topics I*	(0,100)

TOTAL CREDITS FOR SUBJECT GROUP 1: **1,000**

SUBJECT GROUP 2: POWER ENGINEERING

FIRST OR SECOND SEMESTER

CODE	SUBJECT	CREDIT
CVS501T	Conversion Systems V	(0,100)
EAN501T	Engineering Analysis V	(0,100)
PWS501T	Power Systems V	(0,100)
RMD501C	Research Methodology	(0,050)
RPN500T	Research Report: Engineering: Electrical: Power Engineering V (year subject)	(0,500)
RPN500R	Research Report: Engineering: Electrical: Power Engineering V (re-registration)	(0,000)
RPN501R	Research Report: Engineering: Electrical: Power Engineering V (re-registration)	(0,000)
SII501T	Scientific Computing V	(0,050)

plus one of the following subjects:

CSY501T	Control Systems V	(0,100)
EEM501T	Electrical Machines and Drives V	(0,100)
EGS501T	Energy Systems and Technology V	(0,100)
PWN501T	Power Analysis V	(0,100)
SEI501T	Special Topics I*	(0,100)

TOTAL CREDITS FOR SUBJECT GROUP 2: **1,000**

SUBJECT GROUP 3: TELECOMMUNICATION TECHNOLOGY

FIRST OR SECOND SEMESTER

CODE	SUBJECT	CREDIT
DCO501T	Digital Communications V	(0,100)
EAN501T	Engineering Analysis V	(0,100)
RET500T	Research Report: Engineering: Electrical: Telecommunication Technology V (year subject)	(0,500)
RET500R	Research Report: Engineering: Electrical: Telecommunication Technology V (re-registration)	(0,000)
RET501R	Research Report: Engineering: Electrical: Telecommunication Technology V (re-registration)	(0,000)
RMD501C	Research Methodology	(0,050)
SII501T	Scientific Computing V	(0,050)
TMM501T	Telecommunications V	(0,100)



plus one of the following subjects:

EDD501T	Embedded Systems V	(0,100)
HFS501T	High-Frequency Systems V	(0,100)
RTS501T	Real-Time Systems V	(0,100)
SEI501T	Special Topics I*	(0,100)

TOTAL CREDITS FOR SUBJECT GROUP 3: **1,000**

5.6 MAGISTER TECHNOLOGIAE: ENGINEERING: ELECTRICAL **Qualification code: MTEE95**

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Electrical or an NQF Level 7 qualification in Electrical Engineering (or related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of one year and a maximum of three years.
- d. *Presentation:*
Research
- e. *Dissertation:*
A student who applies for the Magister Technologiae: Engineering: Electrical has to submit a dissertation with a limited scope on an approved subject.

Research will be done in the following niche areas in Electrical Engineering:
- Clinical Engineering
- Control Engineering
- Electronics
- Power Engineering
- Telecommunication Engineering
- f. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
DEE500T	Dissertation: Engineering: Electrical	(1,000)
DEE500R	Dissertation: Engineering: Electrical (re-registration)	(0,000)
DEE501R	Dissertation: Engineering: Electrical (re-registration)	(0,000)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**



5.7 DOCTOR TECHNOLOGIAE: ENGINEERING: ELECTRICAL
Qualification code: DTEE96

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
 A Magister Technologiae: Engineering: Electrical or an NQF Level 8 qualification in Electrical Engineering (or a related field) obtained from a South African university.

 Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. *Selection criteria:*
 All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
 A minimum of two years and a maximum of five years.
- d. *Presentation:*
 Research
- e. *Intake for the qualification:*
 January and July
- f. *Thesis:*
 The Doctorate in Technology: Engineering: Electrical will be conferred on the basis of a thesis on an approved topic.

 Research will be done in the following niche areas in Electrical Engineering:
 - Clinical Engineering
 - Control Engineering
 - Electronics
 - Power Engineering
 - Telecommunication Engineering
- g. *Subject credits:*
 Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
DEE700T	Thesis: Engineering: Electrical	(2,000)
DEE700R	Thesis: Engineering: Electrical (re-registration)	(0,000)
DEE701R	Thesis: Engineering: Electrical (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		2,000



5.8 MSc (ELECTRONIC ENGINEERING)

Qualification code: PGEE04

Campus where offered: Pretoria Campus

REMARKS

Please note: This qualification is offered in partnership with the ESIEE (France) and is managed by F'SATIE at the Tshwane University of Technology. The degree is conferred by the ESIEE (France). The rules of the ESIEE thus apply to this qualification. Students are required to accumulate 90 ECTS (European Credit Transfer System) credits. Thirty ECTS credits are awarded for a research Magister Technologiae: Engineering: Electrical, which the student has to complete before the MSc can be conferred.

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Electrical with an aggregate of 60% for the final year of study with Engineering Mathematics IV and at least two of the following subjects: Signal Processing IV, Control Systems IV, Digital Control Systems IV and Digital Signal Processing IV, or an NQF Level 7 qualification in Electrical Engineering (or a related field) with an aggregate of 60% for the final year of study obtained from an accredited South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty of Engineering and the Built Environment reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

- b. *Recommended subject(s):*
Software Engineering IV and at least two specialisation subjects.
- c. *Selection criteria:*
Prospective students may be requested to pass an admission test. Admission depends on available space.
- d. *Minimum duration:*
Two years
- e. *Subject credits:*
Subject credits are shown in brackets after each subject.

ATTENDANCE

CODE	SUBJECT	ECTS CREDIT
ESI5001	Digital Communication V	(7,5)
ESI5002	Digital Electronics V	(7,5)
ESI5003	Digital Control V	(7,5)
ESI5004	Embedded Systems V	(7,5)
ESI5005	High-Frequency Systems V	(7,5)
ESI5006	Management V	(7,5)
ESI5007	French Language Skills	not applicable
ESI5008	Telecommunication Networks V	(7,5)
ESI5009	RF Design V	(7,5)
ESI5010	Advanced Control Systems V	(7,5)
ESI5011	Advanced Embedded Systems V	(7,5)
ESI5012	Image Analysis V	(7,5)
ESI5013	Machine Intelligence V	(7,5)
ESI5014	Real-Time Signal Processing V	(7,5)
ESI5021	Signal Theory V	(7,5)
ESI5022	Software Engineering V	(7,5)



ESI5023	Special Topics I	(7,5)
ESI5024	Special Topics II	(7,5)
ESI5025	Special Topics III	(7,5)
ESI5026	Scientific Computing V	(7,5)

5.9 MSc (POWER ENGINEERING)

Qualification code: PGPW07

Campus where offered: Pretoria Campus

REMARKS

Please note: This qualification is offered in partnership with the ESIEE (France) and is managed by F'SATIE at the Tshwane University of Technology. The degree is conferred by the ESIEE (France). The rules of the ESIEE thus apply to this qualification. Students are required to accumulate 90 ECTS (European Credit Transfer System) credits. Thirty ECTS credits are awarded for a research Magister Technologiae: Engineering: Electrical, which the student has to complete before the MSc can be conferred.

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Electrical with an aggregate of 60% for the final year of study with Engineering Mathematics IV and at least two of the following subjects: Signal Processing IV, Control Systems IV, Digital Control Systems IV and Digital Signal Processing IV, or an NQF Level 7 qualification in Electrical Engineering (or a related field) with an aggregate of 60% for the final year of study obtained from an accredited South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty of Engineering and the Built Environment reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. *Recommended subject(s):*
Software Engineering IV and at least two specialisation subjects.
- c. *Selection criteria:*
Prospective students may be requested to pass an admission test. Admission depends on available space.
- d. *Minimum duration:*
Two years
- e. *Subject credits:*
Subject credits are shown in brackets after each subject.

ATTENDANCE

CODE	SUBJECT	ECTS CREDIT
ESI5003	Digital Control V	(7,5)
ESI5004	Embedded Systems V	(7,5)
ESI5006	Management V	(7,5)
ESI5007	French Language Skills	not applicable
ESI5021	Signal Theory V	(7,5)
ESI5023	Special Topics I	(7,5)
ESI5024	Special Topics II	(7,5)
ESI5025	Special Topics III	(7,5)
ESI5026	Scientific Computing V	(7,5)
ESI5027	Conversion Systems V	(7,5)



6. DEPARTMENT OF GEOMATICS

6.1 PERSONNEL INFORMATION

On 9 September 2011, this department had the following staff members:

Head of Department: Vacant
Telephone numbers: 012 382 5211/5223

Departmental Administrator: Ms A Viljoen

NAME	POST DESIGNATION	HIGHEST GENERIC QUALIFICATION(S)
Mr JIP Bisschoff	Senior Lecturer	NH Dip (Management Practices) (Tech Pta), B Tech (Surveying) (Tech Pta)
Mr MA Kwinda	Lecturer	BAdmin (Hons) (Unisa), B Tech (Surveying) (TUT)
Mr IF Muzondo	Acting Sectional Head and Lecturer	MSc (GIS) (University of Zimbabwe), Dip (GIS) (University of Zimbabwe), BSc (Hons) (Surveying) (University of Zimbabwe), NH Dip (Higher Education and Training) (CPUT)
Ms LT Mokuia	Laboratory Technician	N Dip (Surveying) (Tech Pta)
Mr NK Neluembeni	Junior Lecturer	N Dip (Surveying) (TNG), B Tech (Transport) (Wits Tech)
Mr C Paradzayi	Lecturer	BSc (Hons) (Surveying) (University of Zimbabwe), MSc (Geomatics) (UCT)

6.2 NATIONAL DIPLOMA: SURVEYING

Qualification code: NDSU03

Campus where offered: Pretoria Campus

Purpose of the qualification:

The National Diploma: Surveying enables the student to determine the position of points on the surface of the earth with commensurate accuracy to produce maps and plans, to set out all aspects of building structures, dams, including roads, railways and canals.

REMARKS

a. Admission requirement(s) and selection criteria:

• FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:

Admission requirement(s):

For 2012: A Senior Certificate or an equivalent qualification, with D symbols at the Higher Grade or C symbols at the Standard Grade for English and Mathematics.

As from 2013: A Senior Certificate or an equivalent qualification, with D symbols (50–59%) at the Higher Grade or C symbols (60–69%) at the Standard Grade for English and Mathematics and E symbols (40–49%) at the Higher Grade or D symbols (50–59%) at the Standard Grade for Physical Sciences.

Selection criteria:

For 2012: To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **24**.

As from 2013: To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **20**.

Assessment procedures:

Candidates who meet these minimum requirements will be considered for admission to the National Diploma.



- **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE SINCE 2008:**

Admission requirements:

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 and 3 for Physical Sciences.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least 20.

Assessment procedures:

Candidates who meet these minimum requirements will be considered for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final combined score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

- **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**

- Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits that were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
- Enrol for existing diploma (semester courses) and request exemption of subjects at the Office of the Registrar for equivalent T-course credits that were obtained from any other technikon in South Africa.
 - i. If the number of exemptions of subjects on the existing diploma (T-course) is equal or less than 50% of the total credits for the existing diploma, the applicant will have to enrol and complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma, the applicant may apply for RPL status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology Programme that will commence in 2013. Applicants must apply at least six (6) months prior to admission.

- b. *Procedures and criteria for applications:*

- Applications will be assessed against minimum admission requirements.
- Candidates who meet the minimum requirements will receive a letter to invite them to do the assessment. The candidate will be requested to call the Department at tel. 012 382 5211 and make a booking for a specific session.
- The candidates accepted for writing the admission test will be notified via SMS and an official letter. A list of their names will be posted on the departmental notice board a month prior to the test date.
- Candidates will complete the test at a date, time and venue as confirmed during the booking procedure and as posted on the notice board.
- The test is based on the profile of the skills, aptitude, knowledge and potential that a student requires for study in Geomatics. The test is done anonymously with the student number as the only reference available to evaluators.

- c. *Minimum duration:*

Three years

- d. *Presentation:*

Day classes

- e. *Intake for the qualification:*

January only

- f. *Readmission:*

See Chapter 3 of Students' Rules and Regulations.



- g. Registration with professional body:*
It is compulsory for students who register for the National Diploma: Surveying to register as technicians-in-training with the South African Council for Professional and Technical Surveyors (PLATO). This qualification has been accredited by the South African Council of Professional and Technical Surveyors (PLATO). A National Diploma: Surveying is required for registration as a surveyor. Contact the Head of the Department in that regard. Students are also strongly advised to register with the South African Geomatics Institute (SAGI).
- h. Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- i. Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- j. Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks

- * Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005 and Senex in July 2010.)
- ** The subject, Control Surveying: Project IIIA (CSJ30YT), must be taken simultaneously with Control Surveying: Project IIIB (CSJ30ZT), or Control Surveying: Project IIIA (CSJ30YT) must already have been completed when Control Surveying: Project IIIB (CSJ30ZT) is taken.

- **SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.**
- **SUBJECTS ARE OFFERED IN SEMESTERS AS DETERMINED BY THE HEAD OF THE DEPARTMENT.**

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
COS101T	Communication Skills I	(0,050)*	
CSK101G	Computer Skills I	(0,100)	
DRW101B	Drawing I	(0,083)	
GEG111T	Geography I	(0,083)	
MAT171T	Mathematics I	(0,084)*	
PHU161E	Physics ID	(0,083)	
SUR111T	Surveying I		
SUR11YT	Surveying: Theory I	(0,066)	
SUR11ZT	Surveying: Practical I	(0,034)	
TOTAL CREDITS FOR THE SEMESTER:		0,583	

SECOND SEMESTER

MAT271T	Mathematics II	(0,083)*	Mathematics I
MPJ201T	Map Projections II	(0,083)	
PHO211T	Photogrammetry II	(0,100)	
SUD211T	Survey Drawing II	(0,083)	Drawing I
SUR211T	Surveying II		
SUR21WT	Surveying: Theory II	(0,065)	Surveying I
SUR21ZT	Surveying: Practical II	(0,035)	Surveying I
TOTAL CREDITS FOR THE SEMESTER:		0,449	
TOTAL CREDITS FOR THE FIRST YEAR:		1,032	



6.3 BACCALAUREUS TECHNOLOGIAE: SURVEYING

Qualification code: BTSU02

Campus where offered: Pretoria Campus

Purpose of the qualification:

To train an engineering surveyor who will meet the criteria for registration as a Professional Engineering Surveyor by the South African Council for Technical and Land Surveying Profession (PLATO). An undergraduate learner achieving this qualification will be skilled and competent to solve broadly defined problems and to apply the principles of engineering surveying by using both the theoretical and practical knowledge and proven techniques in the execution of technical tasks as per the ethical and professional standards required by the surveying profession in the industry.

REMARKS

a. *Admission requirement(s):*

A National Diploma: Engineering: Surveying or a NQF Level 6 (old NQF and the new HEQF) qualification in Engineering Surveying (or closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding, may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

b. *Selection criteria:*

Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be interviewed by a panel consisting of the Head of the Department and at least two other senior academic staff members. Please consult the Department to obtain more details regarding the focus points of the interview.

Students may be selected for the programme if all the following criteria can be met:

- Suitable student who complies with all admission requirements (both academic and those mentioned above).
- If an appropriate project is available for the student to work on.
- Where appropriate, the necessary equipment and facilities are available or will be obtainable in order to execute the entire project.
- The necessary funding is or will be available to fund the running expenses and other expenses related to the project.

c. *Minimum duration:*

One year

d. *Presentation:*

Block-based classes



- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- g. *Registration with professional body:*
This qualification has been accredited by the South African Council of Professional and Technical Surveyors (PLATO).

As from September 2004, persons in possession of the Baccalaureus Technologiae: Surveying and the required practical experience may register with the South African Council of Professional and Technical Surveyors (PLATO) as a Professional Engineering Surveyor.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.
- Key to asterisks
* Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005.)

ATTENDANCE

Students must take the five compulsory subjects plus three additional subjects, which they should select from the remainder of the subjects.

FIRST SEMESTER (2012)

CODE	SUBJECT	CREDIT
GDE401T	Geometric Design IV	(0,097)*
SUR411T	Surveying IV (Compulsory)	(0,167)

SECOND SEMESTER (2012)

PMN411T	Practice Management IV (Compulsory)	(0,125)
RMD101L	Research Methodology	(0,097)*
TPN401T	Town Planning IV	(0,097)*

FIRST SEMESTER (2013)

FMN141T	Financial Management	(0,097)*
GIS401T	Geographic Information Systems IV (Compulsory)	(0,125)

SECOND SEMESTER (2013)

GED401T	Geodesy IV (Compulsory)	(0,167)
PUY401T	Project Management: Surveying IV (Compulsory)	(0,125)

TOTAL CREDITS FOR THE QUALIFICATION	1,000
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7. DEPARTMENT OF INDUSTRIAL ENGINEERING

7.1 PERSONNEL INFORMATION

On 9 September 2011, this department had the following staff members:

Acting Head of Department: Ms MG Kanakana - MBA (Nelson Mandela University)
Telephone numbers: 012 382 5711/4402

Departmental Administrator: Mrs I van Rooyen

NAME	POST DESIGNATION	HIGHEST GENERIC QUALIFICATION(S)
Mr G de Clercq	Lecturer	MBA (Univ of Wales)
Mr T Nenzhelele	Lecturer	M Tech (Industrial Engineering) (TUT)
Dr K Mpofo	Lecturer	D Tech (Mechanical Engineering) (TUT)
Mr MD Mawela	Lecturer	MBA (Unisa)

7.2 NATIONAL DIPLOMA: ENGINEERING: INDUSTRIAL Qualification code: NDEI03

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s) and selection criteria:*

• **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with D symbols (50 – 59%) at the Higher Grade or C symbols (60 – 69%) at the Standard Grade for English and Mathematics and an E symbol (40 – 49%) at the Higher Grade or a D symbol (50 – 59%) at the Standard Grade for Physical Science.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Candidates who do not meet the requirements for Mathematics and/or Physical Sciences may enrol for Mathematics N4 and/or Engineering Sciences N4 at any further education and training (FET) college, and if these are successfully passed at a performance level of at least 60%, they may reapply for admission to the University.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission into the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.



- **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008: Admission requirement(s):**

A National Senior Certificate with an endorsement of a bachelor's degree or a diploma or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test, to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates meeting these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

- **FOR STUDENTS WHO OBTAINED A QUALIFICATION FROM FURTHER EDUCATION AND TRAINING (FET) COLLEGES:**

CANDIDATES WHO MEET THE FOLLOWING MINIMUM REQUIREMENTS WILL BE CONSIDERED FOR ADMISSION TO THE NATIONAL DIPLOMA:

Candidates with a National Certificate (Vocational) at NQF Level 4:

A National Certificate (Vocational) at Level 4 with at least a competent (50%) achievement for English and Mathematics and at least (60%) for Physical Sciences.

Candidates with a National N Certificate (Nated 191: N3/N4 courses) at NQF Level 4/5:

A National N Certificate at Level 4/5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Candidates with a National N Certificate (Nated 191: N5/N6 courses) at NQF Level 5:

A National N Certificate at Level 5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Applicants may also apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain subjects credits for equivalent Engineering subjects (including Mathematics and Engineering Science) successfully passed at N5/N6 level with at least a 60% achievement.

Candidates with a National N Diploma (Nated 191: N6 with a Trade Certificate) at NQF level 6:

A National N Diploma (Nated 191: N6 with a Trade Certificate) with at least a 50% achievement for all subjects completed on N4/N5/N6 Certificates at NQF Level 5 (including Mathematics and Engineering Science).

Candidates will be exempted for all subjects on NQF Level 5 of the National Diploma (Semester 1 and 2) that amount to 50% of the qualification, and they will also be exempted from Experiential Learning I on submission of the Trade Certificate at NQF Level 5/6.

Applicants must apply for Recognition of Prior Learning (subject RPL) at the Office of the Registrar to obtain credits for equivalent engineering subjects. Applicants will enrol and complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.



- **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**
 - Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits that were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
 - Enrol for existing diploma (semester courses) and request exemption from subjects at the Office of the Registrar for equivalent T-course credits that were obtained from any other technikon in South Africa.
 - i. If the number of exemptions of subjects on the existing diploma (T-course) is equal or less than 50% of the total credits for the existing diploma, the applicant will have to complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma, the applicant may apply for RPL status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology programme that will commence in 2013. Applicants must apply at least six (6) months prior to admission.
- b. *Minimum duration:*
Three years
- c. *Presentation:*
Day classes
- d. *Intake for the qualification:*
January and July
- e. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- f. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- g. *Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- h. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- i. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks:

* Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005, May 2008 and April 2010.)

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
CAI101T	Computer-Aided Draughting I*	(0,047)*	
Egn101T	Engineering Communication I*	(0,042)	
ETT101T	Electrotechnology I	(0,083)	
MAT171T	Mathematics I	(0,083)	
MDR101B	Mechanical Engineering Drawing I	(0,083)	
MHC101T	Mechanics I	(0,083)	
MME101T	Mechanical Manufacturing Engineering I	(0,083)	
TOTAL CREDITS FOR THE SEMESTER:		0,504	



SECOND SEMESTER

EWK121T	Engineering Work Study I	(0,083)	Engineering Communication I Mathematics I Mechanical Manufacturing Engineering I Mechanics I
MAT271T	Mathematics II	(0,083)	Mathematics I
MFR201T	Manufacturing Relations II	(0,083)	Engineering Communication I
MME201T	Mechanical Manufacturing Engineering II	(0,083)	Computer-Aided Draughting I Mechanical Engineering Drawing I Mechanical Manufacturing Engineering I
PEI111T	Production Engineering: Industrial I	(0,083)	
QTQ101T	Qualitative Techniques I	(0,083)	Mathematics I
TOTAL CREDITS FOR THE SEMESTER:		0,498	
TOTAL CREDITS FOR THE FIRST YEAR:		1,002	

SECOND YEAR

FIRST SEMESTER

CSG201T	Costing II	(0,083)	
EWK221T	Engineering Work Study II	(0,083)	Engineering Work Study I
FLM201T	Facility Layout and Materials Handling II	(0,083)	
MAT351T	Mathematics III	(0,083)	Mathematics II
PEI211T	Production Engineering: Industrial II	(0,083)	Mechanical Manufacturing Engineering I Production Engineering: Industrial I
QAS201T	Quality Assurance II	(0,083)	Qualitative Techniques I
TOTAL CREDITS FOR THE SEMESTER:		0,498	

SECOND SEMESTER

ATM301B	Automation III	(0,085)*	Mechanical Manufacturing Engineering II
EWK321T	Engineering Work Study III	(0,083)	Engineering Work Study II
IAC321T	Industrial Accounting III	(0,083)	Costing II
IED201T	Industrial Engineering Systems Design II*	(0,083)	Engineering Communication I Mechanics I
ILE301T	Industrial Leadership III	(0,083)	Manufacturing Relations II
ORS321T	Operational Research III	(0,083)	Production Engineering: Industrial II
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE SECOND YEAR:		0,998	

THIRD YEAR

FIRST SEMESTER

EXP1IEN	Experiential Learning I	(0,500)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	



SECOND SEMESTER

EXP2IEN	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE THIRD YEAR:		1,000	

7.3 NATIONAL DIPLOMA: ENGINEERING: INDUSTRIAL (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION) Qualification code: NDEIF0

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s) and selection criteria:*
See qualification NDEI03.
- b. *Minimum duration:*
Three and a half years.
- c. *Presentation:*
Day classes
- d. *Intake for the qualification:*
January only
- e. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- f. *Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- g. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks:

- * Information does not correspond to information on AA72.
(Deviations approved by the Senate in April 2010.)

FIRST YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
FPCAI01	Computer-Aided Draughting (Extended) I	(0,083)	
FPEGN01	Engineering Communication (Extended) I	(0,008)	
FPETT01	Electrotechnology (Extended) I	(0,083)	
FPMAT04	Mathematics (Extended) I	(0,083)	
FPMDR01	Mechanical Engineering Drawing (Extended) I	(0,083)	
FPMHC01	Mechanics (Extended) I	(0,083)	
FPMME01	Mechanical Manufacturing Engineering (Extended) I	(0,083)	

TOTAL CREDITS FOR THE FIRST YEAR: **0,506**



SECOND YEAR

FIRST SEMESTER

After completion of all core first-year extended subjects, namely **Mathematics (Extended) I**, **Mechanics (Extended) I** and **Electrotechnology (Extended) I**.

EWK121T	Engineering Work Study I	(0,083)	
MAT271T	Mathematics II	(0,083)	Mathematics (Extended) I
MFR201T	Manufacturing Relations II	(0,083)	Engineering Communication (Extended) I
MME201T	Mechanical Manufacturing Engineering II	(0,083)	Computer-Aided Draughting (Extended) I Mechanical Engineering Drawing (Extended) I Mechanical Manufacturing Engineering (Extended) I
PEI111T	Production Engineering: Industrial I	(0,083)	
QTQ101T	Qualitative Techniques I	(0,083)	
TOTAL CREDITS FOR THE SEMESTER:		0,498	

SECOND SEMESTER

CSG201T	Costing II	(0,083)	
EWK221T	Engineering Work Study II	(0,083)	Engineering Work Study I
FLM201T	Facility Layout and Materials Handling II	(0,083)	
MAT351T	Mathematics III	(0,083)	Mathematics II
PEI211T	Production Engineering: Industrial II	(0,083)	Mechanical Manufacturing Engineering (Extended) I Production Engineering: Industrial I
QAS201T	Quality Assurance II	(0,083)	Qualitative Techniques I
TOTAL CREDITS FOR THE SEMESTER:		0,498	
TOTAL CREDITS FOR THE SECOND YEAR:		0,996	

THIRD YEAR

FIRST SEMESTER

ATM301B	Automation III	(0,083)	Mechanical Manufacturing Engineering II
EWK321T	Engineering Work Study III	(0,083)	Engineering Work Study II
IAC321T	Industrial Accounting III	(0,083)	Costing II
IED201T	Industrial Engineering Systems Design II*	(0,083)	Engineering Communication (Extended) I Mechanics (Extended) I
ILE301T	Industrial Leadership III	(0,083)	Manufacturing Relations II
ORS321T	Operational Research III	(0,083)	Production Engineering: Industrial II
TOTAL CREDITS FOR THE SEMESTER:		0,498	

SECOND SEMESTER

EXP1IEN	Experiential Learning I	(0,500)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE SECOND YEAR:		0,998	



FOURTH YEAR

FIRST SEMESTER

EXP2IEN	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE THIRD YEAR:		0,500	

7.4 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: INDUSTRIAL Qualification code: BTEI03

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Engineering: Industrial or an NQF Level 6 (old NQF and the new HEQF) qualification in Industrial Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.
- National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).
- Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.
- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Day and/or evening classes. Evening classes will only be presented if there are sufficient students.
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.



- g. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

ATTENDANCE

FIRST SEMESTER (January – June)

CODE	SUBJECT	CREDIT
ENT401B	Entrepreneurship IV	(0,125)
ISY401T	Information Systems IV	(0,125)
PJR401B	Project Research IV	(0,125)
SDN411T	Systems Dynamics IV	(0,125)

TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER (July – December)

LEN401T	Logistics Engineering IV	(0,125)
PHY401T	Production Technology IV	(0,125)
PJE401T	Project Engineering IV	(0,125)
QAS401T	Quality Assurance IV	(0,125)

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE QUALIFICATION: 1,000

7.5 MAGISTER TECHNOLOGIAE: ENGINEERING: INDUSTRIAL (Field of specialisation: Technology Management) (Structured) Qualification code: MTEIS0

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering or an NQF Level 7 qualification in Engineering (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission, at least six months before actual enrolment, to the Department or Registrar to obtain the required approval by Senate. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.

- c. *Duration:*
A minimum of eighteen months and a maximum of three years.



- d. *Presentation:*
Block-based classes
- e. *Intake for the qualification:*
January and July
- f. *Subject credits:*
Subject credits are shown in brackets after each subject.

ATTENDANCE

CODE	SUBJECT	CREDIT
RRT500T	Research Report: Technology Management V (year subject)	(0,500)
RRT500R	Research Report: Technology Management V (re-registration)	(0,000)
RRT501R	Research Report: Technology Management V (re-registration)	(0,000)

FIRST SEMESTER

EBU501T	Engineering Business Dynamics V	(0,100)
EDY501T	Engineering Data Analysis V	(0,100)

SECOND SEMESTER

LCY501T	Life Cycle Management V	(0,100)
TVC501T	Technology Venture Creation V	(0,100)

plus one of the following subjects (subjects are offered in both semesters):

BNL501T	Business Law V	(0,100)
SPP501T	Supply Chain Management V	(0,100)
IPM501T	Intellectual Property Management V	(0,100)
SUV501T	Sustainability Development V	(0,100)

TOTAL CREDITS FOR THE QUALIFICATION: **1,000**

7.6 MAGISTER TECHNOLOGIAE: ENGINEERING: INDUSTRIAL Qualification code: MTEI95

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Industrial or an NQF Level 7 qualification in Industrial Engineering (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.



- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of one year and a maximum of three years.
- d. *Presentation:*
Research
- e. *Intake for the qualification:*
January and July
- f. *Dissertation:*
In the dissertation, the candidates must prove that they understand a particular problem in the industry in which they have done research, are able to analyse and set it out logically, arrive at logical conclusions or a diagnosis, and are then able to make proposals for the solution or the elimination of the problem. The dissertation must comply with the usual general technical requirements and rules regarding scope, quality and layout. The chosen research theme must be based on one or more prerequisite Level IV subjects.
- g. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
INU530T	Dissertation: Engineering: Industrial	(1,000)
INU530R	Dissertation: Engineering: Industrial (re-registration)	(0,000)
INU531R	Dissertation: Engineering: Industrial (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000

7.7 DOCTOR TECHNOLOGIAE: ENGINEERING: INDUSTRIAL

Qualification code: DTEI96

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Magister Technologiae: Engineering: Industrial or an NQF Level 8 qualification in Industrial Engineering (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of two years and a maximum of five years.
- d. *Presentation:*
Research



- e. *Intake for the qualification:*
January and July
- f. *Thesis:*
An advanced research project with a thesis. In the thesis, candidates must give proof of original and creative thinking and problem-solving. They must also be able to make a real contribution to the solving of a particular problem in the industry to which their research applies. The thesis must comply with the usual technical requirements and rules regarding scope, quality and layout.
- g. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
INU700T	Thesis: Engineering: Industrial	(2,000)
INU700R	Thesis: Engineering: Industrial (re-registration)	(0,000)
INU701R	Thesis: Engineering: Industrial (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		2,000

7.8 BACCALAUREUS TECHNOLOGIAE: TECHNOLOGY MANAGEMENT

Qualification code: BTTE01

Campus where offered: Pretoria Campus

Purpose of the qualification:

To train technicians/technologists in the field of technology management, enabling them to become technical/logistical managers in factories and mines. An undergraduate student achieving this qualification will be skilled and competent to solve broadly defined managerial problems and to apply the principles of technology management by using both the theoretical and practical knowledge and proven techniques in the execution of technical tasks as per the ethical and professional standards required by the engineering profession in the industry.

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Engineering: Industrial or an NQF Level 6 (old NQF and the new HEQF) qualification in Industrial Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.



- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Block-based classes
- e. *Intake for the qualification:*
January only
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- g. *Subject credits:*
Subject credits are shown in brackets after each subject.

YEAR SUBJECTS

CODE	SUBJECT	CREDIT
RMD100N	Research Methodology	(0,075)
FIRST SEMESTER		
BAD40AB	Business Administration IVA	(0,038)
ENT401B	Entrepreneurship IV	(0,075)
IES201T	Industrial Economics II	(0,075)
INK201T	International Marketing II	(0,075)
INL201T	International Law II	(0,075)
ISY401T	Information Systems IV	(0,075)
PJR401B	Project Research IV	(0,100)
THY401T	Technology Management (A) IV	(0,075)
SECOND SEMESTER		
BAD40BB	Business Administration IVB	(0,037)
BUL401T	Business Logistics IV	(0,075)
FCC201T	Finance and Cost Accounting II	(0,075)
PJE401T	Project Engineering IV	(0,075)
THY411T	Technology Management (B) IV	(0,075)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000



8. DEPARTMENT OF MECHANICAL ENGINEERING

8.1 PERSONNEL INFORMATION

On 9 September 2011, this department had the following staff members:

Acting Head of Department: Mr HG van Zyl - MDip (Engineering) (Mechanical) (Tech Pta),
Dip (Tertiary Education) (UP)
Telephone numbers: 012 382 5162/4888

Departmental Administrators: Ms A Marneweck, Ms S Wilbers, Ms NM Rathogo and
Ms B van Eeden

NAME	POST DESIGNATION	HIGHEST GENERIC QUALIFICATION(S)
Mr CT Abraham	Lecturer	BEng (Bangalore University, India)
Ms IEA Aghachi	Senior Lecturer	MSc (Engineering) (Mechanical) (Wits)
Mr LW Beneke	Section Head	MSc (Maths Technology) (University of Southern Mississippi, USA)
Dr DA Desai	Lecturer	MDip Tech (Engineering) (Mechanical) (Tech Pta), D Tech (Engineering) (Mechanical) (TUT)
Mr C Duff	Senior Technologist	B Tech (Industrial Design) (Wits Tech)
Mr JC Fwamba	Junior Lecturer	B Tech (Engineering) (Mechanical) (TUT)
Mr CH Hancke	Senior Lecturer	NH Dip (Post-School Ed) (TUT)
Prof Z Huan	Associate Professor	PhD (Thermal Physics) (Tianjin Univ, China)
Dr T Jamiro	Senior Lecturer	PhD (Mechanical Engineering) (Wits)
Mr JC Kearney	Technologist	B Tech (Education) (TUT)
Ms MC Khoathane	Lecturer	M Tech (Polymer Technology) (TUT)
Mr CF Meyer	Principal Lecturer	MEng (Mechanical) (UJ)
Mr JK Nwamba	Lecturer	M Tech (Engineering) (Mechanical) (TUT)
Mr PA Oosthuizen	Lecturer	MDip Tech (Industrial Design) (Wits Tech)
Ms E Relling	Lecturer	MSc (Chemistry) (Wits)
Prof ER Sadiku	Professor	PhD (Polymer Physics) (Strathclyde)
Mr JL Scribante	Lecturer	BEng (Metallurgical) (UP)
Mr CB Steyn	Lecturer	M Tech (Engineering) (Mechanical) (TUT)
Mr P van Rhyn	Senior Technologist	MSc (Engineering) (UP)
Mr MD Wythe	Lecturer	MDes RCS (ID Eng) (London)

8.2 NATIONAL DIPLOMA: ENGINEERING: MECHANICAL

Qualification code: NDME05

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s) and selection criteria:*

• **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with D symbols (50 – 59%) at the Higher Grade or C symbols (60 – 69%) at the Standard Grade for English and Mathematics and an E symbol (40 – 49%) at the Higher Grade or a D symbol (50 – 59%) at the Standard Grade for Physical Science.



Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) with a minimum of **23**.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

- **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:**

Admission requirement(s):

A National Senior Certificate with an endorsement of a bachelor's degree or a diploma or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Candidates who do not meet the requirements for Mathematics and/or Physical Sciences, may enrol for Mathematics N4 and/or Engineering Sciences N4 at any further education and training (FET) college, and if these are successfully passed at a performance level of at least 60%, they may reapply for admission at the University.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

- **FOR STUDENTS WHO OBTAINED A QUALIFICATION FROM FURTHER EDUCATION AND TRAINING (FET) COLLEGES:**

CANDIDATES WHO MEET THE FOLLOWING MINIMUM REQUIREMENTS WILL BE CONSIDERED FOR ADMISSION TO THE NATIONAL DIPLOMA:**Candidates with a National Certificate (Vocational) at NQF Level 4:**

A National Certificate (Vocational) at level 4 with at least a competent (50%) achievement for English and Mathematics and at least (60%) for Physical Sciences.

Candidates with a National N Certificate (Nated 191: N3/N4 courses) at NQF Level 4/5:

A National N Certificate at Level 4/5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.



Candidates with a National N Certificate (Nated 191: N5/N6 courses) at NQF Level 5:
A National N Certificate at Level 5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Applicants may also apply for Recognition of Prior Learning (subject RPL) at the Office of the Registrar to obtain subject credits for equivalent Engineering subjects (including Mathematics and Engineering Science), successfully passed at N5/N6 level with at least a 60% achievement.

Candidates with a National N Diploma (Nated 191: N6 with a Trade Certificate) at NQF Level 6:

A National N Diploma (Nated 191: N6 with a Trade Certificate) with at least a 50% achievement for all subjects completed on N4/N5/N6 Certificates at NQF Level 5 (including Mathematics and Engineering Science).

Candidates will be exempted from all subjects on NQF Level 5 of the National Diploma (Semester 1 and 2) that amount to 50% of the qualification, and they will also be exempted from Experiential Learning I on submission of the Trade Certificate at NQF Level 5/6.

Applicants must apply for Recognition of Prior Learning (Subject RPL), at the Office of the Registrar to obtain credits for equivalent engineering subjects. Applicants will enrol and complete the other 50% of the diploma, and graduate with a diploma from the Tshwane University of Technology.

• **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**

- Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits that were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
- Enrol for existing diploma (semester courses) and request exemption from subjects at the Office of the Registrar for equivalent T-course credits that were obtained from any other technikon in South Africa.
 - i. If the number of exemptions of subjects on the existing diploma (T-course) is equal or less than 50% of the total credits for the existing diploma, the applicant will have to complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma, the applicant may apply for RPL status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology programme that will commence in 2013. Applicants must apply at least six (6) months prior to admission.
- b. *Minimum duration:*
Three years
- c. *Presentation:*
Day classes
- d. *Intake for the qualification:*
January and July
- e. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- f. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- g. *Government Certificate of Competence:*
See Section A3 of this publication. **Please note:** Students will be required to register for the additional Electrical subjects as a secondary registration. Please confirm with the Head of the Department before registration.



- h. Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- i. Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- j. Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.
- Key to asterisks:
* Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005 and May 2008.)

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
CAI101T	Computer-Aided Draughting I*	(0,068)*	
EGN101T	Engineering Communication I*	(0,083)	
ETT101T	Electrotechnology I	(0,068)*	
MAT171T	Mathematics I	(0,083)	
MDR101T	Mechanical Engineering Drawing I	(0,068)*	
MHC101T	Mechanics I	(0,068)*	
MME101T	Mechanical Manufacturing Engineering I	(0,068)*	
TOTAL CREDITS FOR THE SEMESTER:		0,506	

SECOND SEMESTER

FMS211T	Fluid Mechanics II	(0,083)	Mathematics I Mechanics I
MAT271T	Mathematics II	(0,083)	Mathematics I
MMH211T	Mechanics of Machines II	(0,083)	Mechanics I
SMT211T	Strength of Materials II	(0,083)	Mathematics I Mechanics I
TDN201T	Thermodynamics II	(0,083)	
plus one of the following subjects:			
ENY101T	Electronic Technology	(0,083)*	Mathematics I
ETT211T	Electrotechnology II	(0,083)	Electrotechnology I
MME201T	Mechanical Manufacturing Engineering II	(0,083)	Computer-Aided Draughting I Mechanical Engineering Drawing I Mechanical Manufacturing Engineering I
TOTAL CREDITS FOR THE SEMESTER:		0,498	
TOTAL CREDITS FOR THE FIRST YEAR:		1,004	

SECOND YEAR

FIRST SEMESTER

FMS331T	Fluid Mechanics III	(0,083)	Engineering Communication I Fluid Mechanics II
MAT351T	Mathematics III	(0,083)	Mathematics II



MED201T	Mechanical Engineering Design II	(0,083)	Computer-Aided Draughting I Engineering Communication I Mechanical Engineering Drawing I Mechanical Manufacturing Engineering I Mechanics I Strength of Materials II
MMH331T	Mechanics of Machines III	(0,083)	Engineering Communication I Mechanics of Machines II
SMT331T	Strength of Materials III	(0,083)	Engineering Communication I Strength of Materials II
TDN321T	Thermodynamics III	(0,083)	Engineering Communication I Thermodynamics II

TOTAL CREDITS FOR THE SEMESTER: 0,498

SECOND SEMESTER

ASA301T	Applied Strength of Materials III	(0,083)	Mathematics II Strength of Materials III
HYM301T	Hydraulic Machines III	(0,083)	Fluid Mechanics III Mathematics II
MED321T	Mechanical Engineering Design III	(0,083)	Mathematics II Mechanical Engineering Design II Mechanics of Machines II
SMP301T	Steam Plant III	(0,083)	Mathematics II Thermodynamics III
TMH301T	Theory of Machines III	(0,083)	Mathematics II Mechanics of Machines III

plus one of the following subjects:

CNF301T	Control of Machines	(0,083)*	Mathematics III
EIE301T	Electric Machines	(0,083)*	Electrotechnology II
MME301T	Mechanical Manufacturing Engineering III	(0,083)	Mechanical Manufacturing Engineering II

TOTAL CREDITS FOR THE SEMESTER: 0,498

TOTAL CREDITS FOR THE SECOND YEAR: **0,996**

THIRD YEAR

FIRST SEMESTER

EXP1ENM	Experiential Learning I	(0,500)	
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TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER

EXP2ENM	Experiential Learning II	(0,500)	Experiential Learning I
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TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE THIRD YEAR: **1,000**



8.3 NATIONAL DIPLOMA: ENGINEERING: MECHANICAL (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION) Qualification code: NDMEF0

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s) and selection criteria:*
See qualification NDME05.
- b. *Minimum duration:*
Three and a half years.
- c. *Presentation:*
Day classes.
- d. *Intake for the qualification:*
January only.
- e. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- f. *Experiential Learning I and II:*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- g. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

FIRST YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
FPCAI01	Computer-Aided Draughting (Extended) I	(0,083)	
FPEGN01	Engineering Communication (Extended) I	(0,008)	
FPETT01	Electrotechnology (Extended) I	(0,083)	
FPMAT04	Mathematics (Extended) I	(0,083)	
FPMDR01	Mechanical Engineering Drawing (Extended) I	(0,083)	
FPMHC01	Mechanics (Extended) I	(0,083)	
FPMME01	Mechanical Manufacturing Engineering (Extended) I	(0,083)	
TOTAL CREDITS FOR THE FIRST YEAR:		0,506	

SECOND YEAR

After completion of all core first-year extended subjects, namely **Mathematics (Extended) I**, **Mechanics (Extended) I** and **Electrotechnology (Extended) I**.

FIRST SEMESTER

FMS211T	Fluid Mechanics II	Mechanics (Extended) I (0,083)	Mathematics (Extended) I
MAT271T	Mathematics II	(0,083)	Mathematics (Extended) I
MMH211T	Mechanics of Machines II	(0,083)	Mechanics (Extended) I



SMT211T	Strength of Materials II Mechanics (Extended) I	(0,083)	Mathematics (Extended) I
TDN201T	Thermodynamics II	(0,083)	
plus one of the following subjects:			
ENY101T	Electronic Technology	(0,083)	Mathematics (Extended) I
ETT211T	Electrotechnology II	(0,083)	Electrotechnology (Extended) I
MME201T	Mechanical Manufacturing Engineering II	(0,083)	Computer-Aided Draughting (Extended) I Mechanical Engineering Drawing (Extended) I Mechanical Manufacturing Engineering (Extended) I

TOTAL CREDITS FOR THE SEMESTER: 0,498

SECOND SEMESTER

FMS331T	Fluid Mechanics III (Extended) I	(0,083)	Engineering Communication Fluid Mechanics II
MAT351T	Mathematics III	(0,083)	Mathematics II
MED201T	Mechanical Engineering Design II	(0,083)	Computer-Aided Draughting (Extended) I Engineering Communication (Extended) I Mechanical Engineering Drawing (Extended) I Mechanical Manufacturing Engineering (Extended) I Mechanics (Extended) I Strength of Materials II
MMH331T	Mechanics of Machines III	(0,083)	Engineering Communication (Extended) I Mechanics of Machines II
SMT331T	Strength of Materials III	(0,083)	Engineering Communication (Extended) I Strength of Materials II
TDN321T	Thermodynamics III	(0,083)	Engineering Communication (Extended) I Thermodynamics II

TOTAL CREDITS FOR THE SEMESTER: 0,498

TOTAL CREDITS FOR THE SECOND YEAR: **0,996**

THIRD YEAR

FIRST SEMESTER

ASA301T	Applied Strength of Materials III	(0,083)	Mathematics II Strength of Materials III
HYM301T	Hydraulic Machines III	(0,083)	Fluid Mechanics III Mathematics II
MED321T	Mechanical Engineering Design III	(0,083)	Mathematics II Mechanical Engineering Design II Mechanics of Machines II
SMP301T	Steam Plant III	(0,083)	Mathematics II Thermodynamics III



TMH301T	Theory of Machines III	(0,083)	Mathematics II Mechanics of Machines III
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plus one of the following subjects:

CNF301T	Control of Machines	(0,083)	Mathematics III
EIE301T	Electric Machines	(0,083)	Electrotechnology II
MME301T	Mechanical Manufacturing Engineering III	(0,083)	Mechanical Manufacturing Engineering II

TOTAL CREDITS FOR THE SEMESTER: 0,498

SECOND SEMESTER

EXP1ENM Experiential Learning I (0,500)

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE THIRD YEAR: **0,998**

FOURTH YEAR

FIRST SEMESTER

EXP2ENM Experiential Learning II (0,500) Experiential Learning I

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE FOURTH YEAR: **0,500**

**8.4 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL
Qualification code: BTME05**

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A National Diploma: Engineering: Mechanical or an NQF Level 6 (old NQF and the new HEQF) qualification in Mechanical Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding, may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.



- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation*
Block-based classes offered over a period of one or two years.
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- g. *Re-registration:*
A student may re-register for the subject Engineering Design Project IV only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the Project only and not to re-do it when it is failed.
- h. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- i. *Subject credits:*
Subject credits are shown in brackets after each subject.

ATTENDANCE

Subjects are offered as determined by the Head of the Department.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
EDP400T	Engineering Design Project IV (year subject)	(0,250)	
EDP401R	Engineering Design Project IV (re-registration)	(0,000)	
plus two of the following subjects:			
FMS411T	Fluid Mechanics IV	(0,125)	Hydraulic Machines III
MMH411T	Mechanics of Machines IV	(0,125)	Mathematics III Theory of Machines III
SMT411T	Strength of Materials IV	(0,125)	Applied Strength of Materials III Mathematics III
TDN401T	Thermodynamics IV	(0,125)	Mathematics III Steam Plant III
plus two of the remaining subjects above and two of the following subjects or four of the following subjects:			
ATC411T	Automatic Control IV	(0,125)	Mathematics III Theory of Machines III
MFE401T	Manufacturing Engineering IV	(0,125)	Mechanical Manufacturing Engineering III
RAC401T	Refrigeration and Air Conditioning IV	(0,125)	Steam Plant III
SAN401T	Stress Analysis IV	(0,125)	Applied Strength of Materials III Mathematics III
TRM401T	Turbo Machines IV	(0,125)	Hydraulic Machines III
TOTAL CREDITS FOR THE QUALIFICATION:		1,000	



8.5 NATIONAL DIPLOMA: ENGINEERING: MECHATRONICS

Qualification code: NDMR06

Campus where offered: Pretoria Campus

Purpose of the qualification:

The purpose of the qualification is to train and qualify top-quality technicians and technologists in the field of Mechatronics Engineering in South Africa. It is intended to subsequently empower candidate engineering technicians and technologists to demonstrate that they are capable of applying their acquired knowledge, skills, attitudes and values in the work environments in South Africa. The qualification is designed to add value to the qualifying students in terms of enrichment of the person, status and recognition.

REMARKS

a. *Admission requirement(s) and selection criteria:*

• **FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with D symbols (50 – 59%) at the Higher Grade or C symbols (60 – 69%) at the Standard Grade for English and Mathematics and an E symbol (40 – 49%) at the Higher Grade or a D symbol (50 – 59%) at the Standard Grade for Physical Science.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Assessment procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).
- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.

• **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:**

Admission requirement(s):

A National Senior Certificate with an endorsement of a bachelor's degree or a diploma or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **23**.

Assessment Procedure:

- **For the January intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma or the National Diploma (Extended Curriculum). Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Candidates with a final combined score of less than 10 for Mathematics and Physical Sciences will write an academic placement test to determine whether they will be channelled to the National Diploma or National Diploma (Extended Curriculum).



- **For the July intake:** Candidates who meet these minimum requirements qualify for consideration for admission to the National Diploma. Candidates with a final combined score of 10 for Mathematics and Physical Sciences will gain direct admission to the National Diploma. Applicants with a final score of less than 10 for Mathematics and Physical Sciences will be invited for the Academic Placement Test before final acceptance.
- **FOR STUDENTS WHO OBTAINED A QUALIFICATION FROM FURTHER EDUCATION AND TRAINING (FET) COLLEGES:**

CANDIDATES WHO MEET THE FOLLOWING MINIMUM REQUIREMENTS WILL BE CONSIDERED FOR ADMISSION TO THE NATIONAL DIPLOMA:

Candidates with a National Certificate (Vocational) at NQF Level 4:
A National Certificate (Vocational) at Level 4 with at least a competent (50%) achievement for English and Mathematics and at least (60%) for Physical Sciences.

Candidates with a National N Certificate (Nated 191: N3/N4 courses) at NQF Level 4/5:
A National N Certificate at Level 4/5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Candidates with a National N Certificate (Nated 191: N5/N6 courses) at NQF Level 5:
A National N Certificate at Level 5 with at least a 50% achievement for English and a 60% achievement for Mathematics N3/N4 and Engineering Sciences N3/N4.

Applicants may also apply for Recognition of Prior Learning (subject RPL), at the Office of the Registrar to obtain subjects credits for equivalent Engineering subjects (including Mathematics and Engineering Science) successfully passed at N5/N6 level with at least a 60% achievement.

Candidates with a National N Diploma (Nated 191: N6 with a Trade Certificate) at NQF level 6:
A National N Diploma (Nated 191: N6 with a Trade Certificate) with least a 50% achievement for all subjects completed on N4/N5/N6 Certificates at NQF Level 5 (including Mathematics and Engineering Science).

Candidates will be exempted from all subjects on NQF Level 5 of the National Diploma (Semester 1 and 2) that amount to 50% of the qualification, and they will also be exempted from Experiential Learning I on submission of the Trade Certificate at NQF level 5/6.

Applicants must apply for Recognition of Prior Learning (Subject RPL) at the Office of the Registrar to obtain credits for equivalent engineering subjects. Applicants will enrol and complete the other 50% of the diploma, and graduate with a diploma from the Tshwane University of Technology.
- **FOR CANDIDATES WITH INCOMPLETE QUALIFICATIONS FROM FORMER TECHNIKONS:**
 - Enrol for existing diploma (semester courses) and request recognition for subjects at the Office of the Registrar for equivalent T-course credits that were obtained from either Technikon Northern Gauteng, Technikon North-West or Technikon Pretoria.
 - Enrol for existing diploma (semester courses) and request exemption from subjects at the Office of the Registrar for equivalent T-course credits that were obtained from any other technikon in South Africa.
 - i. If the number of exemptions of subjects on the existing diploma (T-course) is equal to or less than 50% of the total credits for the existing diploma, the applicant will have to complete the other 50% of the diploma and graduate with a diploma from the Tshwane University of Technology.
 - ii. If the number of equivalent subject credits is more than 50% of the existing diploma, the applicant may apply for RPL status at the Office of the Registrar for the diploma and gain access to the Bachelor of Technology programme that will commence in 2013. Applicants must apply at least six (6) months prior to admission.



- b. *Minimum duration:*
Three years
- c. *Presentation:*
Day classes
- d. *Intake for the qualification:*
January and July
- e. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- f. *Accreditation by professional body:*
This qualification has been provisionally accredited by the Engineering Council of South Africa (ECSA).
- g. *Mechatronic Engineering Practice (experiential learning):*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- h. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- i. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks:

- * Information does not correspond to information on AA72.
(Deviations approved by the Senate in September 2011.)

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
EGN101B	Engineering Communication	(0,050)	
ETT101T	Electrotechnology I	(0,100)	
MAT171T	Mathematics I	(0,100)	
MDR111T	Mechanical Engineering Drawing	(0,100)	
MFE101C	Manufacturing Engineering	(0,150)	
MHC101C	Mechanics I	(0,100)	
TOTAL CREDITS FOR THE SEMESTER:		0,600	

SECOND SEMESTER

CDD101T	Computer-Aided Design	(0,100)	
ENY101T	Electronic Technology	(0,100)	Mathematics I
ETT211T	Electrotechnology II	(0,100)	Electrotechnology I
MAT271T	Mathematics II	(0,100)	Mathematics I
MSS201T	Materials and Processing II*	(0,150)	Manufacturing Engineering
TOTAL CREDITS FOR THE SEMESTER:		0,550	
TOTAL CREDITS FOR THE FIRST YEAR:		1,150	



SECOND YEAR

FIRST SEMESTER

DIT101T	Digital Technology I	(0,100)	Mathematics I
MAT351T	Mathematics III	(0,100)	Mathematics II
MHC201T	Mechanics II	(0,100)	Mathematics I Mechanics I
SMT201B	Strength of Materials II*	(0,100)	Mathematics I Mechanics I
THF201T	Thermo-Flow	(0,100)	Mathematics I Mechanics I

TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER

CNF301T	Control of Machines	(0,100)	Electronic Technology Mathematics III
CSD201T	Computer Studies	(0,100)	Digital Technology I Electronic Technology Mathematics II
DIT201T	Digital Technology II	(0,100)	Digital Technology I
EIE301T	Electric Machines	(0,100)	Electrotechnology II
MED202B	Mechanical Engineering Design II*	(0,100)	Computer-Aided Design Engineering Communication Manufacturing Engineering Mechanical Engineering Drawing Mechanics I Strength of Materials II

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE SECOND YEAR: **1,000**

THIRD YEAR

FIRST SEMESTER

MCD301T	Mechatronic Engineering Design	(0,100)	Control of Machines Mechanical Engineering Design II
MHC301T	Mechanics III	(0,100)	Engineering Communication Mechanics II
NUA301T	Networks and Communication	(0,100)	Engineering Communication
SMT301B	Strength of Materials III*	(0,100)	Strength of Materials II
SOA301T	Sensors and Process Control	(0,100)	Digital Technology II Thermo-Flow

TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER

Students must pass all the above subjects in order to continue with the following subject:

EXP1MEC	Mechatronic Engineering Practice (Experiential Learning)	(0,350)
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TOTAL CREDITS FOR THE SEMESTER: 0,350

TOTAL CREDITS FOR THE THIRD YEAR: **0,850**



8.6 NATIONAL DIPLOMA: ENGINEERING: MECHATRONICS (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION) Qualification code: NDMRF0

Campus where offered: Pretoria Campus

Purpose of the qualification:

The purpose of the qualification is to train and qualify top-quality technicians and technologists in the field of Mechatronics Engineering in South Africa. It is intended to subsequently empower candidate engineering technicians and technologists to demonstrate that they are capable of applying their acquired knowledge, skills, attitudes and values in the work environments in South Africa. The qualification is designed to add value to the qualifying students in terms of enrichment of the person, status and recognition.

REMARKS

- a. *Admission requirement(s) and selection criteria:*
See qualification NDMR06.
- b. *Minimum duration:*
Three and a half years
- c. *Presentation:*
Day classes
- d. *Intake for the qualification:*
January only
- e. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- f. *Mechatronic Engineering Practice (experiential learning):*
See Section A2 of this publication and Chapter 5 of the Students' Rules and Regulations.
- g. *Practicals:*
It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.

Key to asterisks:

- * Information does not correspond to information on AA72.
(Deviations approved by the Senate in September 2011.)

FIRST YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
FPEGN02	Engineering Communication (Extended)	(0,050)	
FPETT01	Electrotechnology (Extended) I	(0,100)	
FPMAT04	Mathematics (Extended) I	(0,100)	
FPMDR02	Mechanical Engineering Drawing (Extended)	(0,100)	
FPMFE01	Manufacturing Engineering (Extended)	(0,150)	
FPMHC01	Mechanics (Extended) I	(0,100)	
TOTAL CREDITS FOR THE FIRST YEAR:		0,600	



SECOND YEAR

FIRST SEMESTER

CDD101T	Computer-Aided Design	(0,100)	
ENY101T	Electronic Technology	(0,100)	Mathematics (Extended) I
ETT211T	Electrotechnology II	(0,100)	Electrotechnology (Extended) I
MAT271T	Mathematics II	(0,100)	Mathematics (Extended) I
MSS201T	Materials and Processing II*	(0,150)	Manufacturing Engineering (Extended)

TOTAL CREDITS FOR THE SEMESTER: 0,550

SECOND SEMESTER

DIT101T	Digital Technology I	(0,100)	Mathematics (Extended) I
MAT351T	Mathematics III	(0,100)	Mathematics II
MHC201T	Mechanics II	(0,100)	Mathematics (Extended) I Mechanics (Extended) I
SMT201B	Strength of Materials II*	(0,100)	Mathematics (Extended) I Mechanics (Extended) I
THF201T	Thermo-Flow	(0,100)	Mathematics (Extended) I Mechanics (Extended) I

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDIT FOR THE SECOND YEAR: **1,050**

THIRD YEAR

FIRST SEMESTER

CNF301T	Control of Machines	(0,100)	Electronic Technology Mathematics III
CSD201T	Computer Studies	(0,100)	Digital Technology I Electronic Technology Mathematics II
DIT201T	Digital Technology II	(0,100)	Digital Technology I
EIE301T	Electric Machines	(0,100)	Electrotechnology II
MED202B	Mechanical Engineering Design II*	(0,100)	Computer-Aided Design Engineering Communication (Extended) Manufacturing Engineering (Extended) Mechanical Engineering Drawing (Extended) Mechanics (Extended) I Strength of Materials II

TOTAL CREDITS FOR THE SEMESTER: 0,500



SECOND SEMESTER

MCD301T	Mechatronic Engineering Design	(0,100)	Control of Machines Mechanical Engineering Design II
MHC301T	Mechanics III	(0,100)	Engineering Communication (Extended) Mechanics II
NUA301T	Networks and Communication	(0,100)	Engineering Communication (Extended) Strength of Materials II
SMT301B	Strength of Materials III*	(0,100)	
SOA301T	Sensors and Process Control	(0,100)	Digital Technology II Thermo-Flow
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE THIRD YEAR:		1,000	

FOURTH YEAR

FIRST SEMESTER

Students must pass all the above subjects in order to continue with the following subject:

EXP1MEC	Mechatronic Engineering Practice (Experiential Learning)	(0,350)
TOTAL CREDITS FOR THE SEMESTER:		0,350
TOTAL CREDITS FOR THE FOURTH YEAR:		0,350

8.7 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL (Field of specialisation: Mechatronics) Qualification code: BTMR09/BTMR05

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*

A National Diploma: Engineering: Mechanical or a NQF Level 6 (old NQF and the new HEQF) qualification in Mechanical Engineering (or a closely related field) obtained from an accredited South African university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.



- b. *Selection criteria:*
Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.
- c. *Minimum duration:*
One year
- d. *Presentation:*
Block-based classes offered over a period of one or two years.
- e. *Intake for the qualification:*
January and July
- f. *Readmission:*
See Chapter 3 of Students' Rules and Regulations.
- g. *Re-registration:*
A student may re-register for the subject Engineering Design Project IV only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the Project only and not to re-do it when it is failed.
- h. *Subject credits:*
Subject credits are shown in brackets after each subject.

Key to asterisks

- * Information does not correspond to information in Report 151.
(Deviations approved by the SENEX on 29 August 2005 and Senate in March 2009.)

ATTENDANCE

Subjects are offered as determined by the Head of the Department.

OPTION 1 (BTMR09): ONLY FOR STUDENTS WHO COMPLETED THE NATIONAL DIPLOMA: ENGINEERING: MECHATRONICS (NDMR06)

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
ASA301T	Applied Strength of Materials III	(0,083)	Mathematics II
ATC411B	Automatic Control IV	(0,125)	Mathematics III
DCS401T	Digital Control Systems IV	(0,100)	Automatic Control IV
EDP400T	Engineering Design Project IV (year subject)	(0,342)*	
EDP401R	Engineering Design Project IV (re-registration)	(0,000)	
SFD301T	Software Design III	(0,100)	Computer Studies
TDN401T	Thermodynamics IV	(0,125)	Mathematics III

plus one of the following subjects:

SAN401T	Stress Analysis IV	(0,125)	Applied Strength of Materials III Mathematics III
SMT411T	Strength of Materials IV	(0,125)	Applied Strength of Materials III Mathematics III

TOTAL CREDITS FOR OPTION 1: **1,000**



**OPTION 2 (BTMR05): ONLY FOR STUDENTS WHO COMPLETED THE NATIONAL DIPLOMA:
ENGINEERING: MECHANICAL (FIELD OF SPECIALISATION: MECHATRONICS) (NDMR01)**

EDP400T	Engineering Design Project IV (year subject)	(0,300)*	
EDP401R	Engineering Design Project IV (re-registration)	(0,000)	
ATC411B	Automatic Control IV	(0,125)	Mathematics III Theory of Machines III
DCS401T	Digital Control Systems IV	(0,100)	Automatic Control IV
MMH411T	Mechanics of Machines IV	(0,125)	Mathematics III Theory of Machines III
SAN401T	Stress Analysis IV	(0,125)	Applied Strength of Materials III Mathematics III
SMT411T	Strength of Materials IV	(0,125)	Applied Strength of Materials III Mathematics III

plus one of the following subjects:

PWE311T	Power Electronics III	(0,100)	Electrical Machines II
SFD301T	Software Design III	(0,100)	Mathematics III Software Design II

TOTAL CREDITS FOR OPTION 2: **1,000**

**8.8 MAGISTER TECHNOLOGIAE: ENGINEERING: MECHANICAL
Qualification code: MTME95**

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Baccalaureus Technologiae: Engineering: Mechanical or an NQF Level 7 qualification in Mechanical Engineering (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of one year and a maximum of three years.
- d. *Presentation:*
Research



- e. *Intake for the qualification:*
January and July
- f. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
MCC510T	Dissertation: Engineering: Mechanical	(1,000)
MCC510R	Dissertation: Engineering: Mechanical (re-registration)	(0,000)
MCC511R	Dissertation: Engineering: Mechanical (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000

8.9 DOCTOR TECHNOLOGIAE: ENGINEERING: MECHANICAL

Qualification code: DTME96

Campus where offered: Pretoria Campus

REMARKS

- a. *Admission requirement(s):*
A Magister Technologiae: Engineering: Mechanical or an NQF Level 8 qualification in Mechanical Engineering (or a related field) obtained from a South African university.
- Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. *Selection criteria:*
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. *Duration:*
A minimum of two years and a maximum of five years.
- d. *Presentation*
Research
- e. *Intake for the qualification:*
January and July
- f. *Subject credits:*
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
MCC710T	Thesis: Engineering: Mechanical	(2,000)
MCC710R	Thesis: Engineering: Mechanical (re-registration)	(0,000)
MCC711R	Thesis: Engineering: Mechanical (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		2,000



8.10 BACCALAUREUS TECHNOLOGIAE: POLYMER TECHNOLOGY

Qualification code: BTPY03

Campus where offered: Pretoria Campus

Purpose for the qualification:

The purpose of the qualification is to train students to become polymer technologists who have a polymer-based technical background for a career in any industrial and other sectors in which polymer plays a role. At this level, some introduction to research methodology, project planning and technical writing is encouraged.

REMARKS

a. *Admission requirement(s):*

A National Diploma: Polymer Technology **or** a National Diploma: Engineering: Chemical Engineering **or** a National Diploma: Engineering: Mechanical, **or** a National Diploma: Engineering: Metallurgy **or** a National Diploma: Analytical Chemistry **or** an NQF Level 6 Bachelor's Degree in Chemical/Mechanical Engineering (or a closely related field) obtained from a South Africa university. Preference will be given to applicants with an average of 60% or more. Students who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Students other than those with a National Diploma: Polymer Technology will also have to complete Polymer Technology I as part of their qualification.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required.

b. *Selection criteria:*

Please note that meeting the minimum requirements does not guarantee admission. Due to capacity constraints, qualifying students will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications.

c. *Minimum duration:*

One year

d. *Presentation:*

Block-based classes offered over a period of two years.

e. *Intake for the qualification:*

January and July

f. *Readmission:*

See Chapter 3 of Students' Rules and Regulations.

g. *Subject credits:*

Subject credits are shown in brackets after each subject.



FIRST YEAR

CODE	SUBJECT	CREDIT
POP410T	Polymer Technology: Practical IV	(0,250)
PYT400T	Polymer Technology IV	(0,250)
TOTAL CREDITS FOR THE FIRST YEAR:		0,500

SECOND YEAR

PWP410T	Polymer Science: Practical IV	(0,250)
PYW400T	Polymer Science IV	(0,250)
TOTAL CREDITS FOR THE SECOND YEAR:		0,500
TOTAL CREDITS FOR THE QUALIFICATION:		1,000

8.11 MAGISTER TECHNOLOGIAE: POLYMER TECHNOLOGY

Qualification code: MTPY01

Campus where offered: Pretoria Campus

Purpose of the qualification:

The purpose of this degree is to train polymer technologists to be versatile enough to fit in the industries (if they want to make their careers in the cooperate world) and to build high-level technological capacity to train the youth if, at the end of their studies, they pursue careers in the academic or research, development and innovation environments.

REMARKS

a. *Admission requirement(s):*

A Baccalaureus Technologiae: Polymer Technology or an NQF Level 7 qualification in Polymer or Plastics Technology or Sciences (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.

b. *Selection criteria:*

All applications are subject to selection and may include a personal interview with a departmental selection panel.

c. *Duration:*

A minimum of one year and a maximum of three years.

d. *Presentation:*

Research

e. *Intake for the qualification:*

January and July



- f. **Content:**
This programme comprises a research project with a dissertation, provided the student passes Research Methodology first. In the dissertation, the candidates must prove that they understand a particular problem in the industry in which they have done research and are able to analyse it, set it out logically, arrive at logical conclusions or a diagnosis, and make proposals for the solution or elimination of the problem. The dissertation should comply with the usual general technical requirements and rules relating to scope, quality and layout.
- g. **Subject credits:**
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
POY500T	Dissertation: Polymer Technology	(1,000)
POY500R	Dissertation: Polymer Technology (re-registration)	(0,000)
POY501R	Dissertation: Polymer Technology (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		1,000

8.12 DOCTOR TECHNOLOGIAE: POLYMER TECHNOLOGY

Qualification code: DTPY01

Campus where offered: Pretoria Campus

Purpose of the qualification:

The purpose of this degree is to train polymer technologists to be versatile enough to fit in the industries (if they want to make their careers in the cooperate world) and to build high-level technological capacity to train the youth if, at the end of their studies, they pursue careers in the academic or research, development and innovation environments.

REMARKS

- a. **Admission requirement(s):**
A Magister Technologiae: Polymer Technology or an NQF Level 8 qualification in Polymer or Plastics Technology or Sciences (or a related field) obtained from a South African university.

Holders of any other equivalent South African or foreign qualifications may also be considered. Foreign students will be required to submit an evaluation by the South African Qualifications Authority (SAQA) of their qualifications with their application forms for admission. The Faculty reserves the right to assess these qualifications and the applicant's suitability for admission to the programme.
- b. **Selection criteria:**
All applications are subject to selection and may include a personal interview with a departmental selection panel.
- c. **Duration:**
A minimum of two years and a maximum of five years.
- d. **Presentation:**
Research
- e. **Intake for the qualification:**
January and July



- f. **Content:**
This programme comprises an advanced research project with a thesis. In the thesis, the candidates must provide proof of original, creative thinking and problem-solving skills, and prove that they can make a real contribution to the solution of a particular problem in the industry to which the research applies. The thesis should comply with the usual general technical requirements and rules relating to scope, quality and layout.
- g. **Subject credits:**
Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
POY700T	Thesis: Polymer Technology	(2,000)
POY700R	Thesis: Polymer Technology (re-registration)	(0,000)
POY701R	Thesis: Polymer Technology (re-registration)	(0,000)
TOTAL CREDITS FOR THE QUALIFICATION:		2,000

8.13 NATIONAL DIPLOMA: THREE-DIMENSIONAL DESIGN (Field of specialisation: Engineering and Related Design) Qualification code: NDDI08

Campus where offered: Pretoria Campus

Purpose for the qualification:

The National Diploma: Three-Dimensional Design is an undergraduate qualification preparing graduates for a career in industrial design. Industrial design is an international profession that plays an important role in a country's economic growth. In the world of today, thousands of products are developed and designed to meet specific needs. Industrial design is part of the process of turning ideas into products that can be sold to mass markets. 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. Industrial designers typically create finished products that emphasise the look, feel, safety and convenience of a product. Industrial designers also understand manufacturing materials and processes, making sure that products can be manufactured at the right price for the intended target market.

REMARKS

- a. *Admission requirement(s) and selection criteria:*

- **FOR STUDENT WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

A Senior Certificate or an equivalent qualification, with a D symbol (50 - 59%) at the Higher Grade for English and an E symbol (40 - 49%) for Mathematics or a C symbol (60 - 69%) at the Standard Grade for English and a D symbol (40 - 49%) for Mathematics.

Recommended subject(s):

Physical Sciences, Visual Arts, Technical Drawing, Woodwork and Metal Work.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) with a minimum of **21**.



Assessment procedure:

Candidates with an APS of 21 and more will be required to submit a portfolio. Submit the prescribed portfolio of work to the Department of Mechanical Engineering in order to be considered for selection. (Places are limited as class sizes are small; make sure your portfolio is submitted before the deadline. The Department's selection decision is final and no discussion with unsuccessful applicants will be allowed). Please consult the website of the Faculty of Engineering and the Built Environment for the latest Three-Dimensional Design brochure for portfolio requirements. Students who were conditionally admitted based on their APS will be re-evaluated on their final Grade 12 results. The portfolio will account for 60% and the APS for 40% of the total score.

- **FOR STUDENTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE SINCE 2008:**

Admission requirement(s):

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 (first or second language) and 3 for Mathematics or 5 for Mathematical Literacy.

Recommended subject(s):

Computer Applications Technology, Consumer Studies, Design, Engineering Graphics and Design, Physical Sciences, Visual Arts.

Selection criteria:

To be considered for this qualification, candidates must have an Admission Points Score (APS) of at least **21** (with Mathematics) or **23** (with Mathematical Literacy).

Assessment procedure:

Candidates with an APS of 21 and more (with Mathematics) or 23 and more (with Mathematical Literacy) will be required to submit a portfolio. Submit the prescribed portfolio of work to the Department of Mechanical Engineering in order to be considered for selection. (Places are limited as class sizes are small; make sure your portfolio is submitted before the deadline. The Department's selection decision is final and no discussion with unsuccessful applicants will be allowed). Please consult the website of the Faculty of Engineering and the Built Environment for the latest Three-Dimensional Design brochure for portfolio requirements. Students who were conditionally admitted based on their APS will be re-evaluated on their final Grade 12 results. The portfolio will account for 60% and the APS for 40% of the total score.

b. *Minimum duration:*

Three years

c. *Presentation:*

Day classes

d. *Intake for the qualification:*

January only

e. *Readmission:*

See Chapter 3 of the Students' Rules and Regulations.

f. *Practicals:*

It is compulsory for students to attend the practical classes. Students must pass the practical component of a subject to be admitted to the examination.

g. *Subject credits:*

Subject credits are shown in brackets after each subject. The total number of credits required for this qualification is 3,000.



FIRST YEAR

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
BMN120D	Business Management I	(0,134)	
FHE100T	Freehand Drawing	(0,166)	
HAD110T	History of Art and Design	(0,166)	
ITD100T	Industrial Design I	(0,266)	

FIRST SEMESTER

MDR111T	Mechanical Engineering Drawing	(0,067)	
MUR101T	Manufacturing I	(0,067)	

SECOND SEMESTER

CDD101T	Computer-Aided Design	(0,067)	
EGG101T	Engineering Design I	(0,067)	

TOTAL CREDITS FOR THE FIRST YEAR: **1,000**

SECOND YEAR

BMN230D	Business Management II	(0,134)	Business Management I
HOI200T	History of Industrial Design	(0,133)	History of Art and Design
ITD200T	Industrial Design II	(0,333)	Industrial Design I
MIY100T	Material Technology I	(0,100)	
PDW210T	Presentation Drawing	(0,166)	Freehand Drawing

FIRST SEMESTER

MUR201T	Manufacturing II	(0,067)	Manufacturing I
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SECOND SEMESTER

EGG201T	Engineering Design II	(0,067)	Engineering Design I
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TOTAL CREDITS FOR THE SECOND YEAR: **1,000**

THIRD YEAR

BMN330D	Business Management III	(0,134)	Business Management II
DTH310T	Design Theory	(0,133)	History of Industrial Design
ITD300T	Industrial Design III	(0,350)	Industrial Design II
MIY200T	Material Technology II	(0,100)	Material Technology I
MUO300T	Multimedia Presentation	(0,166)	Presentation Drawing

FIRST SEMESTER

ERG301T	Ergonomics	(0,050)	
MUR301T	Manufacturing III	(0,067)	Manufacturing II

TOTAL CREDITS FOR THE THIRD YEAR: **1,000**



SECTION A3: GOVERNMENT CERTIFICATE OF COMPETENCY (GCC)

1.1 GENERAL STIPULATIONS AND REGULATIONS

1.1.1 Certificates of competency:

The following instructions, rules and syllabi for the GCC examinations are framed in terms of the Minerals Act Regulation 28.6 in force in terms of regulation 28.6 of the Mine Health and Safety Act, 1996 (Act No 29 of 1996).

1.1.1.1 The following Certificates of Competency are issued by the Department of Mineral and Energy Affairs:

- (a) Certificate of Competency as Mechanical Engineer for Factories
- (b) Certificate of Competency as Electrical Engineer for Factories
- (c) Certificate of Competency as Mechanical Engineer for Mines and Works
- (d) Certificate of Competency as Electrical Engineer for Mines and Works

1.1.1.2 Written examinations for each of these certificates are conducted in June and November by the Department of Higher Education and Training in collaboration with the Commission of Examiners of the Department of Mineral and Energy and the Department of Labour.

1.1.2 Qualifying examinations:

To qualify for a Certificate of Competency as a Certificated Mechanical or Electrical Engineer for Mines and Works, the following subjects must be passed by persons accepted as candidates:

- (a) Plant Engineering
- (b) Legal Knowledge (Health and Safety Act and Regulations)

To qualify for a Certificate of Competency, candidates must obtain at least 50% in each of the subjects stipulated above. Candidates need not pass both subjects at the same examination sitting, but the second subject must be passed within three years or six consecutive examination sittings after passing the first, otherwise both subjects must be re-written. However, if a candidate obtains 75% or more of the full marks in a subject, he/she will be permanently exempted from re-writing that subject. An appropriate Certificate of Competency will be forwarded to candidates who have passed the subjects required to qualify for such a certificate.

1.1.3 Acceptance of candidates for a GCC for Factories, Mines and Works as a Certificated Mechanical or Electrical Engineer:

No person will be allowed to enter for the qualifying examination unless he/she has been accepted as a candidate by the Commission of Examiners, and no credit will be given for a pass in the subjects mentioned above prior to such acceptance. An applicant shall not be accepted as a candidate by the Commission of Examiners unless he/she has submitted proof that he/she has reached the age of 23 years, is of sober and general good conduct and that he/she is in possession of qualifications and experience in engineering as follows:

1.1.3.1 Route 1: Bachelor of Science (BSc) degree:

A BSc degree in mechanical or electrical engineering recognised by the Commission of Examiners and at least two years' appropriate practical postgraduate experience in the maintenance and operations of mechanical and electrical machinery, satisfactory to the Commission of Examiners, and of which at least one year at a time has been in the RSA; or

1.1.3.2 Route 2: National Diploma in Engineering:

A recognised National Diploma in Electrical or Mechanical Engineering plus at least two years' experience subsequent to the issuing of such a diploma in the maintenance and operations of mechanical or electrical machinery, as the case may be, which is satisfactory to the Commission of Examiners, and of which at least one year has been at a mine/factory in the RSA. The university of technology must subsequently certify that a candidate for the Government Certificate of Competency, having followed this route, has -

- (a) completed a curriculum that covers the syllabus for Plant Engineering; and
- (b) acquired a National Diploma (Engineering: Electrical or Engineering: Mechanical) and passed



the following prerequisite subjects with at least 50%:

- i. **National Diploma: Engineering: Electrical with the following subjects:**
Mechanics I/Physics I, Mechanical Engineering Drawing I, Mechanical Technology II and III, Strength of Materials II and III.
- ii. **National Diploma: Engineering: Mechanical with the following subjects:**
Electrotechnology I, II and III.

- (c) received the required experiential training; and
- (d) has completed a curriculum (as indicated below)

Students who Completed the N Dip: Engineering: Electrical:

After the completion of all the requirements for Engineering: Electrical: Engineering, candidates must register (as secondary registration) with the Department of Mechanical Engineering for six extra Mechanical Engineering subjects under qualification code NDME05.

With all these subjects completed, the candidate will meet all the academic requirements for a Government Certificate of Competency (GCC).

FIRST YEAR – FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
MDR101T	Mechanical Engineering Drawing I	(0,068)	
MHC101T	Mechanics I	(0,068)	

FIRST YEAR – SECOND SEMESTER

MET211T	Mechanical Technology II	(0,083)	Mechanics I
SMT211T	Strength of Materials II	(0,083)	Mathematics I and Mechanics I

SECOND YEAR – FIRST SEMESTER

MET331T	Mechanical Technology II	(0,083)	Communication Skills I, and Mechanical Technology II
SMT331T	Strength of Materials III	(0,083)	Communication Skills I and Strength of Materials II

Students who Completed the N Dip: Engineering: Mechanical:

After the completion of all the requirements for Engineering: Mechanical, candidates must register (as secondary registration) with the Department of Electrical Engineering for three extra Electrical Engineering subjects under qualification code NDEE12.

With all these subjects completed, the candidate will meet all the academic requirements for a Government Certificate of Competency (GCC).

FIRST YEAR – FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
ETT101T	Electrotechnology I	(0.100)	

FIRST YEAR – SECOND SEMESTER

ETT211T	Electrotechnology II	(0.100)	Electrotechnology I
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SECOND YEAR – FIRST SEMESTER

ETT311T	Electrotechnology III	(0.100)	Electrotechnology II
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1.1.3.3 Route 3: B Tech degree in Engineering:

Enrolled for the B Tech degree at a university of technology granted permission by the



Commission of Examiners with the undertaking from such university of technology to monitor and control the required experiential training after completion of such degree.

1.1.3.4 Route 4: National N Diploma in Engineering:

A N Diploma course (FET colleges) in engineering (mechanical or electrical, as the case may be). The completion of such course shall include passing all the subjects with a mark of at least 50%. Such person shall also serve an apprenticeship in an appropriate trade and gain experience in the maintenance and operations of mechanical or electrical machinery, as the case may be. Such experience, of which at least one year has been at a mine in the RSA, shall be satisfactory to the Commission of Examiners.

The Department of Higher Education and Training will structure a curriculum to cover the electrical and mechanical course according to the requirements of the Plant Engineering syllabus. After completion of the prescribed course, the Department of Higher Education and Training will be required to certify that a candidate for the Government Certificate of Competency, having followed the technical college/FET college route, has –

- (a) completed a curriculum that covers the syllabus for Plant Engineering; and
- (b) acquired a National N Certificate/National N Diploma on the N6 Level, with a mark per subject of at least 50%.

The Commission of Examiners will consider other qualifications and experience on merit.

A person who has been accepted by the Commission of Examiners as a candidate and has not obtained a Certificate of Competency in seven (7) years from the date of acceptance must reapply to the Commission for acceptance.

1.1.4 Programme offering by the Faculty of Engineering and the Built Environment for presenting the Government Certificate of Competency (GCC):

To enable applicants to enhance their respective careers as a Certificated Engineer in either factories or mines and works, the applicant must choose what the basis of his certificate would be. The choice is either mechanical engineering or electrical engineering. As soon as the applicant decides what the basis qualification will be, he/she then selects the appropriate options below, namely:

- National Diploma: Engineering: Electrical (NDEE03/12), with orientation to Power Engineering (as stipulated in subject orientation guide). There is no more specialisation with added mechanical subjects (see section 1.1.3)
- National Diploma: Engineering: Mechanical (NDME05) with added electrical subjects (see section 1.1.3)

1.1.5 Preparation for sitting for the National Examination with DHET/DOL/DME:

1.1.5.1 Examination centre:

The Tshwane University of Technology is an approved examination centre for the national examination for the two subjects that form part of the Government Certificate of Competency (GCC).

1.1.5.2 Preparatory course (SLP):

The Faculty of Engineering and the Built Environment develop a short learning programme (SLP) to guide and prepare applicants for the national examinations for the two subjects, Plant Engineering and Legal Knowledge (Health and Safety Act and Regulations). This course will be presented over a year and is structured with components of distance education and contact education and learning strategies. Applicants can obtain more information at the Office of the Dean and the departments of Electrical and Mechanical Engineering at the beginning of year.

1.1.5.3 Writing of national examination:

Candidates will be prepared to sit for the national examinations during November. Depending on the candidates' progress, they will be allowed to sit for the examinations during the June session to prepare and train them for the experience of sitting for these national examinations.



SECTION B: PHASING OUT QUALIFICATION(S)

1. DEPARTMENT OF ELECTRICAL ENGINEERING

1.1 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL Qualification code: NDEE03

Campus where offered: eMalahleni and Pretoria Campuses (day or evening classes)

NO NEW REGISTRATIONS FOR THIS QUALIFICATION WILL BE ACCEPTED AS FROM 2012. STUDENTS WHO ARE CURRENTLY REGISTERED FOR THIS QUALIFICATION HAVE UNTIL 2016/2017 TO OBTAIN IT, SUBJECT TO THE STIPULATIONS OF REGULATION 3.1.1 ON THE MAXIMUM DURATION OF STUDY.

Phase-out date: 31 December 2016 (for January intake) or 30 June 2017 (for June intake)

Key to asterisks:

* Information does not correspond to information in Report 151.
(Deviations approved by the Senate in May 2008.)

** MEQ33XT and MEQ33YT must be taken concurrently and will count as one subject.

SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
COS101T	Communication Skills I	(0,050)	
CSK101C	Computer Skills I	(0,050)	
EEN111T	Electrical Engineering I	(0,100)	
ELC111T	Electronics I	(0,100)	
ESL111T	Engineering Science I	(0,100)	
MAT171T	Mathematics I	(0,100)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

DSY131T	Digital Systems I	(0,100)	
EEN211T	Electrical Engineering II	(0,100)	Electrical Engineering I or Electrical Engineering (Extended) I
ELC211T	Electronics II	(0,100)	Electronics I or Electronics (Extended) I
MAT271T	Mathematics II	(0,100)	Mathematics I or Mathematics (Extended) I
PJT101T	Projects I	(0,100)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE FIRST YEAR:		1,000	



SECOND YEAR

FIRST SEMESTER

MAT351T	Mathematics III	(0,100)	Mathematics II
SFD201T	Software Design II	(0,100)	

plus three of the following subjects (to orient to a specific field in Electrical Engineering, students should contact the Head of the Department). Subjects are offered at the location determined by the department:

BIS101T	Bio-Systems I	(0,100)	
DCO201T	Digital Communication II	(0,100)	
DSY231T	Digital Systems II	(0,100)	Digital Systems I
EEN311T	Electrical Engineering III	(0,100)	Electrical Engineering II
ELC331T	Electronics III	(0,100)	Electronics II
EMA241T	Electrical Machines II	(0,100)	Electrical Engineering II
ETC221T	Electronic Communication II	(0,100)	Electronics II
MDR101T	Mechanical Engineering Drawing I	(0,100)*	
MEQ211T	Medical Equipment II	(0,100)	
MHC101T	Mechanics I	(0,100)	
PCM221T	Process Instrumentation II	(0,100)	Engineering Science I or Engineering Science (Extended) I
PJT201T	Projects II	(0,100)	Projects I

TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER

One of the following modules:

DPJ301T	Design Project III		
DPJ30YT	Design Project: Light Current III	(0,100)	Digital Systems II Electronics III
DPJ30ZT	Design Project: Heavy Current III	(0,100)	Electrical Engineering III Electronics II

plus four of the following subjects (to orient to a specific field in Electrical Engineering, students should contact the Head of the Department). Subjects are offered at the location determined by the department:

CSY321T	Control Systems III	(0,100)	Mathematics III
DSY341T	Digital Systems III	(0,100)	Digital Systems II
ELD331T	Electrical Distribution III	(0,100)	Electrical Engineering II
EMA341T	Electrical Machines III	(0,100)	Electrical Machines II
EPC321T	Electrical Protection III	(0,100)	Electrical Engineering II
ETC301T	Electronic Communication III	(0,100)	Electronic Communication II
LOD311T	Logic Design III	(0,100)	Digital Systems II
MEQ331T	Medical Equipment III		
MEQ33XT	Medical Equipment: Equipment III**	(0,100)	Bio-Systems I Digital Systems II Medical Equipment II
MEQ33YT	Medical Equipment: Systems III**	(0,100)	Bio-Systems I Digital Systems II Medical Equipment II
MWC301T	Microwave Communication III	(0,100)	Electronic Communication II
PCM321T	Process Instrumentation III	(0,100)	Process Instrumentation II
PWE311T	Power Electronics III	(0,100)	Electronics II



RAE311T	Radio Engineering III	(0,100)	Electronic Communication II
SFD301T	Software Design III	(0,100)	Software Design II
SMT211T	Strength of Materials II	(0,100)*	Mathematics I Mechanics I
TLV311T	Television III	(0,100)	Electronic Communication II
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE SECOND YEAR:		1,000	

THIRD YEAR

FIRST SEMESTER

EXP1EEH	Experiential Learning I	(0,500)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

EXP2EEH	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE THIRD YEAR:		1,000	

1.2 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION) Qualification code: NDEEF0

Campus where offered: eMalahleni and Pretoria campuses (day classes)

NO NEW REGISTRATIONS FOR THIS QUALIFICATION WILL BE ACCEPTED AS FROM 2012. STUDENTS WHO ARE CURRENTLY REGISTERED FOR THIS QUALIFICATION HAVE UNTIL 2017 TO OBTAIN IT, SUBJECT TO THE STIPULATIONS OF REGULATION 3.1.1 ON THE MAXIMUM DURATION OF STUDY.

Phase-out date: 31 December 2017

FIRST YEAR

CODE	SUBJECT	CREDIT
FPCOS03	Communication Skills (Extended) I	(0,050)
FPCSK02	Computer Skills (Extended) I	(0,050)
FPEEN01	Electrical Engineering (Extended) I	(0,100)
FPELC01	Electronics (Extended) I	(0,100)
FPESL01	Engineering Science (Extended) I	(0,100)
FPMAT04	Mathematics (Extended) I	(0,100)

TOTAL CREDITS FOR THE FIRST YEAR: **0,500**

Students will be required to pass all core first-year extended subjects, namely Mathematics (Extended) I, Electrical Engineering (Extended) I and Electronics (Extended) I, before they will be allowed to continue with any second-semester subjects.

As from the second year, students will continue with the subjects of the second semester of the qualification NDEE03. Please note: Students will still register for the qualification code NDEEF0 until they have completed the qualification.



2. DEPARTMENT OF GEOMATICS

2.1 NATIONAL DIPLOMA: CARTOGRAPHY

Qualification code: NDKA03

Campus where offered: Pretoria Campus (day classes)

NO NEW REGISTRATIONS FOR THIS QUALIFICATION WILL BE ACCEPTED AS FROM 2011. STUDENTS WHO ARE CURRENTLY REGISTERED FOR THIS QUALIFICATION HAVE UNTIL 2014 TO OBTAIN IT, SUBJECT TO THE STIPULATIONS OF REGULATION 3.1.1 ON THE MAXIMUM DURATION OF STUDY.

Phase-out date: 31 December 2014

Key to asterisks

* Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005.)

- **SUBJECTS PRINTED IN BOLD ARE NOT FOR REGISTRATION PURPOSES.**
- **SUBJECTS ARE OFFERED IN SEMESTERS AS DETERMINED BY THE HEAD OF THE DEPARTMENT.**

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
COS101T	Communication Skills I	(0,050)*	
CSK101G	Computer Skills I	(0,100)	
DRW101B	Drawing I	(0,083)	
GEG111T	Geography I	(0,083)	
STA111T	Statistics I	(0,084)*	
SUR111T	Surveying I		
SUR11YT	Surveying: Theory I	(0,066)	
SUR11ZT	Surveying: Practical I	(0,034)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

MAT171T	Mathematics I	(0,084)*	
MNC101T	Management: Civil I	(0,050)*	
MPJ201T	Map Projections II	(0,083)	
PHO211T	Photogrammetry II	(0,100)	
SUD211T	Survey Drawing II	(0,083)	Drawing I
SUR211T	Surveying II		
SUR21XT	Surveying: Control II	(0,043)	Surveying I
SUR21YT	Surveying: Engineering II	(0,022)	Surveying I
SUR21ZT	Surveying: Practical II	(0,035)	Surveying I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE FIRST YEAR:		1,000	



SECOND YEAR

FIRST SEMESTER

EXP1CAR	Experiential Learning I	(0,500)	Surveying I
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

EXP2CAR	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE SECOND YEAR:		1,000	

THIRD YEAR

FIRST SEMESTER

CGH301T	Cartography III	(0,125)	
COA301T	Computer Applications III	(0,100)	Computer Skills I Surveying II
MAT271T	Mathematics II	(0,100)	Mathematics I
PHU161E	Physics ID	(0,083)	
SMI301T	Stereo Mapping III	(0,100)	Photogrammetry II
TOTAL CREDITS FOR THE SEMESTER:		0,508	

SECOND SEMESTER

AJE301T	Adjustment of Errors III	(0,083)*	Mathematics II Statistics I
CGQ301T	Cartographic Techniques III		
CGQ30XT	Cartographic Techniques: Theory III	(0,063)	Survey Drawing II
CGQ30YT	Cartographic Techniques: Practical III	(0,062)	Survey Drawing II
CSU301T	Cadastral Surveying III	(0,100)	Survey Drawing II
GIS301T	Geographic Information Systems III*	(0,084)	
PHO331T	Photogrammetry III	(0,100)	Photogrammetry II
TOTAL CREDITS FOR THE SEMESTER:		0,492	
TOTAL CREDITS FOR THE THIRD YEAR:		1,000	

3. DEPARTMENT OF MECHANICAL ENGINEERING

3.1 NATIONAL DIPLOMA: POLYMER TECHNOLOGY

Qualification code: NDPY03

Campus where offered: Pretoria Campus (day classes)

NO NEW REGISTRATIONS FOR THIS QUALIFICATION WILL BE ACCEPTED AS FROM 2011. STUDENTS WHO ARE CURRENTLY REGISTERED FOR THIS QUALIFICATION HAVE UNTIL 2015 TO OBTAIN IT, SUBJECT TO THE STIPULATIONS OF REGULATION 3.1.1 ON THE MAXIMUM DURATION OF STUDY.

Phase-out date: 31 December 2015

Key to asterisks:

* Information does not correspond to information in Report 151. The old Report 151 has been used for auditing purposes for the National Diploma.
(Deviations approved by the Senate in August 2005.)



SUBJECTS ARE OFFERED IN BOTH SEMESTERS.

FIRST YEAR

FIRST SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
CHE141B	Chemistry IA	(0,166)	
MAT171T	Mathematics I	(0,083)	
PHU161B	Physics IA	(0,083)	
PTL111T	Polymer Technology I	(0,083)	
PTP111T	Polymer Technology: Practical I	(0,083)	

TOTAL CREDITS FOR THE SEMESTER: 0,498

SECOND SEMESTER

DCE111T	Drawing: Chemical Engineering I	(0,083)	
OCH221T	Organic Chemistry II	(0,083)	Chemistry IA
PME201T	Plastics Material Science II	(0,083)	Physics IA
PMP201T	Plastics Material Science: Practical II	(0,083)	Physics IA
PTL211T	Polymer Technology II	(0,083)	Polymer Technology I
PTP211T	Polymer Technology: Practical II	(0,083)	Polymer Technology: Practical I Polymer Technology I Polymer Technology: Practical I

TOTAL CREDITS FOR THE SEMESTER: 0,498

TOTAL CREDITS FOR THE FIRST YEAR: **0,996**

SECOND YEAR

FIRST SEMESTER

PCP301T	Polymer Chemistry: Practical III	(0,071)	Organic Chemistry II
PLC311T	Production Planning and Control III	(0,071)	Mathematics I
PME301T	Plastics Material Science III	(0,071)	Plastics Material Science II
PMP301T	Plastics Material Science: Practical III	(0,071)	Plastics Material Science II Plastics Material Science: Practical II
PTL311T	Polymer Technology III	(0,078)*	Polymer Technology II
PTP311T	Polymer Technology: Practical III	(0,071)	Polymer Technology II Polymer Technology: Practical II
PYC301T	Polymer Chemistry III	(0,071)	Organic Chemistry II

TOTAL CREDITS FOR THE SEMESTER: 0,504

SECOND SEMESTER

PYR101T	Polymer Production Practice I	(0,500)	
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TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE SECOND YEAR: **1,004**



THIRD YEAR

FIRST SEMESTER

PYR201T Polymer Production Practice II (0,500) Polymer Production Practice I

TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER

PYR301T Polymer Production Practice III (0,500) Polymer Production Practice II

TOTAL CREDITS FOR THE SEMESTER: 0,500

TOTAL CREDITS FOR THE THIRD YEAR: **1,000**



SECTION C: SUBJECT INFORMATION (OVERVIEW OF SYLLABUS)

Syllabus content subject to change to accommodate emerging industrial trends. **Please note:** a more detailed syllabus is available at the department or in the study guide of the subject concerned.

A

ADJUSTMENT OF ERRORS III (AJE301T) <i>(Subject custodian: Department of Geomatics)</i> Law of propagation of errors. Least squares. Applications to surveying and photogrammetry. Network adjustments, constrained networks, free networks, preanalysis, analysis of results. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
ADVANCED COMPUTER APPLICATIONS IV (ARA400T) <i>(Subject custodian: Department of Architecture)</i> Presentation software such as Art*Lantis, Piranesi, Adobe Photoshop, CorelDRAW. Video editing and multimedia production software. HTML: website design and maintenance. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
ADVANCED COMPUTER APPLICATIONS V (ARA500T) <i>(Subject custodian: Department of Architecture)</i> Presentation software such as Art*Lantis, Piranesi, Adobe Photoshop, CorelDRAW. Video editing and multimedia production software. HTML: website design and maintenance. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
ADVANCED CONTROL SYSTEMS V (ESI5010) <i>(Subject custodian: Department of Electrical Engineering)</i> A selection of advanced control system topics, such as fuzzy control, optimal and multivariable control, robust and non-linear control. (Total tuition time: ± 90 hours)	CONTINUOUS ASSESSMENT
ADVANCED EMBEDDED SYSTEMS V (ESI5011) <i>(Subject custodian: Department of Electrical Engineering)</i> A selection of advanced embedded system topics, such as multi and co-processor design, real-time and high-speed design. (Total tuition time: ± 90 hours)	CONTINUOUS ASSESSMENT
APPLIED BUILDING SCIENCE I (ABC100B) <i>(Subject custodian: Department of Architecture)</i> Basic units: units used in the building industry, SI units, basic maths, statistics, basic mechanics and structures. Principles of heat: thermal insulation, humidity and condensation, ventilation, macro- and microclimate. Principles of sound: acoustics. Electricity. Lighting: artificial light, natural light. Hydraulics. Corrosion. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
APPLIED BUILDING SCIENCE I (ABC101T) <i>(Subject custodian: Department of Building Sciences)</i> Basic applied mechanics as applied to concrete, steel and timber constructions in the building industry. Expansion and contraction. Convection, conduction and radiation of heat in buildings. Heat energy and units of measurement. Thermal conductivity and resistance. Sound: sound propagation and units of measurement, sound insulation, sound reflection, reverberation and acoustics. Reticulation and electricity consumption. Definition of basic electricity terms. Direct and indirect current. Serial and parallel circuits. Three-phase supply lines and power consumption of household appliances, pumps and lifts. Lighting in buildings: light propagation, photometry, basic units of measurement in lighting, artificial light. Basic concepts of hydrology. Pressure in liquids. Hydraulic jacks. Flow of liquid through pipes. Different types of pumps. (Total tuition time: ± 180 hours)	1 X 3-HOUR PAPER
APPLIED GEOMECHANICS IV (AGM401T) <i>(Subject custodian: Department of Civil Engineering)</i> Soil mechanics: properties of soil, testing, site investigation. Lateral earth support. Buried structures. Ground improvement. In-situ tests. Project. (Total tuition time: ± 32 hours)	1 X 3-HOUR PAPER (OPEN BOOK)



APPLIED MECHANICS (EXTENDED) I (FPAME01) <i>(Subject custodian: Department of Civil Engineering)</i> Module 1: Measurements, mechanics, motion in one-dimension kinematics, laws of motion dynamics, kinetic theory of matter and properties of matter. Module 2: Atom theory, electricity, magnetism and electromagnetism, inductors, capacitors, RLC networks. Basics of structural engineering and hydraulics, mass, vectors, forces, properties of sections, friction. Various forms of motions of bodies, Newton's laws, work and energy. Laboratory work. (Total tuition time: ± 180 hours)	1 X 3-HOUR PAPER
APPLIED MECHANICS I (AME111T) <i>(Subject custodian: Department of Civil Engineering)</i> Basics of structural engineering and hydraulics, mass, vectors, forces, properties of sections, friction. Various forms of motions of bodies, Newton's laws, work and energy. Laboratory work. (Total tuition time: ± 90 hours)	1 X 3-HOUR PAPER
APPLIED MINERAL PROCESSING II (ANP201T) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Introduction to ore preparation, chemical and physical separation of ores. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
APPLIED MINERAL PROCESSING III (ANP301T) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Equipment sizing. Power consumption. Industrial flow sheets. Environmental impact. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
APPLIED MINERAL PROCESSING IV (ANP401T) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Project that consists of a mineral processing plant design. Cost estimation. Metallurgical plant commissioning. (Total tuition time: ± 60 hours)	CONTINUOUS ASSESSMENT
APPLIED REFRACTORIES IV (ARF401T) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Principles of thermal stability. Principles of corrosion resistance: oxidation reduction. Principles of corrosion resistance: hot liquids. Principles of corrosion resistance: hot gases and dusts. The working refractory product line. The insulating refractory product line. (Total tuition time: ± 60 hours)	CONTINUOUS ASSESSMENT
APPLIED STRENGTH OF MATERIALS III (ASA301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Slope and deflection of beams. Struts, compound stresses and compound strains. Thick cylinders. Practical laboratory work. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
ARCHITECTURAL DESIGN I (ACH100T) <i>(Subject custodian: Department of Architecture)</i> Design projects at a single-storey residential scale with simple circulation and zoning. Spaces around elements and elements in space. Ergonomics: design around human spatial requirements. Structure and material as generators. Introduction to environmental effects on design. The role of context in determining aesthetics. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
ARCHITECTURAL DESIGN II (ACH200T) <i>(Subject custodian: Department of Architecture)</i> Design projects of simple low-rise (double-storey) buildings with more complex circulation requirements, emphasising in issues such as: 1. Design process: determining design generators, concept, context and concept development; 2. Structure and material as design generators; 3. Environment and climate as design generators; 4. Introduction to problem analysis. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
ARCHITECTURAL DESIGN III (ACH300T) <i>(Subject custodian: Department of Architecture)</i> Design projects of simple multi-storey buildings (i.e. offices with a basement), as well as long-span structures (i.e. factories), emphasising issues such as: 1. Problem analysis as first step to synthesis; 2. Interpretation of the brief; 3. The effects of and solutions to environmental and climatic influences on design; 4. The principles of sustainability, as applied to buildings; 5. The fabric of the city: how a design solution acts as building block within the structure and fabric of the city. (Total tuition time: not available)	CONTINUOUS ASSESSMENT



ARCHITECTURAL DESIGN IV (ACH400T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Architecture)**

Design projects and exercises to promote creativeness and lateral thinking. Visit to historical towns (Pilgrim's Rest and Dullstroom) with survey and analysis of local buildings, town structure, climate and social structure. This will culminate in an appropriate design proposal, encompassing the generation of a brief for sustainable development. Individual buildings by students will be part of a town-planning exercise carried out collectively in groups. A project utilising structure and material as major generators of design. Design projects consisting of structures with complex circulation and specialised design and/or construction and services (small auditorium, museum, etc.), as well as a mixed-use building, emphasising the following issues: problem analysis, interpretation and development of the brief. Environmental and climatic issues and their influence on design. Sustainability. Urban issues. (Total tuition time: not available)

ARCHITECTURAL DESIGN V (ACH500T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Architecture)**

Design exercises pertaining specifically to housing and community in urban and rural context. Community and building visits (precedent studies). Housing design based on mass-production systems and technology. Research paper relating to a specific field of interest. (Total tuition time: not available)

ARCHITECTURAL MANAGEMENT: CONSTRUCTION**CONTINUOUS ASSESSMENT****MATERIALS V (ARM50QT)****(Subject custodian: Department of Architecture)**

Metals: steel, stainless steel, titanium, copper, chrome, nickel and their finishes as hi-tech materials. Composite materials: carbon fibre, GRP, etc. Timber: timbers and laminates as both hi-tech and low-tech materials. Membranes: Teflon and fibre-reinforced plastics. Cables and fasteners: cables and accessories for tensile structures and glazing systems. Adhesives: for specialised applications. Earth: PISE (pneumatically impacted stabilised earth). Stone: use as a structural material. (Total tuition time: not available)

ARCHITECTURAL MANAGEMENT: CONSTRUCTION**CONTINUOUS ASSESSMENT****METHODS V (ARM50PT)****(Subject custodian: Department of Architecture)**

Post-construction analyses: how well a building performs and post-occupancy, user satisfaction surveys. Detailing: performance criteria, evaluation of existing details and generation of model details. Deterioration of buildings: performance criteria, evaluation of details and case studies. Structures: tensile, flat-plate, composite structures, performance during fires and innovative reinforced concrete. Intelligent building: automation and buildings that "learn". Systems of building: certification, standards, etc. Concepts of quality assurance in the production of buildings. Manufacturers' programmes. Indigenous African building methods. (Total tuition time: not available)

ARCHITECTURAL PRACTICE III (AHC300T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Architecture)**

Office management (drawing-office practice, forms of collaboration and doing business, strengths and weaknesses, space and equipment requirements and layout). The SAIA Practice Manual (client/architect agreement, accepting work at risk, remuneration for work at risk, styles of practice, multidisciplinary firms, agreement checklist, employment conditions, architect/consultant relationship, project managers, clerk of works, issuing drawings and documentation, the concept of principal agent). The building contract (tender procedures, types of building contracts, forms of subcontractors, dispute resolution, the role of consultants). (Total tuition time: not available)

ARCHITECTURAL PRACTICE V (AHC500T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Architecture)**

The profession: the council and institutes, legislation, scale of fees, copyright of building plans, ethics and professional conduct. Architectural services and duties: pre-project studies, appraisal and definition of the project, design concept, design development, approval and technical documentation, contract administration and inspection, supplementary services. Managing projects and clients: agreements with clients, agreeing on fees, presenting accounts for services rendered, the architect as the client's principal agent, project programming and familiarisation, directing and reviewing the project, cost-saving techniques, project control and systems, coordination of consultants, keeping in touch, developing client relationships, the second sell. The process of architecture: design and construction documentation, writing effective reports and letters, concept presentation, developing the design, management and documentation, common deficiencies in working drawings, agendas, minutes and meetings. Approvals and applications for relaxation, rezoning and special consent: relationship with statutory authorities, quality of documentation, keeping informed. Post-completion responsibilities: debriefing and job history, the owner's maintenance manual, as-built drawings, post-occupation user satisfaction surveys. (Total tuition time: not available)



ARCHITECTURAL TECHNOLOGY PRACTICE II (ARC200T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Architecture)

Presentation drawings. Working drawings and specifications. Building and site surveying. Office procedures (electronic data-management procedures, printing and plotting, issuing drawings, library, filing, staff meetings, general office duties). Local authority procedures and approval of documents. Exposure to site inspections and meetings. Liaison with consultants and representatives. (Total tuition time: not available)

ASPHALT TECHNOLOGY IV (AHT401T) 1 X 4-HOUR PAPER
(Subject custodian: Department of Civil Engineering)

Rehabilitation. Applications and design. Influence of the traffic and the environment. Project. (Total tuition time: ± 32 hours)

AUTOMATIC CONTROL IV (ATC411B, ATC411T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Gyroscopes. Elements of automatic control. Automatic control. Transducers. System design. (Total tuition time: ± 68 hours)

AUTOMATION III (ATM301B) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

Automation concept. Production works. Detroit automation. Jigs and fixtures. Automatic control of sizes. Press equipment. Numerical control. Hydrostatics. Hydraulic systems. Robotics. (Total tuition time: ± 68 hours)

B

BIO-SYSTEMS I (BIS101T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Electrical Engineering)

An engineering approach to the human body, with reference to medical terminology and the health care environment. Basic medical terminology. Organ systems: cell structure, movement structures, digestive system, ventilation, control and regulation. Special organ systems (the endocrine system), the thyroid gland. (Total tuition time: ± 70 hours)

BUILDING ENTREPRENEURSHIP IV (BEP401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Building Sciences)

Financing and establishing a business. Income tax. Budget control. Costing and cost control. Incentives. Entrepreneurship and business management as applied in the building industry. (Total tuition time: ± 180 hours)

BUILDING SERVICES III (BSV300T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Architecture)

Drainage. Water reticulation. Electrical and electronic services. Lighting. Communication. Air and gas supply. Heating and cooling. Elevators and escalators. Natural heating and ventilation. Fire protection and control. Building regulations. Employing alternative and green technology. Acoustics. Sound systems. (Total tuition time: not available)

BUSINESS ADMINISTRATION IVA (BAD40AB) 1 X 3-HOUR PAPER
(Subject custodian: Business School)

Basic business administration: accounting cycle function of bookkeeping, bookkeeping model. Trading firm: costs and returns, assets and liabilities, administration of assets. Production firm: cost classification, cost particularisation, marginal cost, results analysis. (Total tuition time: ± 80 hours)

BUSINESS ADMINISTRATION IVB (BAD40BB) 1 X 3-HOUR PAPER
(Subject custodian: Department of Managerial Accounting and Finance)

Basic business administration: accounting cycle function of bookkeeping, bookkeeping model. Trading firm: costs and returns, assets and liabilities, administration of assets. Production firm: cost classification, cost particularisation, marginal cost, results analysis. (Total tuition time: ± 80 hours)

BUSINESS LAW V (BNL501T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Industrial Engineering)

Labor law, contracts, the law of corporations and other business organisations, securities law, antitrust, secured transactions, commercial paper, income tax, pensions and benefits, trusts and estates, immigration law, employment law and bankruptcy. (Total tuition time: ± 80 hours)



BUSINESS LOGISTICS IV (BUL401T) **1 X 3-HOUR PAPER**
(Subject custodian: Department of Industrial Engineering)

Decision-making models, stock control, prediction methods, logistics performance criteria, client-order-disconnecting-moment, typology of industrial organisations, design factory layout, material management and distribution. Production control: BSC, OPT, MRP, MRPIIJIT, Kanban, queuing, department control, material development, material handling, operational research (overview). (Total tuition time: not available)

BUSINESS MANAGEMENT I (BMN120D) **1 X 3-HOUR PAPER**
(Subject custodian: Department of Management and Entrepreneurship)

Introduce the student to the basic terminology, "language" and operational procedures relating to the efficient running of a small, medium and micro-enterprises concerned with low-volume manufacture of products. Thereafter to expose the student to the fundamental realities of business, demonstrating how the disciplines, language and procedures covered are applied in product design and manufacturing enterprise. (Total tuition time: ± 160 hours)

BUSINESS MANAGEMENT II (BMN230D) **1 X 3-HOUR PAPER**
(Subject custodian: Department of Management and Entrepreneurship)

Understanding of specific commercial challenges presented within the medium to large manufacturing sector. Develop knowledge related to cost effective product packaging, advertising, distribution, marketing, product branding, Point of Sale and retail product presentation strategies. (Total tuition time: ± 160 hours)

BUSINESS MANAGEMENT III (BMN330D) **1 X 3-HOUR PAPER**
(Subject custodian: Department of Management and Entrepreneurship)

Marketing management and general management, purchasing management, personal management and integration of all business management functions. (Total tuition time: ± 160 hours)

BUSINESS MANAGEMENT V (BMN500T) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Architecture)

Organisational structures: fundamental principles and strategy, partners and philosophy, potential business, strengths and weaknesses, types of organisations, the business plan. Office accommodation: address and locality, space requirements, equipment requirements and layout, image. Office organisation: communications, stationery, library, administrative files, job files. Managing the business: financial planning and budgets, overheads, finance, value-added tax (VAT), PAYE, personal tax, pensions, etc. Insurance, project control and systems, suppliers, employing staff, the unforeseen and the unfortunate, critical management information. Larger companies: communications and structure, specialisation in design, specialisation in marketing, divisionalisation, losing the spice of life. Managing oneself and one's team: self-management, goal setting, team management and leadership, development of individuals. Time management: attitudes, tools, techniques. Marketing and generating new business: essentials of marketing, targeting by sector, building on one's strengths, filling the gaps, being prepared, selling techniques, indirect promotion, building up one's portfolio. (Total tuition time: not available)

C

CADASTRAL SURVEYING III (CSU301T) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Geomatics)

Introduction to property law. Application of act directly pertaining to surveying and act affecting surveying indirectly. (Total tuition time: ± 80 hours)

CARTOGRAPHIC TECHNIQUES: PRACTICAL III (CGQ30YT) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Geomatics)

A cartographic project that reflects cartographic knowledge. Compilation of project in the form of an atlas. (Total tuition time: ± 96 hours)

CARTOGRAPHIC TECHNIQUES: THEORY III (CGQ30XT) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Geomatics)

Sources of data, compilation. Image forming, cartographic materials, cartographic and photo-mechanical equipment (uses and care). Cartographic systems. Cartographic production. Revision methods. Copyright legislation. (Total tuition time: ± 64 hours)



CARTOGRAPHY III (CGH301T) <i>(Subject custodian: Department of Geomatics)</i> Types of maps and their uses. Cartographic representation: colour. Map design: problems and control, purpose. Applications, analysis and interpretation of maps, international cartography. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
CHEMICAL ENGINEERING TECHNOLOGY IIIA (CET33AT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Combined mass and energy balances, introduction to heat and mass transfer, fluid dynamics, pressure drops in pipes (Bernoulli's equation), humidity. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
CHEMICAL ENGINEERING TECHNOLOGY IIIB (CET33BT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Gas absorption, distillation, evaporation, drying and filtration. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
CHEMICAL ENGINEERING TECHNOLOGY: CHEMICAL PRINCIPLES (EXTENDED) II (FPC201) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Introduction to engineering (chemical, metallurgical, civil, surveying, electrical, clinical, digital technology, high-frequency technology, power engineering, process instrumentation, mechanical, industrial, mechatronics), factory safety, measurements, engineering materials, projects. Basic principles and calculation in chemical and metallurgical engineering: units and dimensions, chemical equation and stoichiometry. Gas laws. Material and energy balances. (Total tuition time: ± 120 hours)	1 X 3-HOUR PAPER
CHEMICAL ENGINEERING TECHNOLOGY: CHEMICAL PRINCIPLES II (CET20XT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Basic principles and calculation in chemical and metallurgical engineering: units and dimensions, chemical equation and stoichiometry. Gas laws. Material and energy balances. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
CHEMICAL ENGINEERING TECHNOLOGY: FLUID FLOW IV (CET40XT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Properties of fluids. Pressure. Hydrostatic forces. Buoyancy. Hydrostatic machines. Principles of pneumatic and hydraulic control systems. Flow of fluids – conservation of mass, momentum and energy. Flow in pipes. Flow measurement. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
CHEMICAL ENGINEERING TECHNOLOGY: HEAT AND MASS TRANSFER IV (CET40YT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Introduction to conduction, convection and radiation. Steady-state one-dimensional conduction. Steady-state conduction in multiple dimensions. Condensation and boiling heat transfer. Mass transfer. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER (OPEN BOOK)
CHEMICAL ENGINEERING TECHNOLOGY: METALLURGICAL PRINCIPLES II (CET20YT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Introduction to mineral processing: sample preparation, particle size analysis, comminution, crushing, grinding, industrial screening, and classification. Overview of concentration techniques: density, magnetic and electrostatic separations, froth flotation. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
CHEMICAL ENGINEERING TECHNOLOGY: UNIT OPERATIONS IV (CET40ZT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Design project, consisting of the design of a processes unit (heat exchangers, furnaces, distillation columns, etc.). Different stages in the development of a design, conceptual design, physical data collection, economic evaluation, flow diagrams, final detailed design. (Total tuition time: ± 60 hours)	CONTINUOUS ASSESSMENT
CHEMICAL PLANT IIIA (CMP33AT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Corrosion, materials technology, water treatment, mechanical separation, equipment, size reduction, material handling and storage, environmental protection. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER



CHEMICAL PLANT IIIB (CMP33BT) 1 X 3-HOUR PAPER

(Subject custodian: Department of Chemical and Metallurgical Engineering)

Piping, pumps, compressors, fans, heat exchangers, combustion, mixing and cooling towers. (Total tuition time: ± 60 hours)

CHEMICAL PROCESS DESIGN: EQUIPMENT DESIGN IV (CPD40XT) 1 X 3-HOUR PAPER

(Subject custodian: Department of Chemical and Metallurgical Engineering)

Development of conceptual flow sheets for chemical processes. Equipment sizing and costing. Economic evaluation of projects. Linear and non-linear models in flow-sheet design. Unit equation models. Solution of linear and non-linear equations in flow sheets. Thermodynamic options in flow sheets. Functioning of process simulator. (Total tuition time: ± 60 hours)

CHEMICAL PROCESS DESIGN: PLANT DESIGN IV (CPD40YT) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Chemical and Metallurgical Engineering)

The development of a conceptual flow sheet for a specific chemical process. Familiarisation with the functioning of a process simulator. Flow sheet design and simulation on the process simulator. (Total tuition time: ± 60 hours)

CHEMICAL PROCESS DESIGN: PRINCIPLES III (CPP301T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Chemical and Metallurgical Engineering)

Process design development. Flow diagrams. (Total tuition time: ± 60 hours)

CHEMICAL PROCESS INDUSTRIES II (CPI201T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Chemical and Metallurgical Engineering)

Coal processing (compulsory). Petroleum refining (compulsory). Synthetic rubber. Plastics, paper and pulp. Sugar refining. Agrochemicals. Iron and steel (compulsory). Heavy chemicals (compulsory). (Total tuition time: ± 60 hours)

CHEMISTRY (EXTENDED) IA (FPCHE03) 1 X 3-HOUR PAPER

(Subject custodian: Department of Chemistry)

Atoms, molecules and ions, chemical formulas and equations, the periodic table, chemical bonding, nomenclature of inorganic compounds, phases of matter, solutions, the rate of chemical reactions, equilibrium in chemical reactions, acids and bases, oxidation, reduction and electrochemical cells. Matter and energy: atomic structure, chemical bonding, periodic table and nomenclature of inorganic compounds. Chemical equations and stoichiometry. Solutions. Acids, bases and salts. Chemical reactions. Chemical equilibrium. Electrochemistry and redox theory. Introduction to inorganic and organic chemistry. Practical: experiments based on the theory, with the emphasis on basic laboratory techniques. (Total tuition time: ± 120 hours)

CHEMISTRY IA (CHE141B) 1 X 3-HOUR PAPER

(Subject custodian: Department of Chemistry)

Matter and energy: atomic structure, chemical bonding, periodic table and nomenclature of inorganic compounds. Chemical equations and stoichiometry. Solutions. Acids, bases and salts. Chemical reactions. Chemical equilibrium. Electrochemistry and redox theory. Introduction to inorganic and organic chemistry. Practical: experiments based on the theory, with the emphasis on basic laboratory techniques. (Total tuition time: ± 60 hours)

CLINICAL ENGINEERING TECHNOLOGY MANAGEMENT IV (CTM401T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

Environment, research and development, the manufacturing process, acquisition, commissioning, support, replacement, communication skills, personnel structures, professional ethics. (Total tuition time: ± 70 hours)

COMMERCIAL LAW: CIVIL (CLC101T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Law)

Introduction to general legal practices. Partnerships. Companies. Sales and purchase contracts. Hire purchase and credit agreements. Service contracts. Law of agency. Insurance. Insolvency. Contract law. Construction law. Project. (Total tuition time: ± 32 hours)

COMMUNICATION I (COM150C) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Applied Languages)

Relevant terminology and professional vocabulary. Summarising techniques. Comprehension. Report writing. Writing refereed articles. (Total tuition time: not available)



COMMUNICATION I (COM151T) <i>(Subject custodian: Department of Applied Languages)</i> Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 180 hours)	CONTINUOUS ASSESSMENT
COMMUNICATION SKILLS (EXTENDED) I (FPCOS03) <i>(Subject custodian: Department of Applied Languages)</i> Speaking and communication skills, listening skills, reading for academic understanding, academic vocabulary, learning strategies and information gathering, writing, business and life skills. Communication theory. Oral presentation. Technical writing skills. Group communication skills. (Total tuition time: ± 120 hours)	CONTINUOUS ASSESSMENT
COMMUNICATION SKILLS I (COS101T) <i>(Subject custodian: Department of Applied Languages)</i> Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 64 hours)	CONTINUOUS ASSESSMENT
COMPUTER-AIDED DESIGN (CDD101T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Introduction to computer-aided design (CAD), various software application packages, component and assembly modeling. Students operate CAD software in order to produce three-dimensional models, providing a basis for more advanced CAD applications and compound drawings. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
COMPUTER-AIDED DESIGN II (CMI200T) <i>(Subject custodian: Department of Architecture)</i> An advanced 3D software package, ArchiCAD and Studio VIZ. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
COMPUTER-AIDED DRAUGHTING (EXTENDED) I (FPCAI01) <i>(Subject custodian: Department of Mechanical Engineering)</i> Students will be introduced to operating systems (Windows environment), basic word-processing skills (MS-Word), spreadsheets (MS-Excel), presentations tools (PowerPoint), communications, connectivity, the internet and the Web, computer-aided draughting (CAD), various software packages and compound drawings. (Total tuition time: ± 136 hours)	CONTINUOUS ASSESSMENT
COMPUTER-AIDED DRAUGHTING I (CAI101T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Introduction to computer-aided design (CAD), various software application packages, component and assembly modeling. Students operate CAD software in order to produce three-dimensional models, providing a basis for more advanced CAD applications and compound drawings. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
COMPUTER-AIDED DRAUGHTING I (CAI110T) <i>(Subject custodian: Department of Architecture)</i> A basic 2D CAD software program; either Caddie or AutoCAD. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
COMPUTER-AIDED DRAUGHTING III (CAI310T) <i>(Subject custodian: Department of Architecture)</i> Photoshop, 3-D animation and moving image technology, namely film and fly-throughs. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
COMPUTER-AIDED DRAUGHTING: COMPUTER HARDWARE IV (CDG40PT) <i>(Subject custodian: Department of Architecture)</i> An overview of all the current important terminology, concepts and basics of computing hardware. Hardware support based on MCSE A+ certification. Software support skills relating to the Windows operating system. (Total tuition time: not available)	CONTINUOUS ASSESSMENT



<p>COMPUTER-AIDED DRAUGHTING: NETWORK SYSTEMS IV (CDG40QT) <i>(Subject custodian: Department of Architecture)</i> Networking hardware basics and terminology. Operating system set-up for networking. Data security. Maintaining networks. (Total tuition time: not available)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>COMPUTER APPLICATIONS I (COA110B) <i>(Subject custodian: Department of Architecture)</i> MS Windows, MS Word, MS Excel, CorelDRAW. Basic hardware terminology. Introduction to the Internet and e-mail. Introduction to CAD. (Total tuition time: not available)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>COMPUTER APPLICATIONS I (COA111C) <i>(Subject custodian: Department of Building Sciences)</i> Components of a microcomputer system, engineering applications of software. Managing personal computers. Introduction to computers. Basics of operating systems. Application programs, such as word-processing and spreadsheet programs. (Total tuition time: ± 180 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>COMPUTER APPLICATIONS III (COA301T) <i>(Subject custodian: Department of Geomatics)</i> Program writing and program development in a high-level language (e.g. Visual Basic, C++), subroutines, functions, files. Applications: use of software for project assignments. Database management systems: MS Access, manipulation of data. (Total tuition time: ± 96 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>COMPUTER HARDWARE V (CHH500T) <i>(Subject custodian: Department of Architecture)</i> An overview of all the current important terminology, concepts and basics of computing hardware. Hardware support based on MCSE A+ certification. Software support skills relating to the Windows operating system. (Total tuition time: not available)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>COMPUTER NETWORKS IV (CNW401T) <i>(Subject custodian: Department of Electrical Engineering)</i> Introduction, electrical interfacing, local area networks (LAN), wide area networks (WAN), Internet. (Total tuition time: ± 70 hours)</p>	<p>1 X 3-HOUR PAPER</p>
<p>COMPUTER SKILLS (EXTENDED) I (FPCSK02) <i>(Subject custodian: Department of End-User Computing)</i> Basic and advanced knowledge of word-processing (MS-Word), basic and advanced skills in creating and formatting worksheets (MS-Excel), creating and modifying basic presentations (MS PowerPoint), essential skills in database management (MS Access), designing flowcharts and basic diagrams (MS Visio Professional), introduction to computers (theory), integrating objects between MS Word, Excel, PowerPoint and Access. (Total tuition time: ± 120 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>COMPUTER SKILLS I (CSK101B, CSK101C) <i>(Subject custodian: Department of End-User Computing)</i> The subject consists of theoretical and practical components. The theoretical component introduces students to basic computer knowledge that includes evolution of computers, input devices, processing data, data storage devices, output devices, network basics, safety and green IT, computer hardware care and maintenance. The practical component covers MS Word essentials, MS Excel essentials, MS PowerPoint essentials and Windows XP essentials. (Total tuition time: ± 36 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>COMPUTER SKILLS I (CSK101G) <i>(Subject custodian: Department of Geomatics)</i> Components of a microcomputer system. Engineering applications of software. Managing personal computers. Word-processing, spreadsheets, presentations and databases (Total tuition time: ± 64 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>COMPUTER SKILLS I (CSK101E) <i>(Subject custodian: Department of Civil Engineering)</i> Components of a microcomputer system, engineering applications of software. Managing personal computers. (Total tuition time: ± 60 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>



COMPUTER STUDIES (CSD201T) <i>(Subject custodian: Department of Computer Science)</i> The basic principles of computer hardware (A+) and programming. The hardware component teaches students how to assemble and commission a PC. The programming component teaches them the C programming language. The following topics are covered: data types and conversions, program actions and loop control, functions and parameters, data structures. The subject is practice-orientated and assessment is based on a number of programming tasks completed during the semester. (Total tuition time: ± 120 hours)	1 X 4-HOUR COMPUTER-BASED
CONCRETE TECHNOLOGY IV (CCN401T) <i>(Subject custodian: Department of Civil Engineering)</i> Properties and materials. Production and supply. Special applications. Testing. (Total tuition time: ± 32 hours)	1 X 3-HOUR PAPER
CONSTRUCTION ACCOUNTING III (CSA311T) <i>(Subject custodian: Department of Building Sciences)</i> The purpose of accounting. Records and first entries. Transactions up to trial balance of business and banking transactions. Closing entries up to balance sheet. Contract, sole owners, partnership, limited company and close corporation accounts. Application of a construction accounting computer program. (Total tuition time: ± 180 hours)	1 X 3-HOUR PAPER
CONSTRUCTION AND DETAILING: CONSTRUCTION MATERIALS IV (CDL40QT) <i>(Subject custodian: Department of Architecture)</i> Cement, concrete and cementitious products. Metals: corrosion, joining, ferrous and non-ferrous metals. Bricks and blocks: clay, concrete and earth. Timber: defects and protection, products. Polymers, plastics and rubbers. Mastics. Composite materials: EIFS (external insulated finishing system), straw bale, FRC, Alucobond, Formica solid core. Paint: industrial applications (epoxy, vinyl, etc.). Adhesives: commercial and industrial (resorcinol, phenol formaldehydes). (Total tuition time: not available)	CONTINUOUS ASSESSMENT
CONSTRUCTION AND DETAILING: CONSTRUCTION METHODS IV (CDL40PT) <i>(Subject custodian: Department of Architecture)</i> Detailing: performance criteria, evaluation of existing details and generation of model details. Deterioration of buildings: performance criteria, weathering, corrosion and case studies. Stone: use as a structural material. Structures: tensile, flat-plate, composite structures, performance during fires and innovative reinforced concrete. Intelligent building: automation, buildings that "learn". Systems of building: certification, standards, etc. Concepts of quality assurance and quality control in the construction of buildings. Indigenous African building methods. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
CONSTRUCTION ECONOMICS IV (CEC401T) <i>(Subject custodian: Department of Building Sciences)</i> Introduction to construction and real estate economics, town planning laws and regulations for development. The property development process. Market research. Feasibility analysis. Executive feasibility reports. Investment analysis and finance. Risk analysis. Introduction to value engineering and life-cycle costing. Computer applications for the above. (Total tuition time: ± 180 hours)	1 X 3-HOUR PAPER
CONSTRUCTION ECONOMICS V (CEC500T) <i>(Subject custodian: Department of Building Sciences)</i> South African property law and taxation, property and facilities management, asset management, investment in capital projects, financing decisions, dividend decisions, property valuation and development. (Total tuition time: ± 180 hours)	1 X 4-HOUR PAPER (OPEN BOOK)
CONSTRUCTION LAW AND PROCEDURES IV (CLP401T) <i>(Subject custodian: Department of Building Sciences)</i> Construction law: the basic principles of South African law, law of contracts, construction law, standard conditions of building and civil engineering contracts. Industrial law and building law – practical assignments. Introduction to insurance of buildings. Procedures: tenders. (Total tuition time: ± 180 hours)	1 X 3-HOUR PAPER



CONSTRUCTION MANAGEMENT I (CMN101T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Building Sciences)

Organisations involved in the building industry. Parties involved in the construction process. Construction undertakings and their organisational structures. Obtaining contracts. Introduction to site administration and cost control. Site meetings. Management functions and components: productivity and work study. Introduction to project planning. Introduction to personnel management. Subcontractors. (Total tuition time: ± 180 hours)

CONSTRUCTION MANAGEMENT II (CMN200T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Building Sciences)

Introduction to Contract Law and the JBCC Minor Works contract. Projects based on relevant and appropriate site operations, which cover as many of the following topics as possible: legislation and company policy, communication in the micro-environment on the site, coordination of subcontractors, application of management functions and procedures, collection and application of information on plant, drawing up applications of bar charts, labour schedules, material schedules, plant-use schedules, plant maintenance schedules, networks, simple work study exercises. Application of the procurement and completion of materials for a building site. (Total tuition time: not available)

CONSTRUCTION MANAGEMENT III (CMN301T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Building Sciences)

JBCC documentation. Construction management. Policy and planning. Pre-tender planning. Contract planning. Planning techniques. Network techniques, resource scheduling and optimum cost analysis. Bar charts. Line of balance techniques. Financial reporting and control. Perspectives on estimating, valuations, cost assessment, cost control and production control. Office and site administration and documentation. Applicable clauses from the standard contract for private work. Quality control. Labour relations and labour legislation. Industrial psychology. Human resource management. Occupational safety, health and welfare. Public relations. (Total tuition time: ± 180 hours)

CONSTRUCTION MANAGEMENT IV (CMN411T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Building Sciences)

Construction management. Policy and planning. Line of balance techniques. Cost assessment and cost control. Quality control. Labour relations and labour legislation. Staff management. Public relations. Management of managers. Planning. Organising. Leading. Control. Strategy and interfaces. Product of service. Equipment and facilities. Processes. Control techniques. Personnel. Overview of project management. System theory and concept. (Total tuition time: ± 180 hours)

CONSTRUCTION MANAGEMENT V (CMN520T) 1 X 4-HOUR PAPER (OPEN BOOK)
(Subject custodian: Department of Building Sciences)

Introduction to human resource management strategy, environmental issues, affirmative action, human resource development, productivity, creating a strategic organisation, creating a learning organisation. Human resource development and training, strategic industrial relations management, key success factors and measures, implementation of strategies, performance management. (Total tuition time: ± 180 hours)

CONSTRUCTION MATERIALS (EXTENDED) I (FPCSM01) 1 X 3-HOUR PAPER
(Subject custodian: Department of Civil Engineering)

Atoms, molecules and ions, chemical formulas and equations, the periodic table, chemical bonding, nomenclature of inorganic compounds, phases of matter, solutions, the rate of chemical reactions, equilibrium in chemical reactions, acids and bases, oxidation, reduction and electrochemical cells. The behaviour and characteristics of building materials, sampling, application of laboratory equipment and tests and the interpretation of results. Borrow-pit development, environmental awareness. Standards and codes of practice of materials, manufacturing and construction methods. (Total tuition time: ± 120 hours)

CONSTRUCTION MATERIALS I (CSM101T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Civil Engineering)

The behaviour and characteristics of building materials, sampling, application of laboratory equipment and tests and the interpretation of results. Borrow-pit development, environmental awareness. Standards and codes of practice of materials, manufacturing and construction methods. (Total tuition time: ± 60 hours)



CONSTRUCTION MATERIALS I (CSM110T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Timber: SA pine, common hardwoods. Metals: steel, galvanising and aluminium. Concrete: cement types, aggregates, how to make good concrete. Masonry: bricks and blocks. Mortars: classes and types. Plasters: cement, lime and earth. Roof coverings: concrete tiles and sheet metal (profiles and laying practice). Paint: basic systems (primers, undercoats and topcoats). Floor finishes: ceramic tiles (glazed and quarry), carpets, timber and their skirtings. Fixing systems: nails, screws and bolts. (Total tuition time: not available)

CONSTRUCTION MATERIALS II (CSM200T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Timber: joints commonly used in fittings, doors, windows, etc., boards (faced and plain), plywoods. Metals: steel, brass, copper and aluminium. Plastics: fibreglass roof sheets, ABC, PMMA and PVC. Concrete: cement types, aggregates, integral finishes on concrete. Masonry: bricks and blocks, calcium silicate and earth (mud). Mortars: classes and types. Roof tiles: suitable for commercial uses. Paint: emulsions, alkyd enamels, cement washes, varnishes and timber preservatives, and paint systems (primers, undercoats and topcoats). Floor finishes: ceramic tiles (glazed and quarry), vinyl tiles and sheets, linoleum, timber (fixed and floating), and their skirtings. Mastics: silicon (air- and acetic-cured), polysulphides and principles of joint design. (Total tuition time: not available)

CONSTRUCTION MATERIALS III (CSM300T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Timber: softwoods and common hardwoods, jointing (particularly poles) and protection. Metals: steel, stainless steel, brass, copper and aluminium. Plastics: fibre-glass roof sheets, ABS, PMMA. Stone: marbles, types, concrete, load-bearing masonry. Tiles: suitable for commercial use and industrial applications. Thatch: for large structures, game lodges, fire protection. (Total tuition time: not available)

CONSTRUCTION MATERIALS IV (CSM400T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Cement, concrete and cementitious products. Metals: corrosion, joining, ferrous and non-ferrous metals. Bricks and blocks: clay, concrete and earth. Timber: defects and protection, products. Polymers, plastics and rubbers. Mastics. Composite materials: EIFS (external insulated finishing system), straw bale, FRC, Alucobond, Formica solid core. Paint: industrial applications (epoxy, vinyl, etc.). Adhesives: commercial and industrial (resorcinol, phenol formaldehydes). (Total tuition time: not available)

CONSTRUCTION MATERIALS V (CSM500T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Metals: steel, stainless steel, titanium, copper, chrome, nickel and their finishes as hi-tech materials. Composite materials: carbon fibre, GRP, etc. Timber: timbers and laminates as both hi-tech and low-tech materials. Membranes: Teflon and fibre-reinforced plastics. Cables and fasteners: cables and accessories for tensile structures and glazing systems. Adhesives for specialised applications. Earth: PISE (pneumatically impacted stabilised earth). Stone: use as a structural material. (Total tuition time: not available)

CONSTRUCTION MATERIALS TECHNOLOGY IV (KMT401T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Civil Engineering)*

Concrete technology, asphalt and bitumen technology, other materials, testing. (Total tuition time: ± 32 hours)

CONSTRUCTION METHODS I (KME101T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Civil Engineering)*

Construction methods, techniques, maintenance of and remedial work to a wide range of engineering works and projects, typical construction problems. The application of construction plant, earth-moving calculations, plant management. Standard specifications and codes of practice, contract documents. Safety legislation. (Total tuition time: ± 60 hours)

CONSTRUCTION METHODS I (KME110T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Regulations: National Building Regulations and the National Home Builders Registration Council (NHBC). Site investigation, site visits. Substructure: excavations, strip foundations (other foundation types in concept only). Superstructure: load-bearing walls, cavity walls and elementary masonry detailing. Retaining walls: garden, brick and stone. Roofs: design and selection, trusses, beams, rafters and elementary ceilings. Services: sanitary fittings, design of drainage and water supply systems, electrical systems. Fittings: residential door types and their construction. Stairs: interior stairs for applicable building types. (Total tuition time: not available)



CONSTRUCTION METHODS II (KME210T)**CONTINUOUS ASSESSMENT**

(Subject custodian: Department of Architecture)

Regulations: National Building and NHBRC Regulations, where applicable. Substructure: simple retaining walls, drainage behind walls, complex strip foundations, cut and fill. Waterproofing: semi-basements. Superstructure: load-bearing walls, cavity walls, masonry detailing, expansion joints. Roofs: trusses, beams, rafters, suspended ceiling systems and bulkheads, plastered metal lathes. Structures: pad footings, reinforced strip footings, columns and slabs. Services: design of drainage and water supply systems, stormwater catch pits, active and passive ventilation systems and fire hose reels. Fittings: commercial door types and their construction, master keying, reception counters and other commercial fittings. Stairs and ramps: interior stairs and ramps, elementary prefabricated stairs. Practical training in basic trades: bricklaying, plastering, carpentry, plumbing, painting and decorating. (Total tuition time: not available)

CONSTRUCTION METHODS III (KME310T)**CONTINUOUS ASSESSMENT**

(Subject custodian: Department of Architecture)

Regulations: National Building and NHBRC regulations, where applicable. Bricks and blocks: durability and exposure zones, bonding, joints, pointing and stability, design of multi-storey structures, tall walls, lintels and beams. Timber structures: joint design and fasteners, products and uses, floors and flooring, large-span roofs – commercial and shopping centres. Detailing: performance criteria, evaluation of existing details and generation of model details. Site and geotechnical investigations: failure of foundations, warning signs, bearing capacities, consolidation, stabilisation, groundwater, moisture content and types of soil tests. Roofs: evaluation and problem-solving, gutter and down-pipe design, expansion joint design, packing decks, roof lights and ventilators. Sustainable buildings: recyclability, resource-saving manufacture, initial and life-cycle cost-efficiency, initial and life-cycle energy efficiency, ease of use and maintenance. Thermal behaviour of buildings: revision of basic principles, microclimate and the South African scene – low-cost solutions. Thermal performance: responsive configurations, sun control, insulation and materials. Structures: trusses, portal frames, complex foundations, pre-stressing (both pre- and post-tensioning). Deterioration of buildings: performance criteria, planned maintenance, weathering, corrosion and case studies. Site and surface-water drainage: hydrological factors, site drainage, risks and risk assessment, factors affecting run-off and economic considerations. Solar energy: passive systems, active systems, trombe walls and rock beds. Building systems: agreement, certification, etc. Services: waste disposal, gas, data and communication systems, security systems and incinerators. (Total tuition time: not available)

CONSTRUCTION METHODS IV (KME400T)**CONTINUOUS ASSESSMENT**

(Subject custodian: Department of Architecture)

Detailing: performance criteria, evaluation of existing details and generation of model details. Deterioration of buildings: performance criteria, weathering, corrosion and case studies. Stone: use as a structural material. Structures: tensile, flat-plate, composite structures, performance during fires and innovative reinforced concrete. Intelligent building: automation, buildings that “learn”. Systems of building: certification, standards, etc. Concepts of quality assurance and quality control in the construction of buildings. Indigenous African building methods. (Total tuition time: not available)

CONSTRUCTION METHODS V (KME500T)**CONTINUOUS ASSESSMENT**

(Subject custodian: Department of Architecture)

Post-construction analyses: how well a building performs, post-occupancy, user satisfaction surveys. Detailing: performance criteria, evaluation of existing details and generation of model details. Deterioration of buildings: performance criteria, evaluation of details and case studies. Structures: tensile, flat-plate, composite structures, performance during fires and innovative reinforced concrete. Intelligent building: automation, buildings that “learn”. Systems of building: certification, standards, etc. Concepts of quality assurance and quality control in the construction and production of buildings. Manufacturers' programmes. Indigenous African building methods. (Total tuition time: not available)

CONSTRUCTION TECHNOLOGY I (CTY111T)**1 X 4-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

Draughtmanship and interpretation of drawings. Substructure and setting out of different types of foundations. Superstructure, i.e. walls, windows, doors. Concrete and timber suspension floors with stairs and railing. Roof construction and coverings. Electrical and plumbing services. Carpentry items, i.e. built-in cupboards, skirtings and ironmongery on fillings. Finishes on walls, floors and ceilings. Materials and properties in the building industry. (Total tuition time: ± 180 hours)



CONSTRUCTION TECHNOLOGY II (CTY210T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Building Sciences)*

Projects based on form-work materials and re-use factors. Precast concrete beams and floors. Metal doors and windows. Timber doors and windows. Glass properties. Prefabricated timber trusses. Roof coverings, eaves, flashings and rainwater goods. Dormer windows and use of attic space in roofs. Fireplaces. Fixing methods, fastenings and adhesives. Floor, wall and ceiling finishes. Drainage and plumbing detail. Paint to metal, plaster and timber. Industrial buildings. (Total tuition time: not available)

CONSTRUCTION TECHNOLOGY III (CTY311T)**1 X 4-HOUR PAPER***(Subject custodian: Department of Building Sciences)*

Framed and load-bearing, multi-floor concepts. Use of shoring and strutting for lateral support of adjacent property. Types of soils. Testing of ground pressure resistance. Types of excavations. Keeping excavations free from water. Planking and strutting in excavations. Foundations: piles, raft foundations. Basements: wall construction and waterproofing. Form work and concrete: in situ concrete, pre-stress and after-stress concrete. Steel structures. Cladding of buildings. Installation of services such as air-conditioning, lifts, escalators, fire fittings and inspection trap doors. Special finishes on walls, ceilings and floors. (Total tuition time: ± 180 hours)

CONTRACT DOCUMENTATION I (CDO100T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Drawing equipment and materials, lettering, line work and geometric exercises, graphic projections, scale, dimensioning and annotation. Working drawings: ground-floor plan, sections, elevations and site plan, application of the National Building Regulations, services layouts. Construction detailing, measuring existing work, drawing office equipment, storage of information, the role of the architect, technologist and other professional consultants, the building contractor and the client. (Total tuition time: not available)

CONTRACT DOCUMENTATION II (CDO200T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Measured drawings for restoration or for additions. Preparation of drawings for submission and approval by local authorities. Detail drawings for discussion with consultants. Construction detail design drawings. Schedules: finishing, doors, windows, cupboards, etc. Details of components and fixtures. Working drawings, which will be used as contract documents with a bill of quantities, for measuring by a quantity surveyor. (Total tuition time: not available)

CONTRACT DOCUMENTATION III (CDO300T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

NBR: safety, access for the disabled, dimensions, modular coordination. Substructure: bearing piles, basement construction, retaining walls. Structural systems: concrete, steel, timber and load-bearing masonry. Roofs: long-span sheet metal, tiles, thatch, flat concrete roofs. External construction: cladding types, industrial cladding, prefabricated cladding, curtain walling. Internal construction: partitions, stairs, glazing. Thermal performance: responsive configurations, sun control, insulation and materials. Structures: trusses, portal frames, complex foundations, pre-stressing (both pre-and post-tensioning). Construction detail design drawings. Schedules: finishing, doors, windows, cupboards, etc. Details of components and fixtures. Working drawings, which will be used as contract documents with a bill of quantities, for measuring by a quantity surveyor. (Total tuition time: not available)

CONTRACT DOCUMENTATION V (CDO500T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

No set syllabus, but this subject is based on the design thesis. It is integrated with Construction Methods V and Construction Materials V to produce a complete set of related working drawings. (Total tuition time: not available)

CONTROL OF MACHINES (CNF301T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Mechanical Engineering)*

The use of electropneumatics and electrohydraulics in the control of machines and systems. An introduction to the use of a PLC to control machines and systems, as well as fundamental robot programming. (Total tuition time: ± 120 hours)

CONTROL SURVEYING: PROJECT IIIA (CSJ30YT)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Geomatics)*

Instrument checks and adjustments. Networks: scale enlargement, t-T-correction, eccentric reductions, base extension, trilateration, auxiliary points, short-leg traverses, external orientation. Trigonometric levelling. (Total tuition time: ± 80 hours)



CONTROL SURVEYING: PROJECT IIIB (CSJ30ZT) **CONTINUOUS ASSESSMENT**
(*Subject custodian: Department of Geomatics*)
Project: Setting-out circular, compound, reverse and transition curves. Setting-out vertical curves. Photo control. (Total tuition time: ± 96 hours)

CONTROL SYSTEMS III (CSY321T) **1 X 3-HOUR PAPER**
(*Subject custodian: Department of Electrical Engineering*)
Mathematical modelling of systems, stability of linear feedback systems, steady state error, feedback-control characteristics, the root locus, compensation of feedback control and frequency response. Programmable Logic Controllers (PLCs). (Total tuition time: ± 70 hours)

CONTROL SYSTEMS IV (CSY401T) **1 X 3-HOUR PAPER**
(*Subject custodian: Department of Electrical Engineering*)
State-space analysis of linear systems. Design of compensators using gain adjustment, Lead, Lag, Lead-Lag and PID compensators. Designs of compensators for linear systems, using state space techniques. (Total tuition time: ± 70 hours)

CONTROL SYSTEMS V (CSY501T) **CONTINUOUS ASSESSMENT**
(*Subject custodian: Department of Electrical Engineering*)
System modelling, discrete-time analysis and digital controller design. (Total tuition time: ± 90 hours)

CONVERSION SYSTEMS V (CVS501T, ESI5027) **CONTINUOUS ASSESSMENT**
(*Subject custodian: Department of Electrical Engineering*)
Converter theory, electromechanical systems, electric materials, EM field calculation, distribution (non-linear and transient problems, numerical methods, applications), transmission, planning and design. (Total tuition time: ± 90 hours)

COSTING II (CSG201T) **1 X 3-HOUR PAPER**
(*Subject custodian: Department of Managerial Accounting and Finance*)
Basic methods and a group of selected techniques of cost accounting for application in the business environment. The subject consists of two modules. (Total tuition time: ± 68 hours)

CORROSION III (CRS301T) **1 X 3-HOUR PAPER**
(*Subject custodian: Department of Chemical and Metallurgical Engineering*)
Corrosion processes and corrosion testing. Electrochemistry of corrosion. Passivity. Corrosion of iron and steel. Protection against corrosion. Alloying against corrosion. Non-ferrous alloys and polymers. (Total tuition time: ± 60 hours)

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DESIGN PROJECT III (DPJ301T) **CONTINUOUS ASSESSMENT**
(*Subject custodian: Department of Electrical Engineering*)
Design, construction, testing and documentation of a complete project at the appropriate level in the particular discipline. (Total tuition time: ± 68 hours)

DESIGN PROJECT: HEAVY CURRENT III (DPJ30ZT) **CONTINUOUS ASSESSMENT**
(*Subject custodian: Department of Electrical Engineering*)
This subject covers the concepts and implementation of the design of power engineering systems. This includes the context of power engineering systems and components design (the technology-based organisation), systems engineering concepts (from problem-solving to design implementation), practical implementation, including circuit or system design, construction and documentation. Assessment is through open-book tests, a practical project, a research topic and a final examination. (Total tuition time: ± 70 hours)

DESIGN PROJECT: LIGHT CURRENT III (DPJ30YT) **CONTINUOUS ASSESSMENT**
(*Subject custodian: Department of Electrical Engineering*)
This subject covers the concepts and implementation of the design of light current systems. This includes the context of electronic, telecommunications, digital technology, medical technology, or control technology systems and components design (the technology-based organisation), systems engineering concepts (from problem-solving to design implementation), practical implementation, including circuit design, construction and documentation. Assessment is through open-book tests, a practical project, a research topic and a final examination. (Total tuition time: ± 70 hours)



DESIGN THEORY (DTH310T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Mechanical Engineering)**

Expanded design observation, awareness, reflection, argument, reading and writing skills. (Total tuition time: ± 160 hours)

DEVELOPMENT MANAGEMENT IV (DLM401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Building Sciences)**

Community development, from informal to fully developed communities. Physical development and its influence on the community. The role of the community in development. Partnership with communities. Community involvement and job creation. The contractor and the community. Guidelines and agreements for labour-intensive projects. Perceptions, expectations and consequences. Appropriate delivery systems, e.g. community trusts, corporations. (Total tuition time: ± 180 hours)

DEVELOPMENT MANAGEMENT V (DLM500T)**1 X 4-HOUR PAPER (OPEN BOOK)****(Subject custodian: Department of Building Sciences)**

External environment and stakeholders, the logistics concept, strategic approaches to logistics, operations and material flow, elements of a supply chain, in-bound logistics, production requirements through purchasing, the production system, design and productivity, production planning and control, the impact of inventory on production, inventory management, out-bound logistics, operations management in service industries. (Total tuition time: ± 180 hours)

DIGITAL COMMUNICATION II (DCO201T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Networks, OSI model, implementation, protocols, services. (Total tuition time: ± 70 hours)

DIGITAL COMMUNICATION V (ESI5001)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Electrical Engineering)**

Fourier analysis and filtering, probability and stochastic processes, information theory and entropy, advanced modulation techniques, block and convolutional coding, performance analysis, networking fundamentals, system modelling. (Total tuition time: ± 90 hours)

DIGITAL COMMUNICATIONS V (DCO501T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Electrical Engineering)**

Spectral analysis of common electronic signals: Fourier series and Fourier transform application. Source coding. Channel effect on symbol transmission and inter-symbol interference (ISI) control. Bandpass and multi-level digital modulation: generation, detection, probability of error, bandwidth efficiency, and applications. Channel coding and coding for reliable transmission over the channel. (Total tuition time: ± 90 hours)

DIGITAL CONTROL V (ESI5003)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Electrical Engineering)**

System modelling, discrete-time analysis and digital controller design. (Total tuition time: ± 90 hours)

DIGITAL CONTROL SYSTEMS IV (DCS401T)**1 X 3-HOUR PAPER (OPEN BOOK)****(Subject custodian: Department of Electrical Engineering)**

Discrete-time models and sampled data systems, difference equations, mathematical representation of the sampling process using the Z-transform, analysis of sampled data systems, stability considerations of sampled data systems, design of compensation for sampled data systems, using transform techniques. (Total tuition time: ± 70 hours)

DIGITAL ELECTRONICS V (ESI5002)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Electrical Engineering)**

Analysis of advanced digital electronic circuits, best practice design and prototyping principles. (Total tuition time: ± 90 hours)

DIGITAL SIGNAL PROCESSING IV (DSP401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Introduction to digital signal processing. Sampling analogue signals that are to be converted into their discrete counterparts. The characteristics of discrete-time signals and systems. The three different domains that discrete-time signals are represented in. Time-domain representation and analysis of discrete-time signals and systems (using convolution and difference equations), frequency-domain (Discrete Fourier series, Discrete Fourier Transform, Fast Fourier Transform) representation and analysis and the z-Transform. Applications of digital signal processing; for example, digital filter design. (Total tuition time: ± 70 hours)



DIGITAL SYSTEMS I (DSY131T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Basic components of digital circuits, namely NOT, AND and NOR gates. How more complex gates and logic functions can be built from the basic gates. Boolean algebra and Karnaugh maps are used to simplify functions. Combinational logic circuits, including adders, comparators, decoders, encoders, multiplexers, demultiplexers and error control circuits. Binary, octal, decimal and hexadecimal numbers and operations. Basic components of sequential circuits, namely latches and flip-flops. Counters. (Total tuition time: ± 70 hours)

DIGITAL SYSTEMS II (DSY231T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

How more complex memory components, such as counters and registers, can be built from the basic components. Different analogue-to-digital and digital-to-analogue converters. Introduction to microprocessor systems and programmable interface control devices (PICs). TTL and CMOS-integrated circuit technologies and electronic display units. Introduction to programmable logic devices (PLD, EPLD, FPGA). (Total tuition time: ± 70 hours)

DIGITAL SYSTEMS III (DSY341T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

The emphasis is on computer memory and microcontrollers. Static and dynamic characteristics of read-write memories (SRAM, DRAM), structure and applications. Read-only memories (ROM, EPROM, FLASH). Microcontroller architecture. The design and implementation of applications with flow charts and assembler language form an important component of the subject. (Total tuition time: ± 70 hours)

DIGITAL TECHNOLOGY I (DIT101T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Basic components of digital circuits, namely NOT, AND and NOR gates. It is subsequently shown how more complex gates and logic functions can be built from the basic gates. Boolean algebra and Karnaugh maps are used to simplify functions. Combinational logic circuits, including adders, comparators, decoders, encoders, multiplexers, demultiplexers and error control circuits are covered. Binary, octal, decimal and hexadecimal numbers and operations are also included. (Total tuition time: ± 120 hours)

DIGITAL TECHNOLOGY II (DIT201T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Basic components of sequential circuits, namely latches and flip-flops. It is subsequently shown how more complex memory components, such as counters and registers, can be built from the basic components. Different analogue-to-digital and digital-to-analogue converters are covered, and during the introduction to microprocessor systems, the programmable interface control devices (PICs) are presented. TTL and CMOS-integrated circuit technologies and electronic display units are included. The subject ends with the introduction of programmable logic devices (PLD, EPLD, FPGA). (Total tuition time: ± 120 hours)

DOCUMENTATION III (DOC301T)**1 X 3-HOUR PAPER (OPEN BOOK)****(Subject custodian: Department of Civil Engineering)**

Costing, writing of specifications and the application of standardised specifications. Computer-aided applications. Contractual aspects, payment certificates. (Total tuition time: ± 45 hours)

DRAWING (EXTENDED) I (FPDRW01)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Civil Engineering)**

Lettering, line work and freehand sketches, geometric constructions, fasteners, dimensioning, methods of projections, sectioning, interpenetration curves and pipe developments, conversions: imperial to metric, terms and abbreviations used in engineering drawing, piping diagrams. Drawing office practice. Introduction to draughtsmanship, projections (orthographic and isometric), intersections of surfaces, graphic determination of forces in frames, topographical drawings, SABS specification. (Total tuition time: ± 180 hours)

DRAWING I (DRW101B)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Geomatics)**

Drawing office practice, projections (orthographic and isometric), topographical drawings, specifications. (Total tuition time: ± 96 hours)



DRAWING I (DRW101T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Civil Engineering)**

Drawing office practice. Introduction to draughtsmanship, projections (orthographic and isometric), intersections of surfaces, graphic determination of forces in frames, topographical drawings, SABS specification. (Total tuition time: ± 90 hours)

DRAWING II (DRW201T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Civil Engineering)**

Detailing structural steel members and connections. Detailing and preparation of bending schedules for reinforced concrete members. Drawing longitudinal and cross sections for roads, and road pavement details. Sections through structures, application of National Building Regulations. (Total tuition time: ± 120 hours)

DRAWING: CHEMICAL ENGINEERING (EXTENDED) I (FPDCE01)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Chemical and Metallurgical Engineering)**

Lettering, line work and freehand sketches, geometric constructions, fasteners, dimensioning, methods of projections, sectioning, interpenetration curves and pipe developments, conversions: imperial to metric, terms and abbreviations used in engineering drawing, piping diagrams. Letter and number notation. Line notation. Handling of apparatus. Measurement notation. Geometrical construction. Orthographic projections. Isometric projections. Arcs of penetration and development. Detailed working drawings. Composite drawings. (Total tuition time: ± 120 hours)

DRAWING: CHEMICAL ENGINEERING I (DCE111T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Chemical and Metallurgical Engineering)**

Letter and number notation. Line notation. Handling of apparatus. Measurement notation. Geometrical construction. Orthographic projections. Isometric projections. Arcs of penetration and development. Detailed working drawings. Composite drawings. (Total tuition time: ± 60 hours)

E**EARTHWORKS DESIGN IV (EWD401T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Civil Engineering)**

Materials selection. Design and construction of embankments. Design and construction of cuttings. Environmental impact control. Problem soils. Compaction equipment and techniques. (Total tuition time: ± 32 hours)

ELECTRIC MACHINES (EIE301T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

A variety of electrical motors and generators are used on a large scale in the industry. This subject serves as an introduction to electrical machines and provides exposure to the principles on which such machines operate. Single-phase transformers, induction machines and direct-current machines are discussed in this subject. (Total tuition time: ± 120 hours)

ELECTRICAL DISTRIBUTION III (ELD331T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

The principles and operation of different types of power stations and substations. High-voltage transmission lines, switchgear, cables, isolators, line supports, feeders and busbars. (Total tuition time: ± 70 hours)

ELECTRICAL ENGINEERING (EXTENDED) I (FPEEN01)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Module 1: Introduction to engineering, factory safety, measurements, engineering materials, projects. Module 2: Lettering, line work and freehand sketches, geometric constructions, fasteners, dimensioning, methods of projections, sectioning, interpenetration curves and pipe developments, conversions: imperial to metric, terms and abbreviations used in engineering drawing, piping diagrams. The correct use of SI units and their applications, the construction and maintenance of batteries, a network analysis of direct current circuits and AC theory, a study of various measuring instruments. An investigation into the effects of magnetic lines of force, the application and use of magnetic fields, inductance and the factors affecting it, capacitors and their operation. (Total tuition time: ± 140 hours)



- ELECTRICAL ENGINEERING I (EEN111T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 The correct use of SI units and their applications, the construction and maintenance of batteries, a network analysis of direct current circuits and AC theory, a study of various measuring instruments. An investigation into the effects of magnetic lines of force, the application and use of magnetic fields, inductance and the factors affecting it, capacitors and their operation. (Total tuition time: ± 70 hours)
- ELECTRICAL ENGINEERING II (EEN211T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 The analysis of networks by means of different methods, the effect of harmonics, three-phase systems, power factor correction, the operation of motors and transformers. (Total tuition time: ± 70 hours)
- ELECTRICAL ENGINEERING III (EEN311T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 Three-phase balanced and unbalanced circuits. Symmetrical components and short-circuit and open-circuit problems. Per-unit and basic fault-current calculations. Power in three-phase systems. Power and energy measurements in three-phase circuits. Illumination. (Total tuition time: ± 70 hours)
- ELECTRICAL MACHINES AND DRIVES V (EEM501T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Electrical Engineering)
 Electrical machines modelling and analysis, dynamic and transient analysis of electrical machines, design of electrical machines, vector control of asynchronous machines, electronically commutated machines, special electrical machines (switch reluctance motors, permanent magnet machines, electrical actuators, etc.). (Total tuition time: ± 90 hours)
- ELECTRICAL MACHINES II (EMA241T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 Basic and applied knowledge and practical skills in the field of alternating current single-phase transformers and direct current machinery, namely their construction, principle of operation, operational theory, basic control and applications. The performance and applications of the machinery are closely linked with the improvement of their efficiency and general energy saving when applied in an industrial environment. (Total tuition time: ± 70 hours)
- ELECTRICAL MACHINES III (EMA341T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 Basic and applied knowledge and practical skills in the field of alternating current three-phase and single-phase machinery, namely their construction, principle of operation, operational theory, basic control and applications. The performance and applications of the machinery are closely linked with the improvement of their efficiency and general energy saving when applied in an industrial environment. (Total tuition time: ± 70 hours)
- ELECTRICAL MACHINES IV (EMA411T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 A deeper study of the design and maintenance of synchronous, induction and special machines, as well as the different control techniques and uses of those machines. (Total tuition time: ± 70 hours)
- ELECTRICAL PROTECTION III (EPC321T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 Faults in power systems and fault calculation. Types of relays according to number of inputs and principles of operation. Transmission line protection. Synchronous generator protection. Power transformer protection. Busbar protection. Protection of electrical motors. Instrument transformers for protection relays. (Total tuition time: ± 70 hours)
- ELECTRICAL PROTECTION IV (EPC401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 A great deal of theoretical knowledge and calculations, as well as tasks and practicals on inrush currents, protections on different types of transformer feeders, motors, generators and feeders, busbar (busbar zone protection) distance and cable differential protection. (Total tuition time: ± 70 hours)



ELECTRONIC COMMUNICATION II (ETC221T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

Introduction to communication systems, electromagnetic spectrum. Analysis of passive networks. Transmission lines. Modulation, principles of AM, FM, PM and pulse modulation. Electromagnetic waves and wave propagation. Radio receivers, superheterodyne receivers. Antenna principles. Data communication principles. (Total tuition time: ± 70 hours)

ELECTRONIC COMMUNICATION III (ETC301T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

Modulation techniques: ASK, FSK, PSK, QAM, QPSK, CPFSK, MSK, PAM, TDM, Delta, PCM and DPCM, PNH, SDH. Data control and packaging: data interfaces, matched filter, matched filter codeword detection, error detection and correction. Switching systems. Protocols: V11, V35, V24, R5232, X21 and X25. OSI layer presentation packet switching. ATM networks. Electromagnetic theory. (Total tuition time: ± 70 hours)

ELECTRONIC COMMUNICATION IV (ETC401T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

Spectral analysis of common electronic signals: time/frequency representation of signals, Fourier series and Fourier transform application, factors affecting bandwidth occupied by signal. Principles of analogue-to-digital transmission in communications: source coding, PCM, DPCM, delta modulation, bandwidth requirement of PCM, digital signalling format, multi-level signalling. Channel effect on symbol transmission and inter-symbol interference (ISI) control: ISI, eye diagram as a tool, raised cosine filtering, partial response signalling. Bandpass digital modulation: Generation and detection of ASK, FSK, CPFSK, PSK, BPSK, QPSK, MSK, and QAM, multi-level digital bandpass modulation, calculation of probability of error, bandwidth efficiency, applications. Channel coding and coding for reliable transmission over the channel: Linear block codes and cyclic codes, convolutional code. This subject is designed to equip student with the ability to design some components of communication systems that meet some specifications of overall performance, respecting some system constraints which are related to power, channel bandwidth, effect of noise and complexity of the system. ETC401T will give you the foundation needed for digital communication courses taught in higher academic degrees. (Total tuition time: ± 70 hours)

ELECTRONIC TECHNOLOGY (ENY101T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

The basic principles of electronics: the use of measuring instruments, semiconductor theory, the P-N junction, diodes and rectification, simple power supplies, the bipolar junction transistor, the field effect transistor and operational amplifiers. On completion of this subject, the student should be able to do circuit analysis and design in respect of simple power supplies without smoothing, the direct-current operation of single-stage transistor amplifiers and simple operational amplifier functions. Theoretical presentation is supported by practical experiments in a laboratory, which are taken into account during evaluation. (Total tuition time: ± 120 hours)

ELECTRONICS (EXTENDED) I (FPELC01) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

Module 1: Atom theory, electricity, magnetism and electromagnetism, inductors, capacitors, RLC networks. Module 2: Atoms, molecules and ions, chemical formulas and equations, the periodic table, chemical bonding, nomenclature of inorganic compounds, phases of matter, solutions, the rate of chemical reactions, equilibrium in chemical reactions, acids and bases, oxidation, reduction and electrochemical cells. Introduction to electronic components, analysis and design using measuring instruments, diodes and rectification, simple power supplies, DC operating point of single-stage bipolar junction- and field-effect transistor amplifiers and basic operational amplifier configurations. Theory supported by assessed practical experiments in a laboratory, including soldered and proto-board projects. (Total tuition time: ± 140 hours)

ELECTRONICS I (ELC111T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

Introduction to electronic components, analysis and design using measuring instruments, diodes and rectification, simple power supplies, DC operating point of single-stage bipolar junction- and field-effect transistor amplifiers and basic operational amplifier configurations. Theory supported by assessed practical experiments in a laboratory, including soldered and proto-board projects. (Total tuition time: ± 70 hours)



ELECTRONICS II (ELC211T) <i>(Subject custodian: Department of Electrical Engineering)</i> Modelling of electronic components and their application in circuit analysis and design. Unregulated and regulated linear power supplies with transistor and operational amplifier error correction, short-circuit protection and heat sink principles. Small-signal modelling of transistor amplifiers. Theory is supported by assessed project and practical experiments in a laboratory. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
ELECTRONICS III (ELC331T) <i>(Subject custodian: Department of Electrical Engineering)</i> Analysis and design of analogue electronic subsystems through multistage amplifier modelling, feedback configurations, time and frequency principles in amplifier systems, oscillator circuits, electromagnetic compatibility and electrical noise principles. The student should demonstrate the principles of analogue circuit design and analysis. Assessment is through a demonstrated project and written examination. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
ELECTRONICS IV (ELC411T) <i>(Subject custodian: Department of Electrical Engineering)</i> Design and analysis of electronic sub-systems by making use of basic building blocks of analogue integrated circuits. The emphasis is placed on transistor circuit design while giving enough information about operational amplifier that would enable the learner to intelligent and innovative analogue electronic designs. PSpice is widely used in this course as a most valuable design tool (student version of circuit maker or Orcad lite) in a practical project that runs through the semester. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
ELECTROTECHNOLOGY (EXTENDED) I (FPETT01) <i>(Subject custodian: Department of Electrical Engineering)</i> Atom theory, electricity, magnetism and electromagnetism, inductors, capacitors, RLC networks. The correct use of SI units and their applications. Construction and care of batteries. WS theory and different measuring instruments. The influence of magnetic lines, the application and use of magnetic fields, inductance and the factors that influence it. Capacitors and their functioning. (Total tuition time: ± 226 hours)	1 X 3-HOUR PAPER
ELECTROTECHNOLOGY I (ETT101T) <i>(Subject custodian: Department of Electrical Engineering)</i> The correct use of SI units and their applications. Construction and care of batteries. WS theory and different measuring instruments. The influence of magnetic lines, the application and use of magnetic fields, inductance and the factors that influence it. Capacitors and their functioning. (Total tuition time: ± 113 hours)	1 X 3-HOUR PAPER
ELECTROTECHNOLOGY II (ETT211T) <i>(Subject custodian: Department of Electrical Engineering)</i> Students acquire sound knowledge of systems, machines and equipment used in the field of electrical engineering for the conversion of energy, which mechanical engineers may encounter during their careers. In practical work, students learn to handle and connect equipment. Presentation, alternating current circuit theory, electrical measurements, direct-current machines and single-phase transformers are also dealt with. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
EMBEDDED SYSTEMS V (EDD501T, ESI5004) <i>(Subject custodian: Department of Electrical Engineering)</i> VHDL and FPGA design and real-time DSP implementation. (Total tuition time: ± 90 hours)	CONTINUOUS ASSESSMENT
ENERGY SYSTEMS AND TECHNOLOGY V (EGS501T) <i>(Subject custodian: Department of Electrical Engineering)</i> Modelling of alternative energy sources and corresponding technological options. (Total tuition time: ± 90 hours)	CONTINUOUS ASSESSMENT
ENGINEERING ANALYSIS V (EAN501T) <i>(Subject custodian: Department of Electrical Engineering)</i> Signal spaces, mappings, deterministic signal theory, stochastic signal theory. (Total tuition time: ± 90 hours)	CONTINUOUS ASSESSMENT
ENGINEERING BUSINESS DYNAMICS V (EBU501T) <i>(Subject custodian: Department of Industrial Engineering)</i> Fundamentals of system dynamics, system thinking, and utilisation of stock's, flows and causal loops diagram when drawing a system dynamics module. Stella software is used to draw the module. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT



ENGINEERING COMMUNICATION (EXTENDED) (FPEGN02) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Applied Languages)

Speaking and communication skills, listening skills, reading for academic understanding, academic vocabulary, learning strategies and information gathering, writing, business and life skills. These skills are acquired in an e-learning environment which would also include the following topics: 1. Operating systems (Windows environment); 2. Basic word-processing skills (MS-Word); 3. Spreadsheets (MS-Excel) Presentations tools (PowerPoint); 4. Communications, connectivity, the internet and the Web. Students will be assessed on their language, presentation and report-writing skills. Basics of technical English, verbal communication ethics, technical report writing, general business documents, presentation skills, meetings and interpersonal skills. (Total tuition time: ± 136 hours)

ENGINEERING COMMUNICATION (EXTENDED) I (FPEGN01) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Applied Languages)

Speaking and communication skills, listening skills, reading for academic understanding, academic vocabulary, learning strategies and information gathering, writing, business and life skills. Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 136 hours)

ENGINEERING COMMUNICATION (EGN101B) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Applied Languages)

Basics of technical English, verbal communication ethics, technical report writing, general business documents, presentation skills, meetings and interpersonal skills. (Total tuition time: ± 60 hours)

ENGINEERING COMMUNICATION I (EGN101T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Applied Languages)

Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 68 hours)

ENGINEERING DATA ANALYSIS V (EDY501T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Industrial Engineering)

Innovation, decision making and engineering data analysis tools are discussed to ensure effective problem solving skills. (Total tuition time: ± 80 hours)

ENGINEERING DESIGN I (EGG101T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Identify and gain experience in the use of basic engineering elements in products and product design. Become aware of underlying principles/approaches and thinking in engineering design. (Total tuition time: ± 80 hours)

ENGINEERING DESIGN II (EGG201T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

The purpose of this course is to identify and gain experience in the use of complex engineering elements in products and product design. Instil an engineering design approach/process as an optional way of thinking about design problems. (Total tuition time: ± 80 hours)

ENGINEERING DESIGN PROJECT IV (EDP400T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Mechanical Engineering)

Engineering management, project management, human resource management, law of contract, accounting and financial management, budgeting and the completion of an industrial project. (Total tuition time: ± 68 hours)

ENGINEERING MANAGEMENT IV (EGM411T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Electrical Engineering)

The engineer and the manager, the engineering organisation. Total quality management: principles, applications, the human element in engineering management, engineering and construction contracts, professional ethics, the business plan, strategic and financial management. (Total tuition time: ± 70 hours)



- ENGINEERING MATHEMATICS IV (EMT451T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Mathematics and Statistics)
 Advanced mathematical concepts are used in complex analysis and transforms. Complex variables. Complex differentiation. Complex integration. Z-transforms. Complex Fourier series. Fourier transforms. Solution of the wave equations. Matrix analysis (single-input–single-output systems). (Total tuition time: ± 70 hours)
- ENGINEERING PHYSICS II (EPH201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Physics)
 Fluid flow, ideal and viscous fluids, heat transfer, hygrometry, nuclear physics and radioactivity, basic electromagnetism, semiconductors, waves and modern physics, practical work. (Total tuition time: ± 60 hours)
- ENGINEERING SCIENCE (EXTENDED) I (FPESL01)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Physics)
 Mathematical concepts, including vectors, mechanics – kinematics in one and two dimensions, Newton's laws of motion, rotational motion, work, energy and power, static and dynamic fluids, heat: temperature and heat, heat transfer, waves and optics – properties of waves and sound, electromagnetic waves, geometric optics: light, reflection, thin lenses, prisms and dispersion, aberration, combined lenses, optical instruments, interference and diffraction. Laser: simple theory, types and applications, practical work. (Total tuition time: ± 140 hours)
- ENGINEERING SCIENCE I (ESL111T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Physics)
 Mathematical concepts, including vectors, mechanics – kinematics in one and two dimensions, Newton's laws of motion, rotational motion, work, energy and power, static and dynamic fluids, heat: temperature and heat, heat transfer, waves and optics – properties of waves and sound, electromagnetic waves, geometric optics: light, reflection, thin lenses, prisms and dispersion, aberration, combined lenses, optical instruments, interference and diffraction. Laser: simple theory, types and applications, practical work. (Total tuition time: ± 70 hours)
- ENGINEERING WORK STUDY I (EWK121T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Operations Management)
 Introduction to work study. Productivity and work study. Choice of method study techniques. Use of method study techniques. Work measurement (time studies). Human factors (and work study work). Ergonomics (an introduction). Working conditions and work environment. Jigs and clamps (an introduction). Computer applications. (Total tuition time: ± 68 hours)
- ENGINEERING WORK STUDY II (EWK221T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Operations Management)
 Work measurement (advanced). Predetermined time systems. Standard data. Activity sampling. Analytical and comparative estimation. Ergonomics (advanced). Work study applied in the administration function. Work improvement (advanced). (Total tuition time: ± 68 hours)
- ENGINEERING WORK STUDY III (EWK321T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Operations Management)
 Performance improvement programs. Productivity improvement, Objective Matrix, South African Excellence Model. Systems Analyses and Design for management. (Total tuition time: ± 68 hours)
- ENTREPRENEURIAL SKILLS (EPS101T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Management and Entrepreneurship)
 Types of businesses. Management functions. Planning, organising, guidance, control. Budgeting. Accounting. Administration. Banking. Personnel management. Customer relations. (Total tuition time: ± 60 hours)
- ENTREPRENEURSHIP IV (ENT401B)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Management and Entrepreneurship)
 Introduction to strategic management. A strategic management model for a business. Situational analysis of a business. Strategy formulation, implementation and control. Continuous improvement approaches. Case studies and projects. Entrepreneurship: principles, innovation, creativity, opportunities, entrepreneurial options, sources of support. (Total tuition time: ± 70 hours)



ENVIRONMENTAL ENGINEERING: CIVIL IV (ENR401T) **2 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
Environmental chemistry, environmental microbiology, ecology, environmental engineering, project. (Total tuition time: ± 32 hours)

ENVIRONMENTAL MANAGEMENT FOR ENGINEERS: CIVIL IV (ENN401T) **1 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
ISO 14000, environmental impact assessment, integrated environmental management, environmental audits, case studies, project. (Total tuition time: ± 32 hours)

ERGONOMICS (ERG301T) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Mechanical Engineering)
Identify and gain experience in the use of basic ergonomic concepts applicable to products and product design. Become aware of underlying principles/approaches and thinking in ergonomics. (Total tuition time: ± 60 hours)

EXPERIENTIAL LEARNING I (EXP1BDG) **EXPERIENTIAL LEARNING**
(Subject custodian: Department of Building Sciences)
Students are required to work for six months with approved employers who are –
• building contractors (preferably with MBA or BIA);
• registered quantity surveyors; or
• other employers approved by the Department of Building Sciences as being able to provide students with suitable experiential learning.
Students should be given a broad introduction to the building industry and gain as much experience in the Build Industry as possible. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING I (EXP1CAR, EXP1SUR) **EXPERIENTIAL LEARNING**
(Subject custodian: Department of Geomatics)
To meet the requirements of the National Diploma, students must complete applicable experiential learning, which will be evaluated by the Department. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING I (EXP1ECH) **EXPERIENTIAL LEARNING**
(Subject custodian: Department of Mechanical Engineering)
Students must complete a work-related project at the employer that has been approved by the University. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING I (EXP1ECI) **EXPERIENTIAL LEARNING**
(Subject custodian: Department of Civil Engineering)
Training on site or in the office of a contractor or consultant under the guidance of a mentor. Students must gain practical experience in civil engineering aspects, such as administration, drawing (CAD), design, surveying, construction supervision, contracts and geotechnical and laboratory work. A comprehensive report on the above must be submitted to the Head of the Department, for approval. (Total tuition time: a minimum of 24 weeks)

EXPERIENTIAL LEARNING I (EXP1EME, EXP1EEH) **EXPERIENTIAL LEARNING**
(Subject custodian: Department of Electrical Engineering)
Industry-related training, as determined by the industry and the University. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING I (EXP1ENM) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Electrical Engineering)
Industry-related training, as determined by the industry and the University. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING I (EXP1IEN) **EXPERIENTIAL LEARNING**
(Subject custodian: Department of Industrial Engineering)
Workshop factors: labour machine technology (types and uses), workshop planning and control, inventory control and storage, drawing office practice (design and interpretation), maintenance. Industrial engineering aspects: method study, time studies, labour standards, distribution line analysis, labour schedules. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING I (EXP1MET) **EXPERIENTIAL LEARNING**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
Practical experience in the industry. (Total tuition time: 6 months)



EXPERIENTIAL LEARNING: PRACTICE I (EXP1EYT) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Electrical Engineering*)
Industry-related training, as determined by the industry and the University. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING: WORKSHOP I (EXP1EPT) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Electrical Engineering*)
The aim is to provide the student with the required skills and knowhow to do experiential training. This include the following: Safety and first aid. Application of hand tools, power tools and equipment in practical work. Planning, designing marking and building of containers/boxes using sheet-metal work. Reading and understanding of basic schematic diagrams. Wiring techniques as used in houses, panels and electrical systems. Proteus software design package, soldering tools and techniques, measuring instruments and techniques. The planning, design, layout, construction, faultfinding, testing, documentation and presentation of a complete project. (Total tuition time: ± 120 hours)

EXPERIENTIAL LEARNING II (EXP2CAR, EXP2SUR) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Geomatics*)
To meet the requirements of the National Diploma, students must complete applicable experiential learning, which will be evaluated by the Department. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING II (EXP2BDG) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Building Sciences*)
Students are required to work for six months with approved employers who are:
• building contractors (preferably with MBA or BIA);
• registered quantity surveyors; or
• other employers approved by the Department of Building Sciences as being able to provide the students with suitable experiential learning.
Students should be given a broad introduction to the building industry and gain as much experience in the Build Industry as possible. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING II (EXP2ECI) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Civil Engineering*)
Training on site or in the office of a contractor or consultant under the guidance of a mentor. Students must gain practical experience in civil engineering aspects, such as administration, drawing (CAD), design, surveying, construction supervision, contracts and geotechnical and laboratory work. A comprehensive report on the above must be submitted to the Head of the Department, for approval. (Total tuition time: minimum of 24 weeks)

EXPERIENTIAL LEARNING II (EXP2ECH) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Chemical and Metallurgical Engineering*)
Students must complete a work-related project at the employer that has been approved by the University. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING II (EXP2EEH, EXP2EME) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Electrical Engineering*)
Industry-related training, as determined by the industry and the University. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING II (EXP2ENM) **CONTINUOUS ASSESSMENT**
(*Subject custodian: Department of Electrical Engineering*)
Industry-related training, as determined by the industry and the University. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING II (EXP2MET) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Chemical and Metallurgical Engineering*)
Practical experience in the industry. (Total tuition time: 6 months)

EXPERIENTIAL LEARNING II (EXP2IEN) **EXPERIENTIAL LEARNING**
(*Subject custodian: Department of Industrial Engineering*)
Work study. Quality assurance. Production. Systems. Facility layout and materials handling. The following fields could be covered: material-handling analysis, equipment specifications, selection and evaluation, mechanisation and automation, plant layout (analysis and renewal), office layout and planning, productivity (equipment utilisation studies and capacity analysis), form design and control, industrial systems analysis and design. (Total tuition time: 6 months)



- EXTRACTION OF NON-FERROUS METALS II (ENF201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Applied thermodynamics, reaction thermodynamics and kinetics calculations. Material sources for hydro-metallurgical processing, leaching of ores and concentrates. Separation, purification and enrichment processes for treatment of leach solutions. Precipitation processes for metal separation and recovery. Electrolytic processes for the recovery and purification of metals. (Total tuition time: ± 60 hours)
- EXTRACTION OF NON-FERROUS METALS III (ENF311T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Copper, gold, aluminium, lead, tin and zinc. Calculations. Laboratory practice. Casting of non-ferrous metals. (Total tuition time: ± 60 hours)
- EXTRACTION OF NON-FERROUS METALS IV (ENF401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Extraction of PGMs, extraction reaction kinetics and thermodynamics. Extraction of vanadium, uranium, titanium and nickel by using both pyro- and hydro-metallurgy. Applied thermodynamics. Pyro-metallurgy. Hydro-metallurgy. Electro-metallurgy. Project. (Total tuition time: ± 60 hours)

F

- FACILITY LAYOUT AND MATERIALS HANDLING II (FLM201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Industrial Engineering)
 Introduction. Strategic facilities planning. Product. Process and schedule design. Activity relationships and space requirements. Personnel requirements. Handling of materials. Facility layout. Computer-supported layout. Receiving and shipping. Storage and warehousing. Manufacturing. Office planning. Facility services. Non-manufacturing applications. Evaluating and selecting a facilities plan. Preparing and selling the facilities plan. Implementing and maintaining the facilities plan. (Total tuition time: ± 68 hours)
- FERRO-ALLOY TECHNOLOGY II (FAT201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Iron and steel production, blast furnace iron-making. Steel production. Ferro-alloy technology. Söderberg paste and electrodes. Separation processes. Furnace design. (Total tuition time: ± 60 hours)
- FERRO-ALLOY TECHNOLOGY III (FAT311T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Iron and steel production. Production of alloy steels and stainless steel. Casting of steel. Off-gas systems and pollution. Steel slags. Ferro-alloy technology. Production of ferrosilicon, ferromanganese, ferrochrome and special ferro-alloys. Ferro-alloy furnace equipment. Pollution control and pollution control equipment. (Total tuition time: ± 60 hours)
- FERRO-ALLOY TECHNOLOGY IV (FAT411T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Pyro-metallurgy. Stainless steel production. Non-ferrous metals. Mathematical modelling. (Total tuition time: ± 60 hours)
- FINANCE AND COST ACCOUNTING II (FCC201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Managerial Accounting and Finance)
 Cost price calculation, profit, financial forecasting and budgeting, influence of risk on financial decisions, capital budgeting, dividend policy, capital structure, cash management models, international business finance, investment rules. (Total tuition time: not available)
- FINANCIAL MANAGEMENT (FMN141T)** **1 X 3-HOUR PAPER (OPEN BOOK)**
(Subject custodian: Department of Mechanical Engineering)
 Costing, budgeting, cash flow, current value, inflation and building up of hire rates. (Total tuition time: ± 30 hours)
- FINANCIAL MANAGEMENT III (FMN301T)** **1 X 3-HOUR PAPER (OPEN BOOK)**
(Subject custodian: Department of Mechanical Engineering)
 Tasks and terrain of the financial manager. The capital structure of the business. Capital budgeting and time management for money. Working capital policy. The budgetary policy. Financial analysis and planning. Inflation and its effects on financial decision-making. Taxation and its effects on financial decision-making. Dividend policy. Acquisitions, mergers, prediction of business failure. Issues and concepts in financial management. (Total tuition time: ± 32 hours)



FLUID MECHANICS II (FMS211T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Properties of fluids. Pressure. Hydrostatic forces. Buoyancy. Hydrostatic machines. Principles of pneumatic and hydraulic control systems. Flow of fluids – conservation of mass, momentum and energy. Flow in pipes. Flow measurement. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
FLUID MECHANICS III (FMS331T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Pipe friction losses. Introduction to pumps – ram, jet, air, helix rotor, centrifugal and reciprocating pumps. Piping: losses, water hammer. Channel flow. Viscous flow. Vortices. Forces exerted by a moving fluid – on vanes, on vehicles. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
FLUID MECHANICS IV (FMS411T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Dimensional analysis and similarity. Flow over immersed bodies, external flow. Compressible flow. Advanced flow in pipes. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
FOUNDATION ENGINEERING IV (FDE401T) <i>(Subject custodian: Department of Civil Engineering)</i> Shallow and deep foundation design, lateral earth support. (Total tuition time: ± 32 hours)	1 X 3-HOUR PAPER (OPEN BOOK)
FREEHAND DRAWING (FHE100T) <i>(Subject custodian: Visual Communication)</i> Includes basic freehand perspective line drawing skills for designing products; how to use freehand drawing efficiently to develop, communicate and record design. (Total tuition time: ± 200 hours)	CONTINUOUS ASSESSMENT
FRENCH LANGUAGE SKILLS (ESI5007) <i>(Subject custodian: Department of Electrical Engineering)</i> Conversational French for beginners. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT

G

GEODESY IV (GED401T) <i>(Subject custodian: Department of Geomatics)</i> Introduction to spherical astronomy. Transformation of two-dimensional coordinates. Coordinate systems in three dimensions. Rotation in three dimensions, spherical trigonometry. Coordinate systems. (National Coordinate reference systems). Geodetic surveying, principles. (Control networks and dates). Principles of satellite positioning with special emphasis on the global positioning system and relating GPS and conventional surveys. Gravimetry and gravity field of the earth. (Total tuition time: ± 30 hours)	CONTINUOUS ASSESSMENT
GEOGRAPHIC INFORMATION SYSTEMS III (GIS301T) <i>(Subject custodian: Department of Geomatics)</i> Fundamentals of GIS. Spatial concepts. Spatial data. GIS hardware and software. Data input. Data analysis. GIS output. Data modeling and spatial analysis. Practical applications of GIS. (Total tuition time: ± 30 hours)	CONTINUOUS ASSESSMENT
GEOGRAPHIC INFORMATION SYSTEMS IV (GIS401T) <i>(Subject custodian: Department of Geomatics)</i> Nature of geo-referenced information. Uses, advantages and disadvantages. Data capturing and manipulation techniques. Presentation and management of information. Applications. (Total tuition time: ± 30 hours)	CONTINUOUS ASSESSMENT
GEOGRAPHY I (GEG111T) <i>(Subject custodian: Department of Geomatics)</i> Astronomical geography. Geomorphology. Climatology. South Africa: topography, settlements, maps. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
GEOLOGY: CIVIL IV (GEC401T) <i>(Subject custodian: Department of Civil Engineering)</i> Advanced engineering geology, rock mechanics, geotechnical instrumentation, geophysical methods. (Total tuition time: ± 32 hours)	1 X 3-HOUR PAPER (OPEN BOOK)



GEOMETRIC DESIGN IV (GDE401T) 1 X 4-HOUR PAPER (OPEN BOOK)

(Subject custodian: Department of Civil Engineering)

Principles and practice of road alignment, environmental impact control, design control and criteria, elements of design (geometric, safety), intersection and interchange design, drainage design, earthworks design, design project. (Total tuition time: ± 32 hours)

GEOTECHNICAL ENGINEERING II (GTE201T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Civil Engineering)

Introduction to geology, identification of minerals, classification of rocks, interpretation of geological maps. Engineering geology, identification of rock types, soil profiles, geological mapping, subsurface conditions. Engineering soils, soil composition, grading and soil classification. (Total tuition time: ± 90 hours)

GEOTECHNICAL ENGINEERING III (GTE301T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Civil Engineering)

Soil mechanics, permeability and strength of soils, stability of slopes, earth pressures. Bearing capacity of soils for founding purposes. Consolidation and settlement. Practical site investigations. (Total tuition time: ± 60 hours)

H

HIGH-FREQUENCY SYSTEMS V (ESI5005, HFS501T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Electrical Engineering)

HF system fundamentals and analysis, measurement principles and propagation models. (Total tuition time: ± 90 hours)

HIGH-VOLTAGE ENGINEERING IV (HVE401T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

Breakdown of solids, liquids and gases: ionisation and decay, breakdown in gases, solid dielectrics, liquid dielectrics. High-voltage generation: alternating voltage, direct voltages, impulse voltages. High-voltage measurement. High-voltage testing: non-destructive insulation test techniques, practical power equipment insulation tests. Corona. (Total tuition time: ± 68 hours)

HISTORY OF ARCHITECTURE I (HAC100T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Architecture)

Introduction and an overview of Western architecture, from the origins to the present day, and Southern African architecture, from the origins to the present day. Principal examples, as well as technological and cultural aspects, are highlighted and put in social context. Visits to local historical examples. (Total tuition time: not available)

HISTORY OF ART AND DESIGN (HAD110T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Fine and Applied Arts)

A general outline of the history of art and design from the beginning of recorded history to the present day to indicate broad developmental patterns. (Total tuition time: ± 200 hours)

HISTORY OF INDUSTRIAL DESIGN (HOI200T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Visual Communication)

A general outline of the history of industrial design through the industrial revolution and modern art movements. (Total tuition time: ± 160 hours)

HYDRAULIC MACHINES III (HYM301T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Mechanical Engineering)

Water turbines: Pelton, Kaplan. Centrifugal pumps: construction, characteristic curves, pump systems, net positive suction head. Fans and fan systems: design principles, fan laws, design of ducting. Hydraulic machines: components, pumps, motors, accumulators, design of systems. Fluid couplings. (Total tuition time: ± 68 hours)

HYDRAULICS IV (HDL401T) 1 X 3-HOUR PAPER (OPEN BOOK)

(Subject custodian: Department of Civil Engineering)

Hydrodynamics, hydraulic machinery (pumps, turbines, etc.), hydraulic models. Open-channel hydraulics, fluvial hydraulics, wave hydraulics. (Total tuition time: ± 32 hours)



HYDROGEOLOGY III (HGE301B) 1 X 3-HOUR PAPER

(Subject custodian: Department of Civil Engineering)

Basic concepts, the principles of groundwater hydraulics. Pumping tests and the measurement of spring and river flow. Groundwater replenishment and the rudiments of determining groundwater reserves. Hydrochemistry, water quality requirements and an introduction to the quality of South African groundwater. The water-bearing properties of South African rock groups. Geological and geophysical investigations for borehole siting. (Total tuition time: ± 32 hours)

HYDROLOGY IV (HYD401T) 1 X 3-HOUR PAPER (OPEN BOOK)

(Subject custodian: Department of Civil Engineering)

Introduction to meteorology, groundwater, surface water, water resources analysis, South African hydrology. (Total tuition time: ± 32 hours)

I

IMAGE ANALYSIS V (ESI5012) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Electrical Engineering)

Image formation, frequency domain analysis, neighbourhood processing, texture, segmentation, shape, feature extraction, transformation and classification. (Total tuition time: ± 90 hours)

IMAGE ANALYSIS SYSTEMS V (IAS501T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Electrical Engineering)

Image formation, frequency domain analysis, neighbourhood processing, texture, segmentation, shape, feature extraction, transformation and classification. (Total tuition time: not available)

INDUSTRIAL ACCOUNTING III (IAC321T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Accounting)

Introduction to financial management. Financial analysis, planning and control. Working capital management. Investment decisions. Computer applications. (Total tuition time: ± 68 hours)

INDUSTRIAL DESIGN I (ITD100T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Mechanical Engineering)

Provides a foothold in what needs to be considered when designing products (Factors of Design) and how to go about designing products. It develops basic workshop and model-making skills and provides a variety of hands-on design experiences of the important, common, workshop-based materials and processes for product and model making. (Total tuition time: ± 320 hours)

INDUSTRIAL DESIGN II (ITD200T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Mechanical Engineering)

Broadens design experiences required for mass-produced products. Use of materials, manufacturing processes, business constraints and electronic design applications are developed. Interaction with industry is encouraged. (Total tuition time: ± 400 hours)

INDUSTRIAL DESIGN III (ITD300T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Mechanical Engineering)

Extends and refines applied design skills, knowledge and practice as required for entry-level Industrial Design service. Comprehensive theoretical defence of design decisions is expected. Other subjects in the same year level are integrated into Industrial Design III projects. (Total tuition time: ± 420 hours)

INDUSTRIAL ECONOMICS II (IES201T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Marketing, Logistics and Sport Management)

Constructing recycling model, buying motives of consumers, motives of producers, demand for market group, supply of market goods, functioning of the market mechanism, pricing of production factors, role of government and foreign countries in the economic process. (Total tuition time: not available)

INDUSTRIAL ENGINEERING SYSTEMS DESIGN II (IED201T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Industrial Engineering)

Introduction to systems engineering, the systems design process from conceptual to detail design, models for economic evaluations, design for operational feasibility with emphasis on reliability and maintainability. (Total tuition time: ± 68 hours)



- INDUSTRIAL LEADERSHIP III (ILE301T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Management and Entrepreneurship)
 Leaders and management. Management planning, organising, leading and control. (Total tuition time: ± 68 hours)
- INDUSTRIAL PROJECT IV (IPR413T)** **PROJECT**
(Subject custodian: Department of Electrical Engineering)
 The industrial project is continued throughout the study period for at least 300 hours. The subject content is handled on a personal basis and is evaluated by a panel of experts. The work may be done in the University environment or in the industry itself. Assessment of the project is based on a written report and its oral presentation before a panel of experts. (Total tuition time: ± 12 months)
- INDUSTRIAL RELATIONS AND NEGOTIATION II (IRN201B)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of People Management and Development)
 Industrial relations. Strike management. Negotiation and dispute handling in the following: 1. Contractor/client and contractor/subcontractor relations; 2. Contractor/professional team relations; 3. Management/personnel relations; 4. Project manager/other parties relations. (Total tuition time: ± 32 hours)
- INFORMATION SYSTEMS IV (ISY401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Industrial Engineering)
 Structure and strategic organisational role. Computer systems resources. Decision support systems and executive information systems. Development and implementation of information systems. (Total tuition time: ± 40 hours)
- INORGANIC CHEMISTRY II (ICH231T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemistry)
 Introduction to chemical bonding and an advanced study of ionic bonding. Chemical reactions in aqueous and non-aqueous solutions. Redox chemistry. Interpretation of oxidation state diagrams. Descriptive inorganic chemistry. Practical inorganic chemistry. (Total tuition time: ± 60 hours)
- INTELLECTUAL PROPERTY MANAGEMENT V (IMP501T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Industrial Engineering)
 Intellectual property development, protection, marketing and exchange are discussed. These aspects are linked to business success. In order for business to achieve growth plans, business should have a strong IP Portfolio. (Total tuition time: ± 80 hours)
- INTERNATIONAL LAW II (INL201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Law)
 International law firm, magistrate's court, debt collections, high court, solvent deceased estates, conveyancing, secretarial and notarial practice, Stamp Duties Act, companies and close corporations. (Total tuition time: not available)
- INTERNATIONAL MARKETING II (INK201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Marketing, Logistics and Sport Management)
 Economic rationale of multi-trade business, the import/export process, international marketing environmental scanning, international monetary system, international finance and accounting. Regional market agreements, economic, cultural, political and legal environment. International marketing research, global marketplace, product/services policy and planning, new product/service development, international pricing strategy, channels of distribution and supply chain management, export/import logistics, advertising, multinational sales management, organisation, control and marketing planning and strategy. (Total tuition time: not available)
- IRRIGATION IV (IRR401T)** **1 X 3-HOUR PAPER (OPEN BOOK)**
(Subject custodian: Department of Civil Engineering)
 Soil water and plant irrigation, types of systems. Irrigation scheduling, irrigation design (feasibility studies), irrigation in South Africa, environmental impact of irrigation, design project. (Total tuition time: ± 32 hours)



L**LANDSCAPE DESIGN III (LDE310T)****CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

A brief historical overview. Terminology, perceptions and basic design principles. Landscape design and the design process. Spatial development. Land form. Circulation and paving. Site structures. Plant material. Water. Basic urban design principles. Urban ecology. (Total tuition time: not available)

LAW AND CONTRACT MANAGEMENT IV (LWC400T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Architecture)*

Contract law – basic concepts, such as contract documentation. Basic principles of South African common law. Arbitration. Construction law. Building contract. Principles of property law – forms of ownership. Tender procedures – forms of tender. Certificates. Sectional titles. Land tenure act. Principles of bankruptcy and liquidations. Nominated subcontractors. Laws governing the built environment. Case studies. (Total tuition time: not available)

LIFE CYCLE MANAGEMENT V (LCY501T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Industrial Engineering)*

Total quality, asset and environmental management integration in managing the organisation effectively. (Total tuition time: ± 80 hours)

LOGIC DESIGN III (LOD311T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Computer Systems Engineering)*

Designing programmable logic matrices (PLD, EPLD, FPGA, PAL, GAL). The next step is the intelligent controllers and mechanical control. The architecture, building up and installation of PCs. Support software. (Total tuition time: ± 70 hours)

LOGISTICS ENGINEERING IV (LEN401T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Industrial Engineering)*

Introduction to logistics. Measurement of logistics. System operational requirements. Logistics in system design. System operation and support. Logistic support management. Projects. (Total tuition time: ± 40 hours)

M**MACHINE INTELLIGENCE V (ESI5013, MII501T)****CONTINUOUS ASSESSMENT***(Subject custodian: Department of Electrical Engineering)*

Supervised learning (Bayesian classification, linear classifiers, non-linear classifiers, including neural networks and support vector machines), unsupervised learning and special topics, such as genetic algorithms and swarms and ants optimisation. (Total tuition time: ± 90 hours)

MAINTENANCE MANAGEMENT IV (MMG401T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Building Sciences)*

The history of South African construction methods and architecture. Maintenance construction methods and materials. Maintenance management. The solution and prevention of damp in buildings. Restoration, renovation, refurbishment and remodelling of existing buildings. Life-cycle costing of buildings. Computer applications. (Total tuition time: ± 180 hours)

MANAGEMENT V (ESI5006)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Electrical Engineering)*

Project management, marketing, business strategies, financial planning, new product development and engineering research methodology. (Total tuition time: ± 90 hours)

MANAGEMENT: CIVIL I (MNC101T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Civil Engineering)*

Composition of the civil engineering industry. Types of contracts, tenders, management principles, productivity. Office and site administration, quality control. Elementary economics and financial accounting. (Total tuition time: ± 45 hours)



- MANAGEMENT: CIVIL II (MNC201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
 Contract planning, planning phases of tenders and contracts. Planning techniques, priority diagrams. Financial planning and control, budgeting, cash flow, cost control. Computer applications, construction programme analyses, scheduling of resources. Legislation, labour relations, procedures and practices. (Total tuition time: ± 60 hours)
- MANAGEMENT PRINCIPLES AND PRACTICE IV (MPP401B)** **1 X 3-HOUR PAPER (OPEN BOOK)**
(Subject custodian: Department of Civil Engineering)
 Management approaches. The business environment. The functions of management. Decision-making and problem-solving. Strategic management. Management by objectives. Corporate communication. Small business management. International management. Politics, ethics and social responsibility. Case studies. (Total tuition time: ± 32 hour.)
- MANAGEMENT SKILLS I (MSK121T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of People Management and Development)
 Self-management, organisational environment, introduction to leadership and management principles. (Total tuition time: ± 60 hours)
- MANUFACTURING I (MUR101T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Mechanical Engineering)
 Train students in the safe operating procedures of workshop machinery and selected hand tools. Following the presentation of dimensioned engineering drawings, students will receive additional instruction in the production of work pieces from metals, natural fibres, ceramics and plastics. (Total tuition time: ± 80 hours)
- MANUFACTURING II (MUR201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Mechanical Engineering)
 Knowledge of various manufacturing processes, theory and applications. Material selection including surface treatments, measurement and conformity to specification. (Total tuition time: ± 80 hours)
- MANUFACTURING III (MUR301T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Mechanical Engineering)
 Apply suitable manufacturing methods to Industrial Design III projects. (Total tuition time: ± 80 hours)
- MANUFACTURING ENGINEERING (EXTENDED) (FPMFE01)** **1 X 3-HOUR PAPER AND PRACTICAL**
(Subject custodian: Department of Mechanical Engineering)
 Introduction to engineering (chemical, metallurgical, civil, surveying, electrical, clinical, digital technology, high-frequency technology, power engineering, process instrumentation, mechanical, industrial, mechatronics), factory safety, measurements, engineering materials, projects. Safety and safety legislation, identification and application of various types of steel, measuring equipment, measuring and comparators, hand and machine tools, metal cutting and machining, CNC machining, industrial robots, welding, sheet metal work, with a significant component of practical work. (Total tuition time: ± 360 hours)
- MANUFACTURING ENGINEERING (MFE101C)** **1 X 3-HOUR PAPER AND PRACTICAL**
(Subject custodian: Department of Mechanical Engineering)
 Safety and safety legislation, identification and application of various types of steel, measuring equipment, measuring and comparators, hand and machine tools, metal cutting and machining, CNC machining, industrial robots, welding, sheet metal work, with a significant component of practical work. (Total tuition time: ± 180 hours)
- MANUFACTURING ENGINEERING IV (MFE401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Mechanical Engineering)
 The management of computer-integrated manufacturing (CIM) systems will be dealt with in two parts: Part 1: Computer-aided engineering (CAE), which covers quality, process and capacity planning and costs, Part 2: Computer-aided manufacturing (CAM), which covers aspects such as automation and implementation. Individual aspects of CIM, such as robotics, flexible assembly systems (FAS) and flexible Manufacturing systems (FMS), will be covered in project work. (Total tuition time: ± 68 hours)



MANUFACTURING RELATIONS II (MFR201T) <i>(Subject custodian: Department of People Management and Development)</i> Introduction to human behaviour. Introduction to human resources management. Job evaluation, human resources planning and recruitment. Selection and induction. Individual and organisational development. Performance management. Compensation, integration, maintenance, retirement. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
MAP PROJECTIONS II (MPJ201T) <i>(Subject custodian: Department of Geomatics)</i> Introduction: the shape of the earth, isostasy, geoid, spheroid. Mathematical deductions from selected map projections. Conical projections and cylindrical projections. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
MARKET VALUATIONS IV (MKV401T) <i>(Subject custodian: Department of Building Sciences)</i> Basic principles, concepts and methods of valuations. Comparative selling and income methods, as well as the cost replacement method. Advantages and disadvantages of those methods and the application of valuation methods. Expropriation. (Total tuition time: ± 180 hours)	1 X 3-HOUR PAPER
MATERIAL TECHNOLOGY I (MIY100T) <i>(Subject custodian: Department of Mechanical Engineering)</i> This subject deals specifically with the application of materials and processing methods as a component of Industrial Design II projects. (Total tuition time: ± 120 hours)	1 X 3-HOUR PAPER
MATERIAL TECHNOLOGY II (MIY200T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Students should be able to analyse the performance requirements of products and be capable of providing feasible production strategies that include material selection, production and assembly methods with an appreciation for constraints such as economic viability and projected production volumes. (Total tuition time: ± 120 hours)	CONTINUOUS ASSESSMENT
MATERIALS AND PROCESSING II (MSS201T) <i>(Subject custodian: Department of Mechanical Engineering)</i> A study of the properties and applications of non-ferrous metals, polymers, composites, an overview of processing techniques and machinery, such as laser cutting and welding, spark erosion, plasma cutting, water jet cutting, plastic welding, composite product development, polymer product development, injection moulding and rapid proto-typing with a significant practical component. (Total tuition time: ± 120 hours)	1 X 3-HOUR PAPER AND PRACTICAL
MATHEMATICS (EXTENDED) I (FPMAT04) <i>(Subject custodian: Department of Mathematics and Statistics)</i> Basic algebra, functions, exponents and logarithm, differential calculus, trigonometry, geometry. Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration. (Total tuition time: ± 120 hours)	1 X 3-HOUR PAPER
MATHEMATICS I (MAT171T) <i>(Subject custodian: Department of Mathematics and Statistics)</i> Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
MATHEMATICS II (MAT271T) <i>(Subject custodian: Department of Mathematics and Statistics)</i> Revision of differentiation. Differentiation of functions with more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination). (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
MATHEMATICS III (MAT351T) <i>(Subject custodian: Department of Mathematics and Statistics)</i> First-order differential equations. Higher-order differential equations. Basic mathematical modelling. Laplace transforms. Systems of differential equations. Numerical solutions of differential equations. Fourier Series. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER



MATHEMATICS: CHEMICAL ENGINEERING III (MTE301T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mathematics and Statistics)

First-order differential equations. Higher-order differential equations. Basic mathematical modelling. Laplace transforms. Systems of differential equations. Numerical solutions of differential equations. Fourier Series. (Total tuition time: ± 60 hours)

MECHANICAL ENGINEERING DESIGN II (MED201T, MED202B) 1 X 3-HOUR PAPER (PRESCRIBED OPEN BOOK)
(Subject custodian: Department of Mechanical Engineering)

General introduction to design. Basic principles of design in respect of knuckle, coffered, rivetted and lozenge joints, thin cylinders, gears, shafts, keys, arms for gears, bearings, shaft couplings, pipes and pipe joints, eccentric loading of connections, welding. Drawing projects. (Total tuition time: ± 68 hours)

MECHANICAL ENGINEERING DESIGN III (MED321T) 1 X 3-HOUR PAPER (PRESCRIBED OPEN BOOK)
(Subject custodian: Department of Mechanical Engineering)

Theory: design and applications of flat-belt drives, V-belt drives, advanced tooth gearing, shafts, single-plate, multi-plate, conical and centrifugal clutches, band and block brakes, members that fail by buckling, thick cylinders, bearings and lubrication, steel ropes, helical springs, piping - fittings and valves, stays for tanks and containers. Drawing: construction of helical springs, gear teeth and helical profile of square screw thread. Conventional representation of items. Assembly drawings of designed projects. (Total tuition time: ± 68 hours)

MECHANICAL ENGINEERING DRAWING (EXTENDED) (FPMDR02) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Mechanical Engineering)

Lettering, line work and freehand sketches, geometric constructions, fasteners, dimensioning, methods of projections, sectioning, interpenetration curves and pipe developments, conversions: imperial to metric, terms and abbreviations used in engineering drawing, piping diagrams. Printing, freehand sketches. Construction of scales, ellipse, square screw thread. Isometric drawing. Oblique drawings. Developments of pipes. Curve of interpenetration of T-ends and pipe connections. Projection of prisms and pyramids. Drawing language, e.g. of machining symbols. First-angle and third-angle orthographic projection drawings of single objects, assembly drawings and detail drawings. (Total tuition time: ± 240 hours)

MECHANICAL ENGINEERING DRAWING (EXTENDED) I (FPMDR01) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Chemical and Metallurgical Engineering)

Lettering, line work and freehand sketches, geometric construction, fasteners, dimensioning, methods of projection, sectioning, interpenetration curves and pipe developments, conversions: imperial to metric, terms and abbreviations used in engineering drawing, piping diagrams. Letter and number notation. Line notation. Handling of apparatus. Measurement notation. Geometrical construction. Orthographic projections. Isometric projections. Arcs of penetration and development. Detailed working drawings. Composite drawings. (Total tuition time: ± 120 hours)

MECHANICAL ENGINEERING DRAWING (MDR111T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Mechanical Engineering)

Printing, freehand sketches. Construction of scales, ellipse, square screw thread. Isometric drawing. Oblique drawings. Development of pipes. Curve of interpenetration of T-ends and pipe connections. Projections of prisms and pyramids. Drawing language; for example, of machining symbols. First-angle and third-angle orthographic projection drawings of single objects, assembly drawings and detail drawings. (Total tuition time: ± 68 hours)

MECHANICAL ENGINEERING DRAWING I (MDR101B, MDR101T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Mechanical Engineering)

Printing, freehand sketches. Construction of scales, ellipse, square screw thread. Isometric drawing. Oblique drawings. Development of pipes. Curve of interpenetration of T-ends and pipe connections. Projections of prisms and pyramids. Drawing language; for example, of machining symbols. First-angle and third-angle orthographic projection drawings of single objects, assembly drawings and detail drawings. (Total tuition time: ± 68 hours)

MECHANICAL ENGINEERING DRAWING I (MDR101C) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Chemical and Metallurgical Engineering)

Letter and number notation. Line notation. Handling of apparatus. Measurement notation. Geometrical construction. Orthographic projections. Isometric projections. Arcs of penetration and development. Detailed working drawings. Composite drawings. (Total tuition time: ± 60 hours)



MECHANICAL MANUFACTURING ENGINEERING (EXTENDED) I (FPMME01) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Introduction to engineering (chemical, metallurgical, civil, surveying, electrical, clinical, digital technology, high-frequency technology, power engineering, process instrumentation, mechanical, industrial, mechatronics), factory safety, measurements, engineering materials, projects. Safety and safety legislation. Identification and application of various types of steel. Heat treatment of steel. Hand and machine tools. Metal cutting and machining. Alloy metals. Casting processes. Welding. (Total tuition time: ± 136 hours)

MECHANICAL MANUFACTURING ENGINEERING I (MME101T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Safety and safety legislation. Identification and application of various types of steel. Heat treatment of steel. Hand and machine tools. Metal cutting and machining. Alloy metals. Casting processes. Welding. (Total tuition time: ± 68 hours)

MECHANICAL MANUFACTURING ENGINEERING II (MME201T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Measurement. Operative practical testing. Quality and dimensional control. Gauging and measurement. Measuring instruments. Comparators. Surface measurement. (Total tuition time: ± 68 hours)

MECHANICAL MANUFACTURING ENGINEERING III (MME301T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Flow and handling of materials. Automatic machines. Management techniques to reduce work content and ineffective time. Movements of workers in the shop. Factory organisation. Design and location of a factory. The elements of costs. Factory organisation in conjunction with the costing system. Purchasing procedure. Stores routine (buying and store-keeping). Labour (engagement, time keeping and time booking, methods of remuneration). Wages. Overheads (depreciation and interest on capital). Contract costs. Factory job cost accounting. Estimating and planning. Personnel administration. Incentive schemes. The factory manager and the computer. (Total tuition time: ± 68 hours)

MECHANICS (EXTENDED) I (FPMHC01) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Module 1: Measurements, mechanics, motion in one-dimension kinematics, laws of motion dynamics, kinetic theory of matter and properties of matter. Module 2: Atoms, molecules and ions, chemical formulas and equations, the periodic table, chemical bonding, nomenclature of inorganic compounds, phases of matter, solutions, the rate of chemical reactions, equilibrium in chemical reactions, acids and bases, oxidation, reduction and electrochemical cells. Motion in one dimension. Uniform motion. Instantaneous velocity. Motion with constant acceleration. Free fall. Instantaneous acceleration, scalars, vectors, coordinate systems and vector components, vector algebra, force, Newton's first law, Newton's second law, Newton's third law, ropes and pulleys, motion in a circle. Impulse and momentum. Energy. Work. Fluids and elasticity. Thermodynamics. (Total tuition time: ± 180 hours)

MECHANICS I (MHC101C) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Dynamics: centrifugal forces, simple harmonic motion and pendulums, moments of inertia, vehicle dynamics, hoisting and hauling machines. Power transmission: bearings and couplings, belt drives. Rolling bodies. (Total tuition time: ± 180 hours)

MECHANICS I (MHC101T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Motion in one dimension. Uniform motion. Instantaneous velocity. Motion with constant acceleration. Free fall. Instantaneous acceleration. Scalars, vectors, coordinate systems and vector components, vector algebra. Force. Newton's first law, Newton's second law, Newton's third law. Ropes and pulleys. Motion in a circle. Impulse and momentum. Energy work. Fluids and elasticity. Thermodynamics. (Total tuition time: ± 70 hours)

MECHANICS II (MHC201T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering)

Dynamics: centrifugal forces, simple harmonic motion and pendulums, moments of inertia, vehicle dynamics, hoisting and hauling machines. Power transmission: bearings and couplings, belt drives. Rolling bodies. (Total tuition time: ± 120 hours)



MECHANICS III (MHC301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Kinematics: mechanisms, relative velocity diagrams, relative acceleration diagrams, coriolis component, analytical calculation of slider and crank mechanisms. Gears and gearing. Balancing: static and dynamic and out-of-balance couple. Epicyclic gear trains: velocity ratios and torque. (Total tuition time: ± 120 hours)	1 X 3-HOUR PAPER
MECHANICS OF MACHINES II (MMH211T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Dynamics: centrifugal forces, simple harmonic motion and pendulums, moments of inertia, vehicle dynamics, hoisting and hauling machines. Power transmission: bearings and couplings, belt drives. Rolling bodies. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
MECHANICS OF MACHINES III (MMH331T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Kinematics: mechanisms, relative velocity diagrams, relative acceleration diagrams, coriolis component, analytical calculation of slider and crank mechanisms. Gears and gearing. Balancing: static and dynamic and out-of-balance couple. Epicyclic gear trains: velocity ratios and torque. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
MECHANICS OF MACHINES IV (MMH411T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Introduction to vibrations. Torsional vibrations. Forced vibrations. Damped vibrations. Forced-damped vibrations. Transverse vibrations of beams. Whirling of shafts. Shock and vibration control. Practical vibration measurement and analysis. Random vibration. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
MECHATRONIC ENGINEERING DESIGN (MCD301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Theory: design of machines and systems, including the design and/or selection of appropriate automation components such as sensors, actuators and controller. The mechanical components include structural design, as well as belt drives, chain drives, gears, clutches, brakes, bearings and lubrication, steel ropes, springs, piping, fittings and valves. Conventional representation of items. Assembly drawings of designed projects. The sensors, actuators and controller(s) need to be incorporated and included in the design of machines and/or systems. (Total tuition time: ± 120 hours)	1 X 3-HOUR PAPER
MECHATRONIC ENGINEERING PRACTICE (EXPERIENTIAL LEARNING) (EXP1MEC) <i>(Subject custodian: Department of Mechanical Engineering)</i> Industry-related training, as determined and agreed on by training providers in industry and the University. The training should be at technician level, and involve the application of knowledge and skills obtained during the academic studies. Typical topics are investigation, analysis, problem-solving, design and development, commissioning, improvement, optimisation, quality control, etc. (Total tuition time: ± 420 hours)	CONTINUOUS ASSESSMENT
MEDICAL EQUIPMENT II (MEQ211T) <i>(Subject custodian: Department of Electrical Engineering)</i> Introduction to medical equipment and medical systems. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
MEDICAL EQUIPMENT: EQUIPMENT III (MEQ33XT) <i>(Subject custodian: Department of Electrical Engineering)</i> Introduction to transducers, detectors and sensors, diagnostic equipment and systems: thermometers, blood pressure measurement, electrocardiography, electro-encephalography, electromyography, lung function and spirometry, cardiac output monitoring, specialised systems, therapeutic equipment and systems: infusion pumps, dialysis machines, ventilation. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
MEDICAL EQUIPMENT: EQUIPMENT IV (MEQ40XT) <i>(Subject custodian: Department of Electrical Engineering)</i> Health delivery systems, overview of health policies and systems for treating patients, clinical engineering support systems, environmental hazards: health hazards, sterilisation, quarantine, EMC, gases. Advanced therapeutic equipment: anaesthesia, ventilators, energy transfer instruments, thrombo-elastography. Rehabilitation devices: cardiovascular prosthesis and assist devices, therapy equipment, therapy-supportive equipment, physiological prostheses. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER



- MEDICAL EQUIPMENT: SYSTEMS III (MEQ33YT)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 Electrical safety of medical equipment and systems, testing for performance of systems and fault-finding. Non-ionising radiation: production and detection, introduction to clinical engineering management. (Total tuition time: ± 70 hours)
- MEDICAL EQUIPMENT: SYSTEMS IV (MEQ40YT)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 Advanced transducers and sensors, advanced measurement and analysis techniques, modern imaging systems. (Total tuition time: ± 70 hours)
- METALLURGICAL CHEMISTRY II (MCI201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemistry)
 Physical chemistry: introduction. Gases. Electrochemistry. Chemical equilibrium. Rates and mechanisms of chemical reactions. Colloidal properties of solutions. Colloids. Metallurgical analysis: sampling. Volumetric analysis. Gravimetric analysis. Instruments and analysis in the metal industry. (Total tuition time: ± 60 hours)
- METALLURGICAL THERMODYNAMICS II (MGH201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Introduction. First and second law of thermodynamics. Heat capacity. Real gases. Thermodynamic relations. Properties of mixtures. Absorption. Enthalpy. Entropy (processes: spontaneous, reversible, irreversible). Free energy. Ellingham diagram for oxides and sulphides. Chemical equilibrium. Principles of phase equilibrium. Construction of phase diagrams: binary, free energy. (Total tuition time: ± 60 hours)
- METALLURGICAL THERMODYNAMICS III (MGH301T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Application of the thermodynamics laws to metallurgical processes including extraction and refining of metals, electrochemistry, interfacial phenomena, and corrosion. Topics will include, review of thermodynamics laws and functions, free energy and phase equilibria, solution thermodynamics, kinetics of metallurgical reaction systems. (Total tuition time: ± 60 hours)
- METALLURGY (EXTENDED) I (FPMEY01)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Atom theory, electricity, magnetism and electromagnetism, inductors, capacitors, RLC networks. Basic concepts of atomic bonds, crystal structures and material properties. Control over properties by heat treatment, microstructure and phase diagrams. Measuring material properties with mechanical tests like tensile tests, hardness tests, impact tests, etc. General forming processes, plastic strain, strain hardening, hot working, cold working, recrystallisation. Getting acquainted with the well-known non-ferrous alloys. The basic properties and behaviour of ceramics, polymers and compound materials. (Total tuition time: ± 120 hours)
- METALLURGY I (MEY101T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Basic concepts of atomic bonds, crystal structures and material properties. Control over properties by heat treatment, microstructure and phase diagrams. Measuring material properties with mechanical tests like tensile tests, hardness tests, impact tests, etc. General forming processes, plastic strain, strain hardening, hot working, cold working, recrystallisation. Getting acquainted with the well-known non-ferrous alloys. The basic properties and behaviour of ceramics, polymers and compound materials. (Total tuition time: ± 60 hours)
- MICRO-CONTROLLER SYSTEMS IV (MCS401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Microcontrollers can be seen in action all around us. Although not noticeable, the microcontrollers function in environments not suitable for personal computers. Students learn the advantages and shortcomings of microcontrollers. The practical applications with which the students are confronted stress the importance of microcontroller use. (Total tuition time: ± 70 hours)
- MICROSYSTEMS DESIGN IV (MSD401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 The world of the microprocessor and microcomputer is discovered in this subject, taking the i486 as an example. It is covered in fair detail, from register level to the general software design. The i386-EX with its integrated peripherals on the same chip is investigated as a complete microcomputer. (Total tuition time: ± 70 hours)



MICROWAVE COMMUNICATION III (MWC301T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Electrical Engineering)

Maxwell equations, electrical model of a transmission line, response of lines, wave propagation on lines, transmission line losses, impedance matching, and transmission line measurements. Microwave devices-waveguides, passive components, microwave solid state devices, microwave tubes and microwave antennas. Radio wave propagation: ground wave, ionospheric and line-of-sight propagation, terrestrial microwave communication. (Total tuition time: ± 70 hours)

MICROWAVE ENGINEERING IV (MWE401T) 1 X 3-HOUR PAPER (OPEN BOOK)

(Subject custodian: Department of Electrical Engineering)

Introduction to electromagnetic field theory. Microstrip design and matching at RF. Space diversity engineering. Innovations in system design and implementation. Surveying and radio network planning. Assessment of digital radio performance, propagation, outage time and prediction, interference. (Total tuition time: ± 70 hours)

MINERAL PROCESSING: CHEMICAL PRINCIPLES (EXTENDED) II (FPMNP01) 1 X 3-HOUR PAPER

(Subject custodian: Department of Chemical and Metallurgical Engineering)

Introduction to engineering (chemical, metallurgical, civil, surveying, electrical, clinical, digital technology, high-frequency technology, power engineering, process instrumentation, mechanical, industrial, mechatronics), factory safety, measurements, engineering materials and projects. Understanding the units and dimensions of the British, SI and American engineering systems. Converting one set of units to another. Defining a mole and converting from moles to mass and the reverse for any chemical compound, given the molecular weight. Writing and balancing chemical reaction equations. Calculating the stoichiometric quantities of reactants and products, given the chemical reaction. Understanding the mass conservation law. Calculating material balances for systems without chemical reactions. Calculating material balances for systems with chemical reactions. (Total tuition time: ± 120 hours)

MINERAL PROCESSING: CHEMICAL PRINCIPLES II (MNP20XT) 1 X 3-HOUR PAPER

(Subject custodian: Department of Chemical and Metallurgical Engineering)

Understanding the units and dimensions of the British, SI and American engineering systems. Converting one set of units to another. Defining a mole and converting from moles to mass and the reverse for any chemical compound, given the molecular weight. Writing and balancing chemical reaction equations. Calculating the stoichiometric quantities of reactants and products, given the chemical reaction. Understanding the mass conservation law. Calculating material balances for systems without chemical reactions. Calculating material balances for systems with chemical reactions. (Total tuition time: ± 60 hours)

MINERAL PROCESSING: METALLURGICAL PRINCIPLES II (MNP20YT) 1 X 3-HOUR PAPER

(Subject custodian: Department of Chemical and Metallurgical Engineering)

Ideal gas equation of state, PVT behaviour and cubic equations of state, energy balances and first law of thermodynamics, steam tables, phase changes and humidification processes, state properties and process changes, mixing and solution processes, effect of reactions on material and energy balances. (Total tuition time: ± 60 hours)

MULTIMEDIA PRESENTATION (MUO300T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Visual Communication)

Project application of the spectrum of contemporary design media skills used for effective and unhindered design development and communication. (Total tuition time: ± 200 hours)

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NETWORK SYSTEMS IV (NSY401T) 1 X 3-HOUR PAPER

(Subject custodian: Department of Information Technology)

This subject introduces the basic concepts and principles of wireless communication. The topics discussed include mobile radio propagation, coverage and capacity of mobile network, spread-spectrum, roaming, handover, wireless LAN and MAN, and emerging networks such as ad hoc and sensor networks. (Total tuition time: ± 20 hours)

NETWORK SYSTEMS V (NSY500T) CONTINUOUS ASSESSMENT

(Subject custodian: Department of Mechanical Engineering)

Networking hardware basics and terminology. Operating system set-up for networking. Data security. Maintaining networks. Software support skills (network-related) for Windows 2000 Professional and Windows XP. (Total tuition time: not available)



NETWORKS AND COMMUNICATION (NUA301T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering)**

An overview of networking and communication in the mechatronic environment, including fundamentals and applications of Bus systems such as R485, Ethernet, Profi-bus and ASI-net, as well as an introduction to the MCS 51 microcontroller, voice recognition, vision systems and GSM. (Total tuition time: ± 120 hours)

NUMERICAL METHODS AND STATISTICS IV (NMS401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mathematics and Statistics)**

Mathematical basics, non-linear equations, ordinary differential equations, interpolation, numerical integration, sampling, descriptive statistics, regression analysis, probability. (Total tuition time: ± 70 hours)

O**OFFICE PRACTICE: ARCHITECTURAL PRACTICE IV (OFP40PT)****CONTINUOUS ASSESSMENT****(Subject custodian: Department of Architecture)**

The profession: the council and institutes, legislation, scale of fees, copyright of building plans, ethics and professional conduct. Architectural services and duties: pre-project studies, appraisal and definition of the project, design concept, design development, approval and technical documentation, contract administration and inspection, supplementary services. Managing projects and clients: agreements with clients, agreeing on fees, presenting accounts for services rendered, the architect as the client's principal agent, project programming and familiarisation, directing and reviewing the project, cost-saving techniques, project control and systems, coordination of consultants, keeping in touch, developing client relationships, the second sell. The process of architecture: design and construction documentation, writing effective reports and letters, concept presentation, developing the design, management and documentation, common deficiencies in working drawings, agendas, minutes and meetings. Approvals and applications for relaxation, rezoning and special consent: relationship with statutory authorities, quality of documentation, remaining informed. Post-completion responsibilities: debriefing and job history, the owner's maintenance manual, as-built drawings, post-occupation, user satisfaction surveys. (Total tuition time: not available)

OFFICE PRACTICE: BUSINESS MANAGEMENT IV (OFP40QT)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Architecture)**

Organisational structures: fundamental principles and strategy, partners and philosophy, potential business, strengths and weaknesses, types of organisations, the business plan. Office accommodation: address and locality, space requirements, equipment requirements and layout, image. Office organisation: communications, stationery, library, administrative files, job files. Managing the business: financial planning and budgets, overheads, finance, value-added tax (VAT), PAYE, personal tax, pensions, etc. Insurance, project control and systems, suppliers, employing staff, the unforeseen and the unfortunate, critical management information. Larger companies: communications and structure, specialisation in design, specialisation in marketing, divisionalisation, losing the spice of life. Managing oneself and one's team: self-management, goal setting, team management and leadership, development of individuals. Time management: attitudes, tools, techniques. Marketing and generating new business: essentials of marketing, targeting by sector, building on one's strengths, filling the gaps, being prepared, selling techniques, indirect promotion, building up a portfolio. (Total tuition time: not available)

OPERATIONAL RESEARCH III (ORS321T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Industrial Engineering)**

Fundamentals of decision theory. Decision trees and utility theory. Marginal analysis and normal distribution. Game theory. Linear programming: graphic methods. Linear programming: the simplex method. Linear programming: sensitivity analysis, duality. Linear programming: applications. Transportation and assignment. Integer programming, goal programming and the branch and bound method. Dynamic programming. Simulation. Markov analysis. (Total tuition time: ± 90 hours)

OPTO-ELECTRONICS IV (OET401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Optical fibre wave guides: introduction, wave guide principles, transmission properties, fibre technology. Optical sources: emission, types, and transmission circuits. Optical detectors: principles, semiconductor transmitter type and semiconductor receiver circuits. Optical fibre systems: applications, measurements, noise and losses. (Total tuition time: ± 70 hours)



ORGANIC CHEMISTRY II (OCH221T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Chemistry)**

Aliphatic hydrocarbons. Benzene. Alkyl and aryl halides. Alkanols and alkoxy alkanes. Phenols. Alkanals and alkanones. Carboxylic acids and derivatives. Amines. Practical organic chemistry. (Total tuition time: ± 60 hours)

P**PAVEMENT TECHNOLOGY IV (PTY401T)****1 X 4-HOUR PAPER (OPEN BOOK)****(Subject custodian: Department of Civil Engineering)**

Pavement design factors (gravel, flexible, rigid), pavement construction (gravel, flexible, rigid), pavement assessment and rehabilitation, pavement management, project. (Total tuition time: ± 32 hours)

PHOTOGRAMMETRY II (PHO211T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Geomatics)**

Applications, geometry of vertical photos, stereocopy, parallax, optics, cameras. Mapping - the approximate solution, elementary flight planning. (Total tuition time: ± 80 hours)

PHOTOGRAMMETRY III (PHO331T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Geomatics)**

Rectification of aerial photos, terrestrial photogrammetry, photo control for aerial triangulation. Photogrammetric flight planning project. (Total tuition time: ± 80 hours)

PHYSICAL CHEMISTRY II (PCB221T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Chemistry)**

Gases (ideal and non-ideal). Liquid surface tension, viscosity, additive properties. Chemical kinetics. Chemical equilibrium. Colloids. Colligative properties of solutions. Electrochemistry. Practical physical chemistry. (Total tuition time: ± 60 hours)

PHYSICAL METALLURGY I (PML101T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Chemical and Metallurgical Engineering)**

Binary phase diagrams and their interpretation, phase reactions, equilibria and non-equilibrium solidification of Fe-Fe₃C, Al-Si and Cu-Zn systems. Strengthening mechanisms, solidification phenomena. Heat treatment: the common processes like annealing, normalising, hardening, martempering, etc. Hardenability and the use of hardenability data. IT diagrams corrosion: an introduction to the eight basic corrosion types. (Total tuition time: ± 60 hours)

PHYSICS (EXTENDED) IA (FPPHU03)**1 X 3-HOUR PAPER****(Subject custodian: Department of Physics)**

Basic mathematics for physics, measurements, kinematics in one and two dimensions, Newton's laws of motion, dynamics of uniform circular motion, work, energy and power, impulse and momentum, rotational kinematics, rotational dynamics, fluids, temperature and heat, the ideal gas law and kinetic theory, thermodynamics, electric forces and electric fields, electric potential energy and the electric potential, electric circuits, geometric optics – reflection of light: mirrors, refraction of light: lenses and optical instruments. Practical work. (Total tuition time: ± 120 hours)

PHYSICS IA (PHU161B)**1 X 3-HOUR PAPER****(Subject custodian: Department of Physics)**

Basic mathematics for physics, measurements, kinematics in one and two dimensions, Newton's laws of motion, dynamics of uniform circular motion, work, energy and power, impulse and momentum, rotational kinematics, rotational dynamics, fluids, temperature and heat, the ideal gas law and kinetic theory, thermodynamics, electric forces and electric fields, electric potential energy and the electric potential, electric circuits, geometric optics – reflection of light: mirrors, refraction of light: lenses and optical instruments. Practical work. (Total tuition time: ± 60 hours)

PHYSICS ID (PHU161E)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Physics)**

Basic mathematics for physics, measurements, classical mechanics – force and Newton's laws of motion, basic rotational motion, gravitation, torque, heat, wave motion, sound, electromagnetic waves, geometric optics – light, reflection, thin lenses, prisms and dispersion, aberration, combined lenses, optical instruments, interference and diffraction. Laser: Simple theory, types and applications. Practical work (Total tuition time: ± 80 hours)



PLASTICS MATERIAL SCIENCE II (PME201T) <i>(Subject custodian: Department of Mechanical Engineering)</i> The basic principles of polymer physics. Emphasis is placed on flow and other physical properties, as well as interactions with, for instance, additives. (Total tuition time: ± 84 hours)	1 X 3-HOUR PAPER
PLASTICS MATERIAL SCIENCE III (PME301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> A more advanced overview of polymer physics. The effect of structures or additives on secondary bonds. Electrical properties of polymers. The design of parameters for the use of polymers in specific applications. (Total tuition time: ± 75 hours)	1 X 3-HOUR PAPER
PLASTICS MATERIAL SCIENCE: PRACTICAL II (PMP201T) <i>(Subject custodian: Department of Mechanical Engineering)</i> The theoretical principles. Correctly designed practicals that reflect the knowledge gained in the relevant theoretical subject (physical testing methods for polymer assessment). (Total tuition time: ± 64 hours)	CONTINUOUS ASSESSMENT
PLASTICS MATERIAL SCIENCE: PRACTICAL III (PMP301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Practical tests and testing techniques relating to the theoretical studies. In addition, students undertake a practical project in the form of a mini-script that encompasses both material science and plastics technology. (Total tuition time: ± 60 hours)	CONTINUOUS ASSESSMENT
POLYMER CHEMISTRY III (PYC301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Advanced polymerisation techniques, characterisation, structure and properties, properties of commercial polymers. (Total tuition time: ± 75 hours)	1 X 3-HOUR PAPER
POLYMER CHEMISTRY: PRACTICAL III (PCP301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Polymerisation reactions are carried out, and the reactions are controlled by means of sophisticated analytical techniques. (Total tuition time: ± 64 hours)	CONTINUOUS ASSESSMENT
POLYMER PRODUCTION PRACTICE I (PYR101T) <i>(Subject custodian: Department of Mechanical Engineering)</i> In this six-month period of experiential learning in the industry, students are expected to apply their theoretical training in the work situation. This training is closely monitored by the lecturer concerned. (Total tuition time: six months)	EXPERIENTIAL LEARNING
POLYMER PRODUCTION PRACTICE II (PYR201T) <i>(Subject custodian: Department of Mechanical Engineering)</i> In this six-month period of experiential learning in the industry, students are expected to apply their theoretical training in the work situation. This training is closely monitored by the lecturer concerned. (Total tuition time: ± six months)	EXPERIENTIAL LEARNING
POLYMER PRODUCTION PRACTICE III (PYR301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> In this six-month period of experiential learning in the industry, students are expected to apply their theoretical training in the work situation. This training is closely monitored by the lecturer concerned. (Total tuition time: six months)	EXPERIENTIAL LEARNING
POLYMER SCIENCE IV (PYW400T) <i>(Subject custodian: Department of Mechanical Engineering)</i> There are two components, namely Polymer Chemistry and Polymer Physics. Polymer Chemistry examines the bond between the chain structure, morphology, microstructure and the solvability and molecular mass. Speciality polymer, cross-bonding reactions and the mechanism of degradation and protection against degradation are also examined. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
POLYMER SCIENCE: PRACTICAL IV (PWP410T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Practicals relating to Polymer Science IV. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT



POLYMER TECHNOLOGY I (PTL111T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Students acquire a thorough basic knowledge of materials. An overview is also given of the processes used in the plastics conversion industry. (Total tuition time: ± 84 hours)	1 X 3-HOUR PAPER
POLYMER TECHNOLOGY II (PTL211T) <i>(Subject custodian: Department of Mechanical Engineering)</i> The operating and design principles of the processes relating to the screw pump, injection moulding, profile extrusion blow moulding and injection blow moulding. Emphasis is placed on the interrelationship between the process and the material to be converted. (Total tuition time: ± 84 hours)	1 X 3-HOUR PAPER
POLYMER TECHNOLOGY III (PTL311T) <i>(Subject custodian: Department of Mechanical Engineering)</i> The emphasis is placed on tool and die design. All the other conversion techniques not yet covered are also studied. (Total tuition time: ± 84 hours)	1 X 3-HOUR PAPER
POLYMER TECHNOLOGY IV (PYT400T) <i>(Subject custodian: Department of Mechanical Engineering)</i> This subject comprises compulsory, as well as free-choice, subject matter. Compulsory subject matter includes the selection of polymers and mix design, chemical technology of fluid systems, cellular polymers, polymer films, textiles, polymer morphology, polymer structural analysis. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
POLYMER TECHNOLOGY: PRACTICAL I (PTP111T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Practicals relating to library and computer skills, compression moulding and general thermoset moulding techniques. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
POLYMER TECHNOLOGY: PRACTICAL II (PTP211T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Practical applications of plastics technology theory. (Total tuition time: ± 90 hours)	CONTINUOUS ASSESSMENT
POLYMER TECHNOLOGY: PRACTICAL III (PTP311T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Students are expected to apply theory to a project which encompasses one or more of the manufacturing techniques, and which links the properties to the theory, as studied in Material Science. (Total tuition time: ± 90 hours)	CONTINUOUS ASSESSMENT
POLYMER TECHNOLOGY: PRACTICAL IV (POP410T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Practicals relating to Polymer Technology IV. (Total tuition time: ± 80 hours)	CONTINUOUS ASSESSMENT
POWER ANALYSIS V (PWN501T) <i>(Subject custodian: Department of Electrical Engineering)</i> Power flow analysis, stability analysis of power systems, control of power systems. (Total tuition time: ± 90 hours)	CONTINUOUS ASSESSMENT
POWER ELECTRONICS III (PWE311T) <i>(Subject custodian: Department of Electrical Engineering)</i> Principles of power semiconductor devices. Single-phase rectifiers, basic principles of DC choppers, basic control of inverters, AC voltage controllers and single-phase supplied DC drives. Design principles to protect semiconductor components against overvoltage, overcurrent, overheat, too high dV/dt and dI/dt and also ways to implement them in series and parallel. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
POWER ELECTRONICS IV (PWE411T) <i>(Subject custodian: Department of Electrical Engineering)</i> Revision of theory from PWE311T. Study of three-phase rectifiers. In-depth design of non-isolated DC choppers. Control of inverters. Basic control principles of switch mode DC power supplies. Design of high-frequency transformers and inductors and also of driver circuits. Three-phase supplied DC drives. AC and DC drive control principles. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER



POWER SYSTEMS IV (PWS401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Theory: transmission line design parameters, resistance, inductance, capacitance, parallel circuit three-phase lines. Power systems and load flow analysis: node equations, bus admittance, network reduction, Gauss Seidal solution, Newton Raphson solution, DC power flow. Load and frequency control. Transient operation of transmission line: travelling waves, Bewley lattice diagram, power system over voltages – lightning surges, switching surges. Stability: the swing equation, power angle equation, simplified synchronous machine model and system equivalents, multi-machine stability. High-voltage DC transmission: converters, inverters, complete DC link system. Energy management systems. Economic tariffs. (Total tuition time: ± 70 hours)

POWER SYSTEMS V (PWS501T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Electrical Engineering)**

Generation theory, transmission and distribution theory, interconnection of power systems. (Total tuition time: ± 90 hours)

PRACTICAL METALLURGY II (PMU201T)**PRACTICAL****(Subject custodian: Department of Chemical and Metallurgical Engineering)**

Physical metallurgy: sampling and specimen mounting. Polishing and etching techniques. Macro- and micropreparation. Optical microscopy, qualitative and quantitative metallography. Photography. Introduction to scanning electron microscopy. Pyrometry. Evaluation of material properties. Extraction metallurgy: ore dressing. Hydro-metallurgy. Pyro-metallurgy. Analytical techniques. (Total tuition time: ± 60 hours)

PRACTICE MANAGEMENT IV (PMN411T)**1 X 4-HOUR PAPER (OPEN BOOK)****(Subject custodian: Department of Management and Entrepreneurship)**

The behavioural science approach to organisation. Motives and motivation. Some theories and studies of human behaviour, with specific reference to behaviour. Principles and practice of management. (Total tuition time: ± 30 hours)

PRESENTATION DRAWING (PDW210T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Visual Communication)**

Mastering of drawing and rendering skills using a variety of mediums so that these can be used effectively, efficiently and convincingly to develop, communicate, express, sell and record design. (Total tuition time: ± 200 hours)

PRESENTATION TECHNIQUES I (PTT100T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Architecture)**

The nature and application of presentation drawing. Freehand sketching and drawing techniques. Graphic presentation techniques. Ink, watercolour, markers, pencil and coloured pencil. Introduction to electronic presentations. Principles of composition. Lines, tone, texture and colour. Two- and three-dimensional projection. Perspective drawing. Shadow projection. Model-building. (Total tuition time: not available)

PRE-STRESSED CONCRETE DESIGN IV (PCG401T)**1 X 4-HOUR PAPER (OPEN BOOK)****(Subject custodian: Department of Civil Engineering)**

Design of pre-stressed concrete structures, computer applications. (Total tuition time: ± 32 hours)

PRICE ANALYSIS AND ESTIMATING III (PAY311T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Building Sciences)**

Specification of items for analysis of unit rates in bills of quantities. Different methods of estimating. Factors which could influence the estimate. Cost calculation. Compiling unit rates. Material, labour, overheads and profit. Waste and storage of material. Analysis of costs of mechanical equipment. Subcontractors and suppliers. Analysis of unit rates. Pricing of specialist items. Provisional sums and prime cost items. Pricing of model preliminaries according to a standard system. Drawing up of unit rates for composite items such as additions and renovations. (Total tuition time: ± 180 hours)

PRINCIPLES OF DAM ENGINEERING IV (PDE401T)**1 X 3-HOUR PAPER (OPEN BOOK)****(Subject custodian: Department of Civil Engineering)**

Geological and foundation considerations, design principles, dam safety, seepage, grouting and drainage, project. (Total tuition time: ± 32 hours)



PRINCIPLES OF URBAN DESIGN IV (PUD400T) <i>(Subject custodian: Department of Architecture)</i> Brief historical overview and shifts in policy. The pre-industrial and early colonial city, the later colonial city, the modernist city, the apartheid city. Elements of cities and urban environments. Empirical rules and principles in urban design. Urban design theories. Sustainability. Urban housing. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
PROCESS CONTROL III (PCT301T) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Process and instrumentation diagram, instrumentation, control, typical control systems, alarm and safety, Hazop studies. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
PROCESS CONTROL IV (PCT401B) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Chemical process modelling, Laplace transform, dynamic analysis of processing systems, design of feedback, feed-forward and other control systems. The focus is on understanding control design principles and their implementation in the chemical processing industry. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
PROCESS INSTRUMENTATION II (PCM221T) <i>(Subject custodian: Department of Electrical Engineering)</i> Design procedures and calculations for flow, level, temperature and pressure measurements. Electronic detectors, transmitters, actuators and their applications. Introduction to basic control theory, controllers and programmable logic controllers (PLCs). Laboratory assignments, including distributed control systems and programming of PLCs. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
PROCESS INSTRUMENTATION III (PCM321T) <i>(Subject custodian: Department of Electrical Engineering)</i> Control and operation of plant units for boilers, heat exchangers, furnaces and distillation columns. Control strategies for feedback, feed forward, cascade, adaptive, ratio, selective, time cycle and time schedule control. Instrumentation for hazardous environments. Computer applications and telemetering as used in process instrumentation. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
PROCESS INSTRUMENTATION IV (PCM401T) <i>(Subject custodian: Department of Electrical Engineering)</i> Measurement and control of chemical composition, pollution measurement and control, application of engineering principles, automatic control applications and instrumentation project management. The illustration of SCADA (Supervisory Control and Data Acquisition) to be used in industry to acquire relevant plant information. (Total tuition time: ± 70 hours)	1 X 3-HOUR PAPER
PRODUCTION ENGINEERING: CHEMICAL INDUSTRY IV (PCI401T) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Introduction. Descriptive statistics, for example, graphic representation of data, measures of central position and measures of dispersion. Probability theory – Bayes' theorem. Probability distributions. Sampling theory. Decision theory. Statistical inference. Estimation and hypothesis testing. Linear regression and correlation. Non-parametric tests. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
PRODUCTION ENGINEERING: INDUSTRIAL I (PEI111T) <i>(Subject custodian: Department of Operations Management)</i> Introduction to production management. Production management in perspective. The nature of operating systems and operations management. Product service design. Facility planning and layout. Capacity management. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
PRODUCTION ENGINEERING: INDUSTRIAL II (PEI211T) <i>(Subject custodian: Department of Operations Management)</i> Forecasting. Aggregate planning tactics. Just-in-time systems and purchasing management. Inventory management. Material requirements planning. Operations scheduling. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
PRODUCTION PLANNING AND CONTROL III (PLC311T) <i>(Subject custodian: Department of Mechanical Engineering)</i> A study of the basic principles of production planning and control, costing and human relations. Stock control, loss control and loss prevention are also covered. (Total tuition time: ± 74 hours)	1 X 3-HOUR PAPER



PRODUCTION TECHNOLOGY IV (PHY401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

Resources for advanced manufacturing. Use of more sophisticated technologies. Effective manufacturing equipment. Process planning and factory management. Computer-integrated manufacturing. Projects and computer applications. (Total tuition time: ± 40 hours)

PROGRAMMING I (PGG111T) 1 X 3-HOUR COMPUTER-BASED
(Subject custodian: Department of Computer Science)

Components of a microcomputer system, engineering applications of software. Managing personal computers. (Total tuition time: ± 68 hours)

PROJECT: CHEMICAL ENGINEERING IV (PJC401T) PROJECT
(Subject custodian: Department of Chemical and Metallurgical Engineering)

Students must undertake an experimental examination of an approved physical or extractive metallurgical topic. It must consist of a literature study, planning and execution of experimental work, the interpretation of results and an oral, as well as a written report. (Total tuition time: ± 60 hours)

PROJECT: METALLURGY IV (PJM401T) PROJECT
(Subject custodian: Department of Chemical and Metallurgical Engineering)

Students must undertake an experimental examination of an approved physical or extractive metallurgical topic. It must consist of a literature study, planning and execution of experimental work, the interpretation of results and an oral, as well as a written report. (Total tuition time: ± 60 hours)

PROJECT ENGINEERING IV (PJE401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

Need for and advantages of project management. Definition of the project. Modern project planning methods. Communication and presentation of information. Feasibility studies (affordability). Project implementation. Support of the operational systems. Case studies, projects and computer applications. (Total tuition time: ± 40 hours)

PROJECT MANAGEMENT IV (PJM410T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Civil Engineering)

Management approaches. The business environment. Personnel management. Financial management. Risk analysis. Financial viability studies. IT integration. Decision-making and problem solving. Corporate communication. Small business management. Politics, ethics and social responsibility. Case studies. (Total tuition time: not available)

PROJECT MANAGEMENT: CIVIL IV (PJM401T) 1 X 3-HOUR PAPER (OPEN BOOK)
(Subject custodian: Department of Civil Engineering)

Planning of projects (civil and building). Project management. Quality and time management. Management systems. Computer applications. Project. (Total tuition time: ± 32 hours)

PROJECT MANAGEMENT: SURVEYING IV (PUY401T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

A number of industry-orientated tasks based on a sound investigation, a comprehensive report on the analysis and solution or completion of the task must be submitted. The tender process. (Total tuition time: ± 30 hours)

PROJECT RESEARCH IV (PJR401B) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

Introduction to business research methods and the research process, designing of research including observation studies, qualitative research, experiments and surveys. Data collection and sources with emphasis on measurement and measurement scales, questionnaires and sampling. Analysis and presentation of data with Hypothesis testing, multivariate analysis and measures of association. (Total tuition time: ± 40 hours)



PROJECTS I (PJT101T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Electrical Engineering)**

Basic electricity: measurement of AC and DC current and voltage, breadboard, stripping and insulating of conductors, bending and matching to size, soldering techniques and tools. Electronic measuring instruments: the oscilloscope, function generator and multimeter. Safety and default settings, applications. Electronics; components, size, function and application, reading and understanding basic schematic diagrams. Simple testing of components with measuring instruments. Electronic project: building, construction and testing of the project. Wiring, placing components and soldering. Fitting section: making boxes. Drawing and sheet-metal work. Safety rules of applicable workshop, drawing a plan. The use of manual, marking and measuring tools. (Total tuition time: ± 70 hours)

PROJECTS II (PJT201T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Electrical Engineering)**

The planning, design, layout, construction, testing, documentation and oral presentation of a complete project. (Total tuition time: ± 70 hours)

Q**QUALITATIVE TECHNIQUES I (QTQ101T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mathematics and Statistics)**

Introduction to statistics. Descriptive statistics: graphical representation of data, measurements of central position, measures of dispersion. Basic probability concepts. Probability distributions. Sampling and sampling distributions. Confidence intervals. Hypothesis testing: one sample and two sample. Means, percentages (proportions), variances. Linear regressions and correlation. Hypothesis testing – Chi-square. Analysis of variance. Non-parametric. (Total tuition time: ± 68 hours)

QUALITY ASSURANCE II (QAS201T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Industrial Engineering)**

Essentials of a quality management system. Statistical process control: introduction to quality improvement. The quality life cycle, introduction to statistical process control, basic statistical calculations, analyses and interpretation of control charts, control of attribute control charts, design of experiments, principles of statistical design and analysis, experiments. (Total tuition time: ± 90 hours)

QUALITY ASSURANCE IV (QAS401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Industrial Engineering)**

Introduction: quality assurance in perspective. Philosophies of Crosby, Deming, Juran, etc. Advanced quality techniques. Quality audit (SABS 0157/ISO 9000). Total quality management. Case studies and projects. (Total tuition time: ± 40 hours)

QUALITY CONTROL II (QCL221T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Chemical and Metallurgical Engineering)**

Fundamentals of statistics. Statistical process control. Product acceptance (sampling). Quality engineering. Quality and economy. Computers and quality. (Total tuition time: ± 60 hours)

QUANTITY SURVEYING I (QSU101T)**1 X 4-HOUR PAPER****(Subject custodian: Department of Building Sciences)**

Introduction to the principles, processes and methods of measurement and documentation of builders' work. Drawing up of bills of quantities. Drawing up a list of dimensions. Calculation of quantities. Measurement and description of the following elements of a single-storey building: foundations, including site clearance and simple demolitions, superstructure brickwork, solid floor construction, roofs, finishes, comprising plaster, paint and tiling on walls, conventional floors and plastered and boarded ceilings on bracker. Stock steel, timber and aluminium windows. Stock flush and hard-wood doors, including timber and metal frames. Adjustments for windows, doors and plain openings. Working up by squaring, abstracting and billing. (Total tuition time: ± 180 hours)



QUANTITY SURVEYING II (QSU210T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Building Sciences)**

Projects based on load-bearing structures, including measuring, abstracting and billing with full descriptions and specifications. Reference to manufacturer catalogues and the ASAQS Model Preambles regarding the following: precast and pre-stressed concrete beams and floors, standard metal doors and windows, standard timber doors and windows, glass, prefabricated timber trusses, roof coverings, eaves, flashing and rainwater goods, floor, wall and ceiling finishes, drainage and plumbing detail, paint. The above projects should be augmented with the following systems when compiling a bill of quantities: traditional method x, computerised method, the use of the model preambles and x preliminaries. The appointment of the members of the professional team and their fee scales. The use of standard forms for certificates. (Total tuition time: not available)

QUANTITY SURVEYING III (QSU311T)**1 X 4-HOUR PAPER (PRESCRIBED OPEN BOOK)****(Subject custodian: Department of Building Sciences)**

Measurement and description of the following elements of multi-storey buildings: bulk earthworks and site clearance, load-bearing and framed concrete and brick structures, flat roofs, waterproofing to concrete roofs, sheet-metal covering and boarded roofs. Staircases, including balustrade walls, balustrading and finishes. Structural steelwork. Finishes, comprising facings, in-situ terrazzo, patent plaster finishes, more complex tiling, panelling, other non-standard finishes and suspended ceilings. Purpose-made timber and aluminium windows and doors, including sidelights, fanlights and adjustments. Joinery fittings. Plumbing and drainage complete. Prime cost and provisional sums, payment certificates, including final account adjustments and builders' work regarding specialist installations. Practical working up and drawing up of bills of quantities, complete with trade preambles. (Total tuition time: ± 180 hours)

QUANTITY SURVEYING IV (QSU421T)**2 X 4-HOUR PAPER (PRESCRIBED OPEN BOOK)****(Subject custodian: Department of Building Sciences)**

Comprehensive study of the measurement and description of more specialised elements of builders' work, as well as the procedure for the measurement and documentation of civil engineering work, drawing up of civil engineering bills of quantities and conditions of contract. Computer applications for all of the above. (Total tuition time: ± 180 hours)

QUANTITY SURVEYING V (QSU510T)**2 X 4-HOUR PAPER (PRESCRIBED OPEN BOOK)****(Subject custodian: Department of Building Sciences)**

Objectives of project management, planning projects, estimating for control, project organisation, project control. Project management services in the context of a professional quantity surveying practice, construction management, project administration, project monitoring and quality inspection of construction works. (Total tuition time: ± 180 hours)

R**RADIO ENGINEERING III (RAE311T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Radio frequency amplifiers. Amplitude and angle modulation, as well as demodulation. Frequency conversion and mixing. Receivers. Basic antenna theory and practical antennae. (Total tuition time: ± 70 hours)

RADIO ENGINEERING IV (RAE411T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Electrical Engineering)**

Modern wireless communications, frequency reuse, channel assignment strategies, handoff strategies, interference and system capacity, trunking and GOS. Radio wave propagation and propagation models; outdoor propagation models, indoor propagation models, signal prediction in buildings. Doppler shift, impulse response for a multipath channel, small scale multipath measurements. (Total tuition time: ± 70 hours)

REACTOR TECHNOLOGY IV (REA401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Chemical and Metallurgical Engineering)**

Analysis of kinetic data. Theoretical foundations of chemical kinetics (reaction mechanisms, collision theory, transition state theory). Analysis of complex reactions. Design of ideal isothermal reactors. Temperature and energy effects. Non-ideal reactors/residence time considerations. Heterogeneous catalysis reactors. (Total tuition time: ± 60 hours)



- REAL-TIME SIGNAL PROCESSING V (ESI5014)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Electrical Engineering)
 Advanced signal processing concepts (adaptive filtering, multirate processing and wavelets, filter banks etc.) with the emphasis on real-time DSP implementation. (Total tuition time: ± 90 hours)
- REAL-TIME SYSTEMS V (RTS501T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Electrical Engineering)
 Advanced signal processing concepts (adaptive filtering, multirate processing and wavelets, filter banks, etc.) with the emphasis on real-time DSP implementation. (Total tuition time: ± 90 hours)
- REFRACTORIES II (RFC201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Refractory principles: classification of refractories, the basic principles of refractories. The properties and testing of refractory materials. Refractory materials: the manufacturing of refractory shapes, acid refractory materials, basic refractory materials, non-oxide refractory materials and thermal insulation products. Design and installation: the refractory lining system. The design of a lining: selection of material, mechanical, thermal and physical design. The installation of a refractory lining: pre-fired shapes, castables and other monolithic materials. The commissioning of refractory linings. (Total tuition time: ± 60 hours)
- REFRACTORIES III (RFC321T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Raw materials for monolithic refractories. Manufacture and properties of monolithic refractories. Wear mechanisms of monolithic refractories. Design, applications and installations. (Total tuition time: ± 60 hours)
- REFRACTORIES ENGINEERING IVA (REF40AT)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Design. Regulations and conditions on site. Design with shaped dense materials. Design with shaped heat-insulating materials. Design with unshaped (monolithic) refractory materials. Design with ceramic fibre materials. Thermal calculations. Static calculations of load-bearing parts, taking the influence of temperature into consideration. Expansion calculations. Quality assurance. (Total tuition time: ± 60 hours)
- REFRACTORIES ENGINEERING IVB (REF40BT)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Refractory practice. Design properties: thermal and electrical. Design properties: mechanical. (Total tuition time: ± 60 hours)
- REFRACTORIES ENGINEERING PRACTICE IV (RFP401T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Chemical and Metallurgical Engineering)
 Suitable project relating to the specific refractories industry where the student is employed. (Total tuition time: ± 60 hours)
- REFRIGERATION AND AIR CONDITIONING IV (RAC401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Mechanical Engineering)
 Air-conditioning. Refrigeration. Cold storage. Solar power. (Total tuition time: ± 68 hours)
- REINFORCED CONCRETE AND MASONRY DESIGN III (RCM301T)** **1 X 4-HOUR PAPER (OPEN BOOK)**
(Subject custodian: Department of Civil Engineering)
 Design of reinforced concrete structures, beams, slabs, columns, retaining walls, foundations. Design of unreinforced masonry structures, walls, columns. Application of empirical rules. Design projects. (Total tuition time: ± 90 hours)
- REINFORCED CONCRETE DESIGN IV (RCD401T)** **1 X 4-HOUR PAPER (OPEN BOOK)**
(Subject custodian: Department of Civil Engineering)
 Design of reinforced concrete structures, computer applications. (Total tuition time: ± 32 hours)



RESEARCH METHODOLOGY (RMD110H) <i>(Subject custodian: Department of Building Sciences)</i> Study designs, proposal writing, sample size and power calculations, descriptive and univariate methods of data analysis such as descriptive statistics and graphs, one-sample tests and confidence intervals, two-sample tests and confidence intervals, Pearson's chi-square tests of association, multivariate methods of data analysis such as simple and multiple linear regression analysis, logistic regression analysis, qualitative research methods, use of commonly used statistical packages such as STATA, SPSS, NVIVO and ATLAS for quantitative and qualitative data analysis. (Total tuition time: ± 36 hours)	CONTINUOUS ASSESSMENT
RESEARCH METHODOLOGY (RMD101L) <i>(Subject custodian: Department of Geomatics)</i> Research planning and design. The research report, hypothesis testing, report formats. (Total tuition time: ± 30 hours)	CONTINUOUS ASSESSMENT
RESEARCH METHODOLOGY (RMD100N) <i>(Subject custodian: Department of Industrial Engineering)</i> Introduction to research, the methodology of research and research strategies. The ability to undertake a research assignment independently in a unique speciality area. The physical gathering of data and analysing data statistically and otherwise. (Total tuition time: not available)	PROJECT
RESEARCH METHODOLOGY (RMD500D) <i>(Subject custodian: Department of Architecture)</i> Research methodology: scope and nature of the dissertation, administrative procedures, research topics, the problem and its setting, research proposals, applications for funding, research protocols and research planning. Design as a problem-solving process: formulation of design principles, solving conflicting requirements, precedent studies, design thinking and the evaluation of design. Technical structure of a dissertation: format, layout, numbering system, typography, bibliography and referencing. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
RESEARCH METHODOLOGY (RMD501C) <i>(Subject custodian: Department of Electrical Engineering)</i> Research methods and approaches, information-gathering approaches, writing research reports. (Total tuition time: ± 45 hours)	CONTINUOUS ASSESSMENT
RESEARCH METHODOLOGY: NATURAL SCIENCES: REFRACTORIES (RMR20XT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Introduction, research tools, problem identification and development, review of related literature, planning of research proposals, instrumentation, writing proposals, presenting results of research, statistics, working with a supervisor. (Total tuition time: ± 60 hours)	CONTINUOUS ASSESSMENT
RESEARCH METHODOLOGY: NATURAL SCIENCES: STATISTICS (RMR20YT) <i>(Subject custodian: Department of Chemical and Metallurgical Engineering)</i> Statistical methods for the preparation of, and working with data, including descriptive statistical methods. (Total tuition time: ± 60 hours)	CONTINUOUS ASSESSMENT
RESEARCH REPORT: ARCHITECTURAL TECHNOLOGY: TECHNOLOGY: RESEARCH METHODOLOGY V (ATG50PT) <i>(Subject custodian: Department of Architecture)</i> Research methodology: scope and nature of the dissertation, administrative procedures, research topics, the problem and its setting, research proposals, applications for funding, research protocols and research planning. Technical structure of a dissertation, format, layout, numbering system, typography, bibliography and referencing. (Total tuition time: not available)	CONTINUOUS ASSESSMENT
RESEARCH REPORT: ARCHITECTURAL TECHNOLOGY: TECHNOLOGY: TECHNOLOGY V (ATG50QT) <i>(Subject custodian: Department of Architecture)</i> The dissertation involves the investigation of a relevant research problem. (Total tuition time: not available)	CONTINUOUS ASSESSMENT



RESEARCH REPORT: ARCHITECTURE: PROFESSIONAL V (ATG510T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Architecture)

Appraisal and definition: clarifying the problem statement and design objectives, formulating functional relationships, collecting information on the state of the art, formulating requirements and needs. Design concept: searching for conceptual solutions, producing alternative concepts, evaluating alternative solutions, determining the final conceptual form. Building design: producing a refined design, producing alternatives, technical evaluation, selecting the final design for detailed formulation. (Total tuition time: not available)

RETICULATION DESIGN AND MANAGEMENT IV (RDA401T) 1 X 3-HOUR PAPER (OPEN BOOK)
(Subject custodian: Department of Civil Engineering)

This subject covers water, wastewater and stormwater reticulation systems: hydraulic principles, design parameters, ancillary works, pumping installations, system operation, water management, waste management, environmental aspects. Design project(s). (Total tuition time: ± 32 hours)

RF DESIGN V (ESI5009) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Electrical Engineering)

RF component design principles and analysis. (Total tuition time: ± 90 hours)

S

SATELLITE COMMUNICATIONS IV (SCO401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Electrical Engineering)

Implementation of satellite services. Orbit analysis. Utilisation of spacecraft resources. Assessment of transmission techniques, multiple access and direct broadcasting. Propagation and interference assessment. Satellite link analysis and design. Earth station design. (Total tuition time: ± 70 hours)

SCIENTIFIC COMPUTING V (ESI5026, SII501T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Electrical Engineering)

Scientific computing fundamentals, simulation, C++, Matlab, Simulink and Scilab. (Total tuition time: not available)

SENSORS AND PROCESS CONTROL (SOA301T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Electrical Engineering)

This unit teaches students the required knowledge and skills to understand and apply the basic principles of all different types of sensors for process control (flow, temperature, pressure, level), data acquisition, advanced PLC control and SCADA systems. This is done for application in a mechatronic engineering environment. The knowledge and skills are required to define, design, construct, commission and maintain a process control system. (Total tuition time: ± 120 hours)

SIGNAL PROCESSING IV (SPR401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Electrical Engineering)

Introduction to signal processing. Analogue signal processing. Signals and systems, and the characteristics of signals and systems. The different domains that continuous-time signals are represented in. Time-domain representation and analysis of continuous-time signals and systems (using convolution and ordinary differential equations), frequency-domain representation and analysis (Fourier series, Fourier Transform) and the Laplace Transform. Applications of signal processing; for example, the design of continuous-time filters. (Total tuition time: ± 70 hours)

SIGNAL THEORY V (ESI5021) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Electrical Engineering)

Signal spaces, mappings, deterministic signal theory and stochastic signal theory. (Total tuition time: ± 90 hours)

SITE SURVEYING: APPLICATIONS I (SSU10XT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

Linear surveying. Methods of measuring with a tape. Interpretation and layout of scale model drawings. Contouring and the use of laser equipment. Surveys of existing buildings. (Total tuition time: ± 120 hours)



SITE SURVEYING: PRACTICAL I (SSU10YT)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Geomatics)*

Setting out sites and buildings by means of levelling and elementary tacheometry. Setting out and determining contours. Determining of heights of benchmarks by means of levelling instruments. (Total tuition time: ± 50 hours)

SOCIAL ENVIRONMENTAL STUDIES: CIVIL IV (SIA401T)**2 X 3-HOUR PAPER***(Subject custodian: Department of Civil Engineering)*

Social theory: culture, social groups, urbanisation, wealth and poverty, politics, values. Environmental issues: historical development of environmentalism, terrestrial issues, aquatic issues, global atmospheric changes, population issues, development vs. conservation, north vs. south. Environmental economics: basic economic models, economic perspectives on environmental issues, environmental costing, sustainable development. Environmental policy and law: basic principles of law, South African environmental legislation, international environmental law and treaties, environmental agencies, environmental policy, public health. Development studies: review of social dynamics, urban development, rural development, sustainable development, development agencies. Environmental ethics: history of environmental ethics, critique of the Cartesian paradigm, contemporary perspectives on environmental issues, value conflicts, codes of ethics. Project. (Total tuition time: ± 32 hours)

SOFTWARE DESIGN II (SFD201T)**1 X 4-HOUR COMPUTER-BASED***(Subject custodian: Department of Computer Science)*

Developing and applying structured programming. The core outcomes focus on basic C programming. This includes basic input/output, conditional execution, statement repetition, functions, libraries, one- and two-dimensional arrays. The subject is very practical, and assessment is based on a number of programming tasks completed during the semester. (Total tuition time: ± 70 hours)

SOFTWARE DESIGN III (SFD301T)**1 X 4-HOUR COMPUTER-BASED***(Subject custodian: Department of Computer Science)*

More advanced programming topics will be presented, while still focusing on core skills. The basic principles of object-orientated programming, such as creation of abstract data types (ADTs), pointers, composite data types, linked lists, File I/O and string manipulation, will be covered. Windows programming may also be covered. The subject is practically orientated, and students are evaluated on a number of programming tasks completed during the semester. (Total tuition time: ± 70 hours)

SOFTWARE ENGINEERING IV (SFE401T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Computer Science)*

An introduction to software engineering. The principles involved in the design phases of the development cycle of a complete software project from conceptual development to product delivery. Concepts, such as definitions of the software product and process, project planning, risk analysis, tracking, analysis, design, object-orientated analysis and quality control. On completion of the subject, students have to submit a software product developed in a group context. (Total tuition time: ± 70 hours)

SOFTWARE ENGINEERING V (ESI5022)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Electrical Engineering)*

Software engineering fundamentals, UML design principles and operating system basics. (Total tuition time: ± 90 hours)

SOIL AND GROUND WATER POLLUTION: CIVIL IV (SOI401T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Civil Engineering)*

Sources of pollution, fluid flow and the transport of solute in porous media, remediation of contaminated groundwater, sanitation of polluted soils. Project. (Total tuition time: ± 32 hours)

SOLID WASTE MANAGEMENT IV (SWM401T)**1 X 3-HOUR PAPER***(Subject custodian: Department of Civil Engineering)*

Characteristics of waste, solid waste disposal methods. Design, operation and management of landfill sites. Operation of solid waste removal management systems, third-world applications, waste recycling, emergency waste management, legal aspects. (Total tuition time: ± 32 hours)

SPECIAL TOPICS I (ESI5023, SEI501T)**CONTINUOUS ASSESSMENT***(Subject custodian: Department of Electrical Engineering)*

Special topics based on a selection of seminal research papers from a chosen field. (Total tuition time: ± 90 hours)



<p>SPECIAL TOPICS II (ESI5024) <i>(Subject custodian: Department of Electrical Engineering)</i> Special topics based on a selection of seminal research papers from a chosen field. (Total tuition time: ± 90 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SPECIAL TOPICS III (ESI5025) <i>(Subject custodian: Department of Electrical Engineering)</i> Special topics based on a selection of seminal research papers from a chosen field. (Total tuition time: ± 90 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SPECIFICATION V (SFN500T) <i>(Subject custodian: Department of Architecture)</i> Purpose and use of specifications. Formats of specifications. Compilation of a specification document from standard clauses. Writing specification clauses. Specification as part of the legal framework. (Total tuition time: not available)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SPECIFICATION AND QUANTITIES III (SPQ300T) <i>(Subject custodian: Department of Architecture)</i> The following aspects of specification and quantities are covered: introduction to bills, specifications for bills of quantities, interaction between drawings and other contract documentation, as well as estimates, feasibility, measuring units, costing and influencing factors. (Total tuition time: not available)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>STATISTICS I (STA111T) <i>(Subject custodian: Department of Mathematics and Statistics)</i> Descriptive and inferential statistics, standard deviations, regression, correlation, z- and t-tests, modus, medians, variance frequency, histogram. (Total tuition time: ± 96 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>STEAM PLANT III (SMP301T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Steam plant: theory and calculations, diagrams, efficiency, work ratio. Nozzles, applications, important ratios and velocities. Steam turbines, blade fixing, velocity diagrams, graphical and analytical. Gas turbines, line and TS diagrams, modifications, calculations, efficiencies of compressor and turbine. Cool towers: types, cooling methods, losses, maintenance. Rotary compressor, air control, efficiency, torque, power. Psychrometry: mixtures, saturation, bulb thermometry, chart, air-conditioning systems, flow rate. Legislation, MOS Act, applicable knowledge of plants and pressure vessels. (Total tuition time: ± 68 hours)</p>	<p>1 X 3-HOUR PAPER</p>
<p>STEREO MAPPING III (SMI301T) <i>(Subject custodian: Department of Geomatics)</i> Mapping – the precise solution, orientations, photo control, aerial triangulation methods, stereo mapping from space borne platforms. (Total tuition time: ± 80 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>STRENGTH OF MATERIALS II (SMM201B) <i>(Subject custodian: Department of Mechanical Engineering)</i> Static. Direct stresses. Thermal effects and material combinations. Deformation, Poisson's ration and Young's modules. Centroid and second moment of inertia. Sheer force diagram. Bending moment diagrams. Torsion. Combined stresses. (Total tuition time: ± 60 hours)</p>	<p>1 X 3-HOUR PAPER</p>
<p>STRENGTH OF MATERIALS II (SMT211T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Analysis of simple structures. Simple stress and strain. Shearing forces and bending moments. Thin cylinders (stationary and rotating). Torsion of circular shafts. Helical springs. Laboratory work. (Total tuition time: ± 68 hours)</p>	<p>1 X 3-HOUR PAPER</p>
<p>STRENGTH OF MATERIALS II (SMM201T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Static. Direct stresses. Thermal effects and material combinations. Deformation, Poisson's ration and Young's modules. Centroid and second moment of inertia. Sheer force diagram. Bending moment diagrams. Torsion. Combined stresses. (Total tuition time: ± 60 hours)</p>	<p>1 X 3-HOUR PAPER</p>



STRENGTH OF MATERIALS III (SMT331T, SMT301B) <i>(Subject custodian: Department of Mechanical Engineering)</i> Temperature stresses. Strain energy due to direct stress. Beam sections. Theory of bending. Fatigue and creep. Reinforced concrete beams. Structures. Shear stress in beams. Shearing forces and bending moments. Laboratory work. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
STRENGTH OF MATERIALS IV (SMT411T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Theories of elastic failure. Deflection of beams. Energy methods – coplanar frames. Asymmetrical bending, shear stress in beams. Strains beyond the elastic limit. Struts. Contact stress (Hertz stress). (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
STRESS ANALYSIS IV (SAN401T) <i>(Subject custodian: Department of Mechanical Engineering)</i> Energy methods (space frames). The finite element method. Finite element (modelling techniques). Solutions using a commercially available finite element programme. Stress concentration. Stress in rotation machinery. (Total tuition time: ± 68 hours)	1 X 3-HOUR PAPER
STRUCTURAL ANALYSIS II (SAS201T) <i>(Subject custodian: Department of Civil Engineering)</i> The analysis of elementary structures for structural design purposes, calculation of bending moments, shear forces and deflections, pin-jointed frames, three-pinned structures, struts, combined stresses. Laboratory work. (Total tuition time: ± 90 hours)	1 X 3-HOUR PAPER
STRUCTURAL ANALYSIS III (SAS301T) <i>(Subject custodian: Department of Civil Engineering)</i> The analysis of complex structures for structural design purposes. Calculation of bending moments, shear forces and deflections for propped cantilevers, continuous beams, portal frames. Moment distribution, plastics theory. Laboratory work. (Total tuition time: ± 60 hours)	1 X 3-HOUR PAPER
STRUCTURAL ANALYSIS IV (SAS401T) <i>(Subject custodian: Department of Civil Engineering)</i> Advanced structural analysis methods, applicable computer applications. (Total tuition time: ± 32 hours)	1 X 4-HOUR PAPER
STRUCTURAL MASONRY DESIGN IV (STM401T) <i>(Subject custodian: Department of Civil Engineering)</i> Design of unreinforced and reinforced structural masonry structures. Detailing. (Total tuition time: ± 32 hours)	1 X 4-HOUR PAPER (OPEN BOOK)
STRUCTURAL STEEL AND TIMBER DESIGN III (SST301T) <i>(Subject custodian: Department of Civil Engineering)</i> Design of steel structures, beams, plate girders, connections (bolted and welded), trusses, columns, composite columns. Timber design, element design as for steel, form work and support systems. Design projects. (Total tuition time: ± 90 hours)	1 X 4-HOUR PAPER (OPEN BOOK)
STRUCTURAL STEEL DESIGN IV (SSE401T) <i>(Subject custodian: Department of Civil Engineering)</i> Design of structural steel structures, computer applications. (Total tuition time: ± 32 hours)	1 X 4-HOUR PAPER (OPEN BOOK)
STRUCTURAL TIMBER DESIGN IV (STD401T) <i>(Subject custodian: Department of Civil Engineering)</i> Design of timber structures. Computer applications. (Total tuition time: ± 32 hours)	1 X 4-HOUR PAPER (OPEN BOOK)
STRUCTURES AND CONCRETE: CONCRETE III (SEK30YT) <i>(Subject custodian: Department of Civil Engineering)</i> Reinforced concrete column design, steel columns. Earth pressures and foundations. Concrete: properties of concrete, mix design, batching, mixing, transporting, placing, compaction and curing of concrete, ready-mixed concrete, concrete pumping, quality control, special techniques, repair of concrete and cost analysis. (Total tuition time: ± 180 hours)	CONTINUOUS ASSESSMENT



STRUCTURES AND CONCRETE: STRUCTURES III (SEK30XT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Civil Engineering)

Structures: elementary structural analysis, calculation of sectional properties, shear force and bending moment diagrams of simple supported beams with dead loads, as well as the design of beams in timber and steel. Deflection of simple beams. (Total tuition time: ± 180 hours)

STRUCTURES IV (STR400T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Civil Engineering)

Design: definition, process, national standards. Basic: units, forces, moments, equilibrium, reactions and supports, stress, strain. Materials: affecting factors, properties. Loads: types of loads. Tension: design, cable structures, suspension bridges. Beams: shear, bending moment, bending stress, design of beams. Compression: axial loaded columns, slenderness. Combined axial and bending stress: design, elastic stress, pre-stressing. Connections: welded, bolted, friction grips. Arches and portal frames: three-pinned, portal frame, parabolic arch. Foundations and retaining walls: soil types, foundation types, design, pad foundations, retaining walls and gravity retaining walls. Deflections: permitted, pin-joined frames, beams. Structural systems: arches, slabs, space frames, shells and folded plate structures, cable structures. (Total tuition time: not available)

STUDIO WORK: CONTRACT DOCUMENTATION IV (STW40PT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Architecture)

No set syllabus, but this subject is based on the design thesis. It is integrated with the subject Construction Methods and Materials to produce a complete set of related working drawings. (Total tuition time: not available)

STUDIO WORK: SPECIFICATION IV (STW40QT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Architecture)

The purpose and use of specifications, forms of specification, preliminary items and the specification of all building trades. (Total tuition time: not available)

SUPPLY CHAIN MANAGEMENT V (SPP501T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Industrial Engineering)

This is about engineering inventory planning and control, linking materials requirement planning and entity resource planning with increasing customer service excellence. Integrating just in time, warehousing and technology with supplier management to optimise logistics engineering and taking care of risks. (Total tuition time: ± 80 hours)

SURVEY DRAWING II (SUD211T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

Compilation and plotting of grids and graticule, topographic plans, plotting, scales, symbols. The production of longitudinal cross sections and mass haul diagrams. (Total tuition time: ± 80 hours)

SURVEYING IV (SUR411T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

Instrumentation for precise surveying, application of spherical trigonometry to theodolite errors, effects and corrections of theodolite and level errors. Error analysis of EDM measurements, EDM calibration. Observation and calculation methods of precise surveying, detection and monitoring of movements, absolute and relative, application of least squares to analysis and design survey networks. (Total tuition time: ± 30 hours)

SURVEYING: CIVIL: PRACTICAL II (SUC20YT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

Determining points for staking out roads by means of a traverse, identifying and output of a defined suggested centre line for constructing a road that includes a simple curve. Calculation and placing of geometrical data. Calculation and setting out of the centre line at 20 m intervals for the straight line, as well as the curve. Levelling and check levelling of the longitudinal and cross sections. Drawing of L/S and x sections, calculation and setting out of profile and site slope pegs according to formation line on L/S, with consideration of underground drainage. Calculation and setting out of drainage pipe underneath road. (Total tuition time: ± 40 hours)



<p>SURVEYING: CIVIL: THEORY II (SUC20XT) <i>(Subject custodian: Department of Geomatics)</i> EAM and lasers. Levelling, reciprocal and reverse levelling, longitudinal and transverse sections, setting out profiles and site-slope pegs, area and strip surveying, planning and setting out projects, construction measurements, horizontal curve calculations and setting out procedures. (Total tuition time: ± 45 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SURVEYING: CONTROL II (SUR21XT) <i>(Subject custodian: Department of Geomatics)</i> South African map series, cadastral information, triangulation, solving the triangle with sine drawing and solving the error figures, resection. (Total tuition time: ± 64 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SURVEYING: ENGINEERING II (SUR21YT) <i>(Subject custodian: Department of Geomatics)</i> EDM and lasers. Levelling, setting out profiles and batters, horizontal curve calculations and setting out procedures. (Total tuition time: ± 45 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SURVEYING: GEOMETRIC III (SUR33YT) <i>(Subject custodian: Department of Geomatics)</i> Curves: horizontal - calculation of geometric and setting out data and coordinates of points on the curve. Different set-out methods. Transition curves. Vertical curve theory. (Total tuition time: ± 80 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SURVEYING: PRACTICAL (EXTENDED) I (FPSURZT) <i>(Subject custodian: Department of Geomatics)</i> Introduction to engineering (chemical, metallurgical, civil, surveying, electrical, clinical, digital technology, high-frequency technology, power engineering, process instrumentation, mechanical, industrial, mechatronics), factory safety, measurements, engineering materials, projects. Setting up and levelling of the level and theodolite. Taking levelling readings and compiling the field book, testing and adjusting the different levelling instruments, testing and adjusting the theodolite, distance measurement with a tape, individual levelling line of at least 600 m and testing it, levelling of longitudinal section of at least 300 m and the transverse sections at every 20 m interval in group context. Individual traverse with at least three legs. Calculation and correction of traverse, topographic surveying of demarcated area. Drawing a plan and interpreting the contours. (Total tuition time: ± 200 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SURVEYING: PRACTICAL I (SUR11ZT) <i>(Subject custodian: Department of Geomatics)</i> Setting up and levelling of the level and theodolite. Taking levelling readings and compiling the field book, testing and adjusting the different levelling instruments, testing and adjusting the theodolite, distance measurement with a tape, individual levelling line of at least 600 m and testing it, levelling of longitudinal section of at least 300 m and the transverse sections at every 20 m interval in group context. Individual traverse with at least three legs. Calculation and correction of traverse, topographic surveying of demarcated area. Drawing a plan and interpreting the contours. (Total tuition time: ± 100 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SURVEYING: PRACTICAL II (SUR21ZT) <i>(Subject custodian: Department of Geomatics)</i> Staking out roads that include a simple curve. Levelling of the longitudinal and cross sections. Setting out of profile and batters of intersection and resection. (Total tuition time: ± 40 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SURVEYING: PRECISE III (SUR33XT) <i>(Subject custodian: Department of Geomatics)</i> Instrument adjustments. Spherical triangulation. Precise surveying. Precise levelling. Deformation measurements. Coordinate transformations. (Total tuition time: ± 48 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>
<p>SURVEYING: THEORY (EXTENDED) I (FPSURYT) <i>(Subject custodian: Department of Geomatics)</i> Introduction to engineering (chemical, metallurgical, civil, surveying, electrical, clinical, digital technology, high-frequency technology, power engineering, process instrumentation, mechanical, industrial, mechatronics), factory safety, measurements, engineering materials, projects. Geometrical principles, trigonometry, applications and uses of trigonometry in surveying, spherical triangles, indication of point position on the surface of the earth, coordinate geometry, South African coordinate system. Calculation of joins and polars. Distance measurement and improvements of tape measurements, manipulation of formulas, order sizes, identities, arithmetic and mental arithmetic, calculation of surfaces and volumes of straight and curved figures, conversion of levelling readings. (Total tuition time: ± 150 hours)</p>	<p>CONTINUOUS ASSESSMENT</p>



SURVEYING: THEORY I (SUR11YT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

Basic surveying principles, surveying, testing and adjustment of instrument errors, traverse, levelling of longitudinal and cross sections. Areas and volumes for excavations and filling. South African coordinate system. Calculation of joins and polars and corrections to tape measurements. (Total tuition time: ± 64 hours)

SURVEYING: THEORY II (SUR21WT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

South African map series, cadastral information, triangulation. Determination of final coordinates for intersection and resection including error figures. EDM and lasers. Levelling, setting-out profiles and batters, horizontal curve calculations and setting-out procedures. (Total tuition time: ± 109 hours)

SURVEYING: THEORY III (SUR33WT) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Geomatics)

Instrument checks and adjustment. Networks: scale enlargement, t-T correction, eccentric reduction, base extension, trilateration, auxiliary points, traverses with short leg and exterior orientation. Trigonometric levelling. Curves: horizontal circular and transition, calculation of geometric and setting-out data, coordinates of points on the curve. Different setting-out methods. Vertical curve theory. Spherical trigonometry. Precise surveying and levelling. Deformation measurements. Coordinate transformations. (Total tuition time: ± 208 hours)

SURVEYING FOR ARCHITECTURE III (SFA300T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Architecture)

Principles of surveying. Basic surveying methods. Practical levelling and contouring. Setting out of buildings. Introduction to geographic information systems (GIS). Basic use and application of the Global Positioning System (GPS). Cadastral, referencing and photogrammetric software (CAD). Fieldwork practice. (Total tuition time: not available)

SUSTAINABILITY DEVELOPMENT V (SUV501T) CONTINUOUS ASSESSMENT
(Subject custodian: Department of Industrial Engineering)

Introduction of sustainability in the engineering environment, matching of finance and technology to sustainability, profitable and environmentally friendly technologies and alternative energy systems, incorporating ethical dimensions and social awareness. Efficient design of products and services, with case studies and exercises. (Total tuition time: ± 80 hours)

SYSTEMS DYNAMICS IV (SDN411T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

Introduction to and fundamentals of modelling, system definitions and model formulation, model validation and analysis, interpretation of simulation outputs. Station submodels and entity transfer. Animation of simulation model with the help of cinema. Additional discrete modelling concepts, advanced manufacturing features. Coupling to user subprograms. Continuous and combined models. Variant reduction techniques. (Total tuition time: not available)

T

TECHNOLOGY MANAGEMENT (A) IV (THY401T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

Communicative structures, mechanisms of behaviour, teamwork (leadership and membership), selection techniques, negotiating, problem-solving and decision-making, presentations. (Total tuition time: not available)

TECHNOLOGY MANAGEMENT (B) IV (THY411T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

Operations management: research, investment, production marketing, finance and accounting. Strategic management: innovating, renewing or discontinuing productions, mergers, closing, buying or selling companies. (Total tuition time: not available)



- TECHNOLOGY VENTURE CREATION V (TVC501T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Industrial Engineering)
 Translation of ideas into commercially viable high technology venture. Development of business plan and funding strategies are discussed. To elucidate the role of creativity, entrepreneurial and innovative business activities, and their management, within a global environment, and also of gender and ethnic diversity. (Total tuition time: ± 80 hours)
- TELECOMMUNICATION NETWORKS V (ESI5008)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Electrical Engineering)
 Fixed networks, mobile networks, RF and optical networks. (Total tuition time: ± 90 hours)
- TELECOMMUNICATIONS V (TMM501T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Electrical Engineering)
 Fixed networks, mobile networks, RF and optical networks. (Total tuition time: ± 90 hours)
- TELEVISION III (TLV311T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 Fundamentals of television: Light theory and colometry, formation of picture raster, composite video signal, RF television channel. Cameras: CCD and Plumbicon camera tube. Colour signal. Television receivers, displays: CRT, LCD, PLASMA, LED, distortion, block diagrams, television circuits analysis. Measurements. (Total tuition time: ± 70 hours)
- TELEVISION ENGINEERING IV (TVE401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Electrical Engineering)
 Overview of Analogue Colour television Standards and Colour Television Systems: PAL, PAL+, D2-MAC, SECAM, NTSC. Digital Video Standards: DVB and ATSC. Digital formats: 4:2:2, 4:2:0; SiF, CIF and QCIF (bandwidth and bit rate problem). Video Compression Techniques: DCT, VLC, RLC, Huffman entropy, JPEG, MPEG I and MPEG II. Audio Compression Techniques: MP3 and AC-3. Complete DVB transmitting and receiving chain – process and system multiplexers, scrambling, modulation transmission and receiving of DVB signal. (Total tuition time: ± 70 hours)
- THEORY OF DESIGN I (THD100T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Architecture)
 Visits to buildings. The process of design: Part 1. Relevant topics relating to design projects. Space, form, proportion, scale. Organising principles. Circulation. Theory: Bauhaus, modern movement, international style. (Total tuition time: not available)
- THEORY OF DESIGN II (THD200T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Architecture)
 Visits to buildings. The process of design: Part 2. Relevant topics relating to design projects. Theory: romantic pragmatism. The work of Christopher Alexander. Arts and crafts movement, art nouveau, art deco, classicism. History: Cape settlement. 18th and 19th century South African architecture. Indigenous Southern African design. Neo-classicism in Pretoria and Johannesburg. (Total tuition time: not available)
- THEORY OF DESIGN III (THD300T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Architecture)
 Visits to buildings. The process of design: Part 3. Relevant topics relating to design projects. Environmental effect on buildings. Theory: the Post-Modern Movement, deconstruction, Late Modern Period. History: the Modern Movement in Pretoria and Johannesburg. The vernacular architecture of East and Central Africa. (Total tuition time: not available)
- THEORY OF DESIGN IV (THD400T)** **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Architecture)
 Visits to buildings. Relevant topics relating to design projects. Green architecture. Commercialism. Selected topic from the social and behavioural sciences. The hidden dimension. Selected period from the fine arts, including painting and sculpture. Theory: the work of individual architects and architectural firms. International and local. History: the vernacular architecture of Northern Africa. Islam. Australian architecture. (Total tuition time: not available)



THEORY OF DESIGN V (THD500T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Architecture)**

Weekly seminars dealing with aspects such as social conditions, politics and policies that influence the provision of housing in theory and practice. Participation in Community Planning Forum activities. Research paper relating to a specific field of interest. (Total tuition time: not available)

THEORY OF MACHINES III (TMH301T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering)**

Cams: tangent, curved-flank and circulate arc cams. Flywheels: rectilinear, sinus wave and combined rotational movement diagrams. Governors: function, power and drive, sensitivity, control power and stability. Vibrations: simple, damped and forced. (Total tuition time: ± 68 hours)

THEORY OF STRUCTURES II (TSC211T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Civil Engineering)**

Elementary structural analysis, calculation of sectional properties, that is centroids, moment of inertia, etc. Stresses and strains of structural materials, theory of elastic bending. Calculations of bending moments, shear forces, deflections. Loads on structures. (Total tuition time: ± 75 hours)

THEORY OF STRUCTURES IV (TSC411T)**1 X 4-HOUR PAPER****(Subject custodian: Department of Civil Engineering)**

Advanced structural analysis methods, applicable computer applications. (Total tuition time: ± 32 hours)

THERMODYNAMICS II (TDN201T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering)**

Gases: gas laws, processes, cycles, calculations, steam tables, chart, throttling, boilers and efficiencies, line diagrams, calculations. Condensers: Dalton's laws, efficiency, losses, calculations. Combustion: composition, heat values, excess air, calculations: gravimetric and volumetric. (Total tuition time: ± 68 hours)

THERMODYNAMICS III (TDN321T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering)**

Gases, vapours and entropy. Principles and calculations. IC engines, petrol, diesel. Combustion and engine test bench calculations. Dynamometer: description and calculations. Reciprocating compressors: single and double staging. Refrigeration: cycles and calculations. (Total tuition time: ± 68 hours)

THERMODYNAMICS IV (TDN401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering)**

Power plant. Internal combustion engines. Gas turbines. Rotary compressors and blowers. Combustion. (Total tuition time: ± 68 hours)

THERMODYNAMICS: APPLIED III (TDA301T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Chemical and Metallurgical Engineering)**

Heating and expansion. Nozzles. Refrigeration and cooling. Steam generation theory. Laboratory work. Combustion engines. (Total tuition time: ± 60 hours)

THERMODYNAMICS: CHEMICAL ENGINEERING III (TCE301T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Chemical and Metallurgical Engineering)**

Introduction. First and second law of thermodynamics. Heat capacity. Real gases. Thermodynamic relations. Properties of mixtures. Absorption. Enthalpy. Entropy (processes: spontaneous, reversible, irreversible). Free energy. Ellingham diagram for oxides and sulphides. Chemical equilibrium. Principles of phase equilibrium. Construction of phase diagrams: binary, free energy. (Total tuition time: ± 60 hours)

THERMO-FLOW (THF201T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering)**

Fundamentals of thermodynamic processes and cycles, gas law, steam and steam generation, internal combustion engines, refrigeration. Fundamentals of fluid dynamics, hydrostatics and hydrodynamics, energy equations, pipe flow, pumps and fans. (Total tuition time: ± 120 hours)

TOWN PLANNING IV (TPN401T)**CONTINUOUS ASSESSMENT****(Subject custodian: Department of Geomatics)**

Historical perspective, modern trends. Land use: major land uses, land-use relationships, zoning. Township design: urban, local, residential layouts, informal settlements. Planning law and procedure, ordinances, etc. (Total tuition time: ± 30 hours)



- TRAFFIC ENGINEERING IV (TFE401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
 Traffic surveys. Traffic characteristics and flow theory. Traffic design, traffic management and urban works, traffic safety, statistical methods, parking studies, systems and structures. Traffic systems management, traffic impact studies, traffic control and forms of signing, signals and automated traffic control systems, interchange and intersection capacities. Project. (Total tuition time: ± 32 hours)
- TRANSPORTATION ENGINEERING II (TEN201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
 Transport planning, methods of transport, transport demand. Traffic engineering, traffic flow theory, traffic studies, parking layout, safety. Geometric design, horizontal and vertical alignment of roads and railroads, basic planning, detail design, supervision. (Total tuition time: ± 60 hours)
- TRANSPORTATION ENGINEERING III (TEN301T)** **1 X 4-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
 Design of earthworks for roads and railroads. Materials requirements and selection for road construction, design methods for various classes of pavements, pavement layers, standard specifications. Road drainage requirements and drainage systems. (Total tuition time: ± 75 hours)
- TRANSPORTATION PLANNING IV (TSP401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
 Planning theory and technique, transport models, data retrieval, assessment, environmental planning and characterisation, development control, route planning, transport impact studies. Project. (Total tuition time: ± 32 hours)
- TRANSPORTATION TECHNOLOGY IV (TTN401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
 Transport policies, transportation systems, terminals, public transport, private transport, freight transport, vehicle and driver characteristics. Project. (Total tuition time: ± 32 hours)
- TURBO MACHINES IV (TRM401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Mechanical Engineering)
 Axial fans and pumps. Axial and centrifugal turbines and compressors. (Total tuition time: ± 68 hours)

U

- URBAN PLANNING AND DESIGN IV (UPD401T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
 Planning: historical perspective, modern trends, land-use, legal procedure, urban infrastructure, maintenance. Design: structure plans, township establishment, informal project design, emphasising the engineering-related aspects of urban planning and design. (Total tuition time: ± 32 hours)

W

- WASTEWATER TREATMENT TECHNOLOGY IV (WWT401T)** **1 X 3-HOUR PAPER (OPEN BOOK)**
(Subject custodian: Department of Civil Engineering)
 Wastewater properties, treatment processes, treatment plant design, environmental factors, plant operation and management. Design project. (Total tuition time: ± 32 hours)
- WATER ENGINEERING II (WEN201T)** **1 X 3-HOUR PAPER**
(Subject custodian: Department of Civil Engineering)
 Basic principles of hydraulics, pressures, pipe flow, design of elementary pipe reticulation networks. Pump applications. Water quality, elementary design of water purification works and wastewater treatment plants, legislation. (Total tuition time: ± 90 hours)
- WATER ENGINEERING III (WEN301T)** **1 X 3-HOUR PAPER (OPEN BOOK)**
(Subject custodian: Department of Civil Engineering)
 Hydrology cycle, precipitation, evaporation, hydrographs. Stormwater management, calculation of run-off water. Open-channel flow, clear-water storage, sewerage reticulation, pump installations and pumping mains. (Total tuition time: ± 60 hours)



WATER RESOURCE MANAGEMENT: CIVIL IV (WAT401T)

1 X 3-HOUR PAPER (OPEN BOOK)

(Subject custodian: Department of Civil Engineering)

Water resources, river engineering, limnological aspects, estuaries aspects, water quality modelling, catchment management, project. (Total tuition time: ± 32 hours)

WATER TREATMENT TECHNOLOGY IV (WTT401T)

1 X 3-HOUR PAPER (OPEN BOOK)

(Subject custodian: Department of Civil Engineering)

Properties of water, treatment processes, treatment site design, recalculation, re-use, recovery and conservation of water, environmental factors. (Total tuition time: ± 32 hours)

