2011
PROSPECTUS

PART 3

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

ISSN 0258-7343

TSHWANE UNIVERSITY OF TECHNOLOGY

PARTS OF THE PROSPECTUS

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 2011 only.
2. The “overview of syllabus” is only an outline of the syllabus of a subject. The complete syllabus of a subject appears in the subject study guide.
3. The campus indicated is subject to change and confirmation.
4. Prospective students will not be admitted to any qualification without prior evaluation.
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 of which the closing date is 15 June. The closing date for second-semester courses is 15 May of the year concerned.

THE INDICATED APPLICATION FEES MUST ACCOMPANY ALL APPLICATIONS.

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.
- Acceptance is subject to available capacity according to the student Enrolment Plan (SEP).

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) will be assessed on the equivalent basis by the South African Qualifications Authority, and a full or conditional exemption certificate will be issued. This exemption certificate is a prerequisite for all students who want to enrol for undergraduate studies. The Tshwane University of Technology cannot obtain this certificate on your behalf. Candidates may also apply for recognition of prior learning 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. Candidates from private schools in South Africa (who did not write any of the examinations mentioned above) may apply to the Office of the Registrar for admission via the Senate’s discretionary route.

ENQUIRIES

Contact Centre
Tel: 086 1102 421
Fax: 086 110 2421

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
NELSPRUIT 1200
Tel: 013 745 3500/3603
Madiba Drive
NELSPRUIT
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

On 6 July 2010, this faculty had the following staff members:

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), M Tech (Electrical Engineering) (Tech Pta), MSc (Mathematics) (University of Southern Mississippi), Doctor of Philosophy (Electrical and Information Engineering) (University of the Witwatersrand)
Telephone: 012 382 5148
Office: Room 621, Building 3, Pretoria Campus

Acting Associate Dean: Mr I Tlhabadira - N Dip (Mechanical) (Mangosuthu Technikon), NH Dip (Mechanical) (Vaal Tech), NH Dip (Post School Education) (TNG), B Tech (Mechangical) (TNG), BSc (Hons) (Mechanics) (UP), Certificate in Intellectual Property Law (UNISA), MSc (Applied Science) (Mechanics) (UP)
Telephone: 012 382 5120
Office: Room 622B, Building 3, Pretoria Campus

NAME	POST DESIGNATION	QUALIFICATION(S)
DEPARTMENT OF ARCHITECTURE		
Ms M Bolt	Senior Lecturer	BArch (UP)
Mr P Greyvensteyn	Senior Lecturer	MArch (Wits)
Mr CG Joubert	Senior Lecturer	M Tech (Architecture) (TUT)
Mr MO Odebiyi	Lecturer	MSc (Architecture) (ABU)
Mr EP Pieters	Head of Department	BArch (UP)
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)
DEPARTMENT OF BUILDING SCIENCES		
Ms R Geertsema	Lecturer	M Tech (Construction Management) (TUT)
Mr WP Jansen van Rensburg	Head of Department	BSc (QS) (UP), PrQS
Mr GJ Meintjes	Senior Lecturer	MSc (Project Management) (UP), PrQS
Mr E Mwanaumo	Lecturer	MSc (Project Management) (UP)
Ms V Ranjit	Lecturer	B Tech (Construction Management) (Durban Institute of Technology)
Mr NTS van der Walt	Senior Lecturer	BSc (QS) (UP), PrQS
DEPARTMENT OF CHEMICAL AND METALLURGICAL ENGINEERING		
Mr D Delport	Lecturer	M Dip Tech (Chemistry) (Tech Pta)
Mr V Hlongwane	Lab Technician	N Dip (Engineering) (Chemical) (CPUT)
Mr KK Kgatle	Lecturer	NH Dip (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)
Mr M Mosesane	Lab Technician	N Dip (Engineering) (Chemical) (TUT)

Ms NN Nthite	Departmental Administrator	B Tech (Office Management and Technology) (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 Premlall	Lecturer	M Tech (Engineering) (Chemical) (TUT)
Mr M Ranyaoa	Head of Department	MSc (Engineering) (Chemical) (Sofia University, Bulgaria)
Ms LC Tshabalala	Technologist	B Tech (Engineering) (Metallurgy) (TUT)
DEPARTMENT OF CIVIL ENGINEERING		
Dr CE Ackerman	Senior Lecturer	D Tech (Engineering) (Civil) (Tech Pta)
Mr A Baladzi	Laboratory Technician	B Tech (Information Technology) (Support Services) (TUT)
Mr RFA Berkers	Lecturer	M Tech (Engineering) (Civil) (TUT)
Ms DA Branga-Peicu	Senior Lecturer	MSc (Water Engineering) (Institutul de Constructi Bucoresti – 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	Lecturer	PhD (Engineering) (Civil) (Univ of Ibadan, Nigeria)
Mr M Makaleng	Laboratory Assistant	N Dip (Engineering) (Civil) (TUT)
Mr RJ Moloisane	Lecturer	M Tech (Engineering) (Civil) (*cum laude*) (TUT), MSc (Civil) (UP)
Prof JM Ndambuki	Professor and Head of Department	PhD (Engineering) (Civil) (Delft Univ)
Ms DM Ngoma	Departmental Administrator	B Tech (Office Management and Technology) (TNW)
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)
Ms S van der Merwe	Departmental Administrator	B Tech (Business Information Systems) (TUT)
Dr WA van Wyngaard	Principal Lecturer	D Tech (Engineering) (Civil) (Tech Pta)
Mr JC van Zyl	Principal Lecturer	MEng (Engineering) (Civil) (US)
DEPARTMENT OF ELECTRICAL ENGINEERING		
Mrs BT Abe	Lecturer (eMalahleni Campus)	MEng (Engineering) (Electrical) (Federal University of Technology) (Akure, Nigeria)
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)
Ms NP Cele	Energy Researcher (Centre for Energy and Electric Power)	MSc (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) (Bulgeria)
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)
Prof AA Jimoh	Professor and Head of Department	PhD (Engineering) (Electrical) (McMaster University, Canada)
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)
Ms O Mahlo	Departmental Administrator	N Dip (Office Management and Technology) (TUT)
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)
Ms BN Msiza	Departmental Administrator (Administration)	B Tech (Business Administration) (TUT)
Mr W Mubatenhema	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 Myzece	Associate Professor	PhD (Electronic and Electrical Engineering) (University of Strathclyde, Glasgow, Scotland)
Prof DV Nicolae	Associate Professor	D Tech (Engineering) (Electrical) (Vaal University of Technology)
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)
Mr T Okhai	Lecturer	M Tech (Engineering) (Electrical) (Clinical) (TUT)
Mr LI Onwuegbuna	Lecturer	MSc (Electromagnetic) (University of Witwatersrand)
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 Engergy 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) (*École Supérieure d'Ingénieurs en Électronique et Électrotechnique*) (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)
Mr S Sewpersad	Technician	N Dip (Engineering) (Electrical) (Digital Technology) (Tech Pta)
Mr DR Shongwe	Technician	N Dip (Engineering) (Electrical) (TNT)
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)
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 Administrator (Mbombela Campus)	N Dip (Office Management and Technology) (Tech Pta)
Mr AJ Visser	Lecturer	MSc (Engineering) (Electrical) (University of Stellenbosch)
Mr T Wanjekeche	Lecturer (eMalahleni Campus)	MSc (Engineering) (Electrical) (University of China)
Mr A Whiteford	Technical Assistant	ND (Electrical Engineering) (Clinical) (TUT)
Mr CS Xayimpi	Assistant Technician	N Dip (Electrical Engineering) (WSU)
Mr AA Yusuff	Lecturer	MSc (Electrical Engineering) (Lagos University, Nigeria)
Mr DP Zikalala	Junior Lecturer	B Tech (Engineering) (Electrical) (Power Engineering) (TUT)
DEPARTMENT OF GEOMATICS		
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 NF Laurie	Acting Head of Department and Senior Lecturer	NH Dip (Education) (Post School) (Tech Pta), B Tech (Engineering) (Civil) (Tech Pta), B Tech (Surveying) (Tech Pta)
Mr K Neluembeni	Junior Lecturer	N Dip (Surveying) (TNG), B Tech (Logistics) (TUT)
Mr C Paradzayi	Lecturer	BSc (Land Surveying) (University of Zambia), MSc (Remote Sensing) (UCT)
Ms A Viljoen	Secretary	Senior Certificate
DEPARTMENT OF INDUSTRIAL ENGINEERING		
Mr G de Clercq	Lecturer	MBA (Univ of Wales)
Ms MG Kanakana	Acting Head of Department and Lecturer	MBA (Nelson Mandela University)
Mr T Nenzhelele	Lecturer	M Tech (Industrial Engineering) (TUT)
Mrs I van Rooyen	Departmental Administrator	B Tech (Office Management and Technology) (TUT)
DEPARTMENT OF MECHANICAL ENGINEERING		
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)
Mr DA Desai	Lecturer	MDip Tech (Engineering) (Mechanical) (Tech Pta)
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)
Mr JC Kearney	Technologist	B Tech (Education) (TUT)
Ms MC Khoathane	Lecturer	M Tech (Polymer Technology) (TUT)
Mr L Mabena	Junior Lecturer	B Tech (Transport Economics) (UJ)
Mr FM Mashile	Junior Lecturer	B Tech (Engineering) (Metallurgical Engineering) (UP)
Prof M Mbarawa	Head of Department and Professor	PhD (Engineering) (University of New South Wales, Australia)
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 HG van Zyl	Senior Lecturer	MDip Tech (Engineering) (Mechanical) (Tech Pta), Dip (Tertiary Education) (UP)
Mr MD Wythe	Lecturer	MDes RCS (ID Eng) (London)

CONTENTS

SECTION A: THE BUILT ENVIRONMENT

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 academic 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.

1. DEPARTMENT OF ARCHITECTURE

1.1 BACCALAUREUS TECHNOLOGIAE: ARCHITECTURE: PROFESSIONAL
Qualification code: BTPS09

REMARKS

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 course also serves as an entry course for the Magister Technologiae: Architecture: Professional.

a. Admission requirement(s):

For students who obtained a Senior Certificate before 2008:
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.
For students who have obtained a National Senior Certificate since 2008:
A National Senior Certificate or an equivalent qualification, with English (4) and Mathematics (3) or Mathematical Literacy (5).

b. Selection criteria:

Admission Point Score (APS) and Assessment procedures:
All Candidates after passing the initial administrative screening, will sit for additional assessment, arrange with the Department of Architecture.

FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:

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

Total APS score: 24 (six subjects).

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

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics or Mathematical Literacy	3 5
Additional subjects (excluding Life Orientation):	
Any three other subjects with a final score of 16	
TOTAL APS SCORE (with Mathematics): **TOTAL APS SCORE** (with Mathematic Literacy):	**23** **25**

c. Minimum duration: Four years.

d. Presentation and campus: Pretoria Campus (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 combinations and in sequence as 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 combinations and in sequence as indicated. The following rules will apply for 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 combinations and in sequence as indicated. The following rules will apply for 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 combinations and in sequence as indicated. The following rules will apply for 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**

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

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 and campus: Pretoria Campus (day and block-based classes).

e. Accreditation by professional body: This qualification has been accredited by the South African Council for the Architecture Profession (SACAP).

f. Subject credits: Subject credits are shown in brackets after each subject.

FIRST YEAR
Subjects must be taken in combinations and in sequence as indicated. The following rules will apply for 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)	
BMN500T	Business Management V	(0,040)	
CHH500T	Computer Hardware V*	(0,020)	
CSM500T	Construction Materials V**	(0,040)	
KME500T	Construction Methods V**	(0,040)	
NSY500T	Network Systems V*	(0,030)	
THD500T	Theory of Design V***	(0,040)	
TOTAL CREDITS FOR THE FIRST YEAR:		**0,400**	

SECOND YEAR
Subjects must be taken in combinations and in sequence as indicated. The following rules will apply for 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)	
RMD500D	Research Methodology**	(0,020)	
SFN500T	Specification V*	(0,020)	
TOTAL CREDITS FOR THE SECOND YEAR:		**0,600**	
TOTAL CREDITS FOR THE QUALIFICATION:		**1,000**	

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

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 course also serves as an entry course for the Magister Technologiae: Architectural (Technology).

REMARKS

a.	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.
b.	Selection criteria:	Admission is subject to selection.
c.	Minimum duration:	One year.
d.	Presentation and campus:	Pretoria Campus (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 combinations and in sequence as indicated. The following rules will apply for the first year:
** ARA400T, CDG40PT and CDG40QT must be taken concurrently.
*** CDL40QT 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)	Office Practice III
OFP400T	**Office Practice IV**		
OFP40PT	Office Practice: Architectural Practice IV	(0,050)	Office Practice III
OFP40QT	Office Practice: Business Management IV	(0,050)	Office Practice III
PJG410T	Project Management IV*	(0,050)	Office 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**

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

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 and campus: Pretoria Campus (day and block-based classes).

d. 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 combinations and in sequence as 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**

1.5 SUBJECT INFORMATION

Syllabus content subject to change to accommodate industry changes.

SUBJECT NAME: ADVANCED COMPUTER APPLICATIONS IV
SUBJECT CODE: ARA400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Presentation software such as Art*Lantis, Piranesi, Adobe Photoshop, CorelDRAW. Video editing and multimedia production software. HTML: website design and maintenance.

SUBJECT NAME: APPLIED BUILDING SCIENCE I
SUBJECT CODE: ABC100B
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ARCHITECTURAL DESIGN I
SUBJECT CODE: ACH100T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ARCHITECTURAL DESIGN II
SUBJECT CODE: ACH200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Design projects of simple low-rise (double-storey) buildings with more complex circulation requirements, emphasising the following issues:
- Design process: determining design generators, concept, context and concept development
- Structure and material as design generators
- Environment and climate as design generators
- Introduction to problem analysis

SUBJECT NAME: ARCHITECTURAL DESIGN III
SUBJECT CODE: ACH300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Design projects of simple multi-storey buildings (i.e. offices with a basement), as well as long-span structures (i.e. factories), emphasising the following issues:
- Problem analysis as first step to synthesis
- Interpretation of the brief
- The effects of and solutions to environmental and climatic influences on design
- The principles of sustainability, as applied to buildings
- The fabric of the city: how a design solution acts as building block within the structure and fabric of the city

SUBJECT NAME: ARCHITECTURAL DESIGN IV
SUBJECT CODE: ACH400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ARCHITECTURAL DESIGN V
SUBJECT CODE: ACH500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ARCHITECTURAL MANAGEMENT: CONSTRUCTION MATERIALS V
SUBJECT CODE: ARM50QT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ARCHITECTURAL MANAGEMENT: CONSTRUCTION METHODS V
SUBJECT CODE: ARM50PT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ARCHITECTURAL PRACTICE III
SUBJECT CODE: AHC300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: ARCHITECTURAL PRACTICE V
SUBJECT CODE: AHC500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ARCHITECTURAL TECHNOLOGY PRACTICE II
SUBJECT CODE: ARC200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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

SUBJECT NAME: BUILDING SERVICES III
SUBJECT CODE: BSV300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: BUSINESS MANAGEMENT V
SUBJECT CODE: BMN500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMMUNICATION I
SUBJECT CODE: COM150C
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Relevant terminology and professional vocabulary. Summarising techniques. Comprehension. Report writing. Writing refereed articles.

SUBJECT NAME: COMPUTER-AIDED DESIGN II
SUBJECT CODE: CMI200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
An advanced 3D software package, ArchiCAD and Studio VIZ.

SUBJECT NAME: COMPUTER-AIDED DRAUGHTING I
SUBJECT CODE: CAI110T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
A basic 2D CAD software program; either Caddie or AutoCAD.

SUBJECT NAME: COMPUTER-AIDED DRAUGHTING III
SUBJECT CODE: CAI310T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Photoshop, 3-D animation and moving image technology, namely film and fly throughs.

SUBJECT NAME: COMPUTER-AIDED DRAUGHTING: COMPUTER HARDWARE IV
SUBJECT CODE: CDG40PT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMPUTER-AIDED DRAUGHTING: NETWORK SYSTEMS IV
SUBJECT CODE: CDG40QT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Networking hardware basics and terminology. Operating system set-up for networking. Data security. Maintaining networks.

SUBJECT NAME: COMPUTER APPLICATIONS I
SUBJECT CODE: COA110B
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
MS Windows, MS Word, MS Excel, CorelDRAW. Basic hardware terminology. Introduction to the Internet and e-mail. Introduction to CAD.

SUBJECT NAME: COMPUTER HARDWARE V
SUBJECT CODE: CHH500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION AND DETAILING: CONSTRUCTION MATERIALS IV
SUBJECT CODE: CDL40QT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: CONSTRUCTION AND DETAILING: CONSTRUCTION METHODS IV
SUBJECT CODE: CDL40PT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MATERIALS I
SUBJECT CODE: CSM110T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MATERIALS II
SUBJECT CODE: CSM200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MATERIALS III
SUBJECT CODE: CSM300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MATERIALS IV
SUBJECT CODE: CSM400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: CONSTRUCTION MATERIALS V
SUBJECT CODE: CSM500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION METHODS I
SUBJECT CODE: KME110T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Regulations: National Building Regulations and the National Home Builders Registration Council (NHBRC). 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.

SUBJECT NAME: CONSTRUCTION METHODS II
SUBJECT CODE: KME210T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION METHODS III
SUBJECT CODE: KME310T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION METHODS IV
SUBJECT CODE: KME400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION METHODS V
SUBJECT CODE: KME500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONTRACT DOCUMENTATION I
SUBJECT CODE: CDO100T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONTRACT DOCUMENTATION II
SUBJECT CODE: CDO200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONTRACT DOCUMENTATION III
SUBJECT CODE: CDO300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONTRACT DOCUMENTATION V
SUBJECT CODE: CDO500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: HISTORY OF ARCHITECTURE I
SUBJECT CODE: HAC100T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: LANDSCAPE DESIGN III
SUBJECT CODE: LDE310T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: LAW AND CONTRACT MANAGEMENT IV
SUBJECT CODE: LWC400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: NETWORK SYSTEMS V
SUBJECT CODE: NSY500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: OFFICE PRACTICE: ARCHITECTURAL PRACTICE IV
SUBJECT CODE: OFP40PT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: OFFICE PRACTICE: BUSINESS MANAGEMENT IV
SUBJECT CODE: OFP40QT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PRESENTATION TECHNIQUES I
SUBJECT CODE: PTT100T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PRINCIPLES OF URBAN DESIGN IV
SUBJECT CODE: PUD400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROJECT MANAGEMENT IV
SUBJECT CODE: PJG410T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Management approaches. The business environment. Personnel management. Financial management. Risk analysis. Financial viability studies. IT integration. Decision-making and problem solving. Corporative communication. Small business management. Politics, ethics and social responsibility. Case studies.

SUBJECT NAME: RESEARCH METHODOLOGY
SUBJECT CODE: RMD500D
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: RESEARCH REPORT: ARCHITECTURAL TECHNOLOGY: TECHNOLOGY: RESEARCH METHODOLOGY V
SUBJECT CODE: ATG50PT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: RESEARCH REPORT: ARCHITECTURAL TECHNOLOGY: TECHNOLOGY: TECHNOLOGY V
SUBJECT CODE: ATG50QT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
The dissertation involves the investigation of a relevant research problem.

SUBJECT NAME: RESEARCH REPORT: ARCHITECTURE: PROFESSIONAL V
SUBJECT CODE: ATG510T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SPECIFICATION V
SUBJECT CODE: SFN500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SPECIFICATION AND QUANTITIES III
SUBJECT CODE: SPQ300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRUCTURES IV
SUBJECT CODE: STR400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STUDIO WORK: CONTRACT DOCUMENTATION IV
SUBJECT CODE: STW40PT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STUDIO WORK: SPECIFICATION IV
SUBJECT CODE: STW40QT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
The purpose and use of specifications, forms of specification, preliminary items and the specification of all building trades.

SUBJECT NAME: SURVEYING FOR ARCHITECTURE III
SUBJECT CODE: SFA300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THEORY OF DESIGN I
SUBJECT CODE: THD100T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THEORY OF DESIGN II
SUBJECT CODE: THD200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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 19thcentury South African architecture. Indigenous Southern African design. Neo-classicism in Pretoria and Johannesburg.

SUBJECT NAME: THEORY OF DESIGN III
SUBJECT CODE: THD300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THEORY OF DESIGN IV
SUBJECT CODE: THD400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THEORY OF DESIGN V
SUBJECT CODE: THD500T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

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 NATIONAL DIPLOMA: BUILDING
Qualification code: NDBU04

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Additional subjects (excluding Life Orientation):	
Any four other vocational subjects with a competent (60-69%), totaling a final score of 15	
TOTAL APS SCORE:	**23**

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

Admission requirement(s): **For 2011:** 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.
As from 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.

Selection Criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

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

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

Admission requirement(s): **For 2011:** A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).
As from 2012: A National Senior Certificate or an equivalent qualification, with English (4) and Mathematics (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	**MINIMUM PERFORMANCE LEVEL/SCORE**
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	3
Additional subjects (excluding Life Orientation):	
For 2011: Physical Science (with a minimum score of 3) and any three other subjects with a final score of 12 **As from 2012:** Any four other subjects with a final score of 16	
TOTAL APS SCORE:	**23**

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

b. Minimum duration: Three years.

c. Presentation and campus: Pretoria Campus (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 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 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 student may not register for more than three first-time subjects per semester.

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 student may not register for more than five fist-time subjects per semester.

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 student may not register for more than four first-time subjects per semester.

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**

2.2 BACCALAUREUS TECHNOLOGIAE: CONSTRUCTION MANAGEMENT
Qualification code: BTCU02

REMARKS

a. Admission requirement(s): A National Diploma: Building or an NQF level 6 diploma or bachelor's degree in Construction Economics 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.

c. Minimum duration: One year.

d. Presentation and campus: Pretoria Campus (day classes).

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 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.)

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. Subjects are offered in both semesters.

FIRST OR SECOND SEMESTER

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**

2.3 MAGISTER TECHNOLOGIAE: CONSTRUCTION MANAGEMENT (Structured)
Qualification code: MTCUS0

REMARKS

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

a. Admission requirement(s): A Baccalaureus Technologiae: Construction Management or an NQF level 7 bachelor's or honours degree in Construction Management 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.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (day classes).

e. Subject credits: Subject credits are shown in brackets after each subject.

FIRST OR SECOND SEMESTER

CODE	SUBJECT	CREDIT
CEC501T	Construction Economics V	(0,100)
CMN511T	Construction Management V	(0,200)
CRU501T	Research Report: Construction Management V	(0,500)
CRU501R	Research Report: Construction Management V (re-registration)	(0,000)
DLM501T	Development Management V	(0,100)
RMD101H	Research Methodology	(0,100)

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

2.4 MAGISTER TECHNOLOGIAE: CONSTRUCTION MANAGEMENT
Qualification code: MTCU95

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Construction Management or an equivalent qualification.

In addition, the student should successfully complete Research Methodology in the first year of study if it was not taken for a previous qualification. Students who have not passed Research Methodology should make arrangements for the attendance of and payment for this subject with Mrs K de Villiers (Building 3-405).

b. Selection criteria: All applications are subject to selection.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (research).

e. Dissertation: This instructional programme comprises a research project with a dissertation. In the dissertation, the student should prove that he or she understands a particular problem in the industry in which he or she has completed research, is 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.

f. Subject credits: Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
CMN510T	Dissertation: Construction Management	(1,000)
CMN510R	Dissertation: Construction Management (re-registration)	(0,000)

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

2.5 BACCALAUREUS TECHNOLOGIAE: QUANTITY SURVEYING
Qualification code: BTQS02

REMARKS

a. Admission requirement(s): A National Diploma: Building or an NQF level 6 diploma or bachelor's degree in Construction Economics 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.

c. Minimum duration: One year.

d. Presentation and campus: Pretoria Campus (day classes).

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 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.)

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. Subjects are offered in both semesters.

FIRST OR SECOND SEMESTER

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 (Structured)
Qualification code: MTQSS0

REMARKS

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

a. Admission requirement(s): A Baccalaureus Technologiae: Quantity Surveying or an NQF level 7 bachelor's or honours degree in Quantity Surveying 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.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (day classes).

e. Subject credits: Subject credits are shown in brackets after each subject.

FIRST OR SECOND SEMESTER

CODE	SUBJECT	CREDIT
CEC501T	Construction Economics V	(0,100)
DLM501T	Development Management V	(0,100)
QSU501T	Quantity Surveying V	(0,200)
QSV501T	Research Report: Quantity Surveying V	(0,500)
QSV501R	Research Report: Quantity Surveying V (re-registration)	(0,000)
RMD101H	Research Methodology	(0,100)

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

2.7 MAGISTER TECHNOLOGIAE: QUANTITY SURVEYING
Qualification code: MTQS95

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Quantity Surveying or an equivalent qualification.

In addition, the student should successfully complete Research Methodology in the first year of study if it was not taken for a previous qualification. Students who have not passed Research Methodology should make arrangements for the attendance of and payment for this subject with Mrs K de Villiers (Building 3-405).

b. Selection criteria: All applications are subject to selection.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (research).

e. Dissertation: This programme comprises a research project with a dissertation. In the dissertation, the student should prove that he or she understands a particular problem in the industry in which he or she has done research, is 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.

f. Subject credits: Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
QSU500T	Dissertation: Quantity Surveying	(1,000)
QSU500R	Dissertation: Quantity Surveying (re-registration)	(0,000)

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

2.8 SUBJECT INFORMATION

Syllabus content subject to change to accommodate industry changes.

SUBJECT NAME: APPLIED BUILDING SCIENCE I
SUBJECT CODE: ABC101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: BUILDING ENTREPRENEURSHIP IV
SUBJECT CODE: BEP401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
Financing and establishing a business. Income tax. Budget control. Costing and cost control. Incentives. Entrepreneurship and business management as applied in the building industry.

SUBJECT NAME: COMMUNICATION I
SUBJECT CODE: COM151T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence.

SUBJECT NAME: COMPUTER APPLICATIONS I
SUBJECT CODE: COA111C
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION ACCOUNTING III
SUBJECT CODE: CSA311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION ECONOMICS IV
SUBJECT CODE: CEC401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION ECONOMICS V
SUBJECT CODE: CEC501T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
South African property law and taxation, property and facilities management, asset management, investment in capital projects, financing decisions, dividend decisions, property valuation and development.

SUBJECT NAME: CONSTRUCTION LAW AND PROCEDURES IV
SUBJECT CODE: CLP401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MANAGEMENT I
SUBJECT CODE: CMN101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MANAGEMENT II
SUBJECT CODE: CMN200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MANAGEMENT III
SUBJECT CODE: CMN301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MANAGEMENT IV
SUBJECT CODE: CMN411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MANAGEMENT V
SUBJECT CODE: CMN511T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION TECHNOLOGY I
SUBJECT CODE: CTY111T
EVALUATION METHOD: 1 X 4-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION TECHNOLOGY II
SUBJECT CODE: CTY210T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION TECHNOLOGY III
SUBJECT CODE: CTY311T
EVALUATION METHOD: 1 X 4-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
Framed and load-bearing, multi-floor concepts. Use of shoring and strutting for latLeral 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.

SUBJECT NAME: DEVELOPMENT MANAGEMENT IV
SUBJECT CODE: DLM401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DEVELOPMENT MANAGEMENT V
SUBJECT CODE: DLM501T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1BDG
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2BDG
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MAINTENANCE MANAGEMENT IV
SUBJECT CODE: MMG401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MARKET VALUATIONS IV
SUBJECT CODE: MKV401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
Basic principles, concepts and methods of valuations. Comparative selling and income methods, as well as the cost replacement method. Advantages and disadvantages of those methodLs and the application of valuation methods. Expropriation.

SUBJECT NAME: PRICE ANALYSIS AND ESTIMATING III
SUBJECT CODE: PAY311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: QUANTITY SURVEYING I
SUBJECT CODE: QSU101T
EVALUATION METHOD: 1 X 4-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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 brandering. 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.

SUBJECT NAME: QUANTITY SURVEYING II
SUBJECT CODE: QSU210T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: QUANTITY SURVEYING III
SUBJECT CODE: QSU311T
EVALUATION METHOD: 1 X 4-HOUR PAPER (PRESCRIBED OPEN BOOK)
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: QUANTITY SURVEYING IV
SUBJECT CODE: QSU421T
EVALUATION METHOD: 2 X 4-HOUR PAPER (PRESCRIBED OPEN BOOK)
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: QUANTITY SURVEYING V
SUBJECT CODE: QSU501T
EVALUATION METHOD: 2 X 4-HOUR PAPER (PRESCRIBED OPEN BOOK)
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: RESEARCH METHODOLOGY
SUBJECT CODE: RMD101H
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
What does research entail? Research tools, objectives, characteristics, types, the research process, variables and constructs. Research planning and design: planning the project, stating the problem, hypothesis formulation, research proposal, measurement and assessment. Validity and reliability. Data collection and statistical analysis. The research report, hypothesis testing, report formats.

SUBJECT NAME: SITE SURVEYING: APPLICATIONS I
SUBJECT CODE: SSU10XT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SITE SURVEYING: PRACTICAL I
SUBJECT CODE: SSU10YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 50 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRUCTURES AND CONCRETE: CONCRETE III
SUBJECT CODE: SEK30YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRUCTURES AND CONCRETE: STRUCTURES III
SUBJECT CODE: SEK30XT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SECTION B: ENGINEERING ENVIRONMENT

The following qualifications are applicable:

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

GENERIC STIPULATIONS WITH REGARDS TO THE NATIONAL DIPLOMAS (refer to registered qualification standard SAQA ID: 49744)

The purpose of the National Diploma: 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 technician. It is intended to subsequently empower a candidate engineering technician to demonstrate 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.

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.

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.

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

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.

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.

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.

CRITICAL CROSS-FIELD OUTCOMES:

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.

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 NATIONAL DIPLOMA: ENGINEERING: CHEMICAL
Qualification code: NDCE03

Purpose for the qualification:
This qualification is intended for employment at technician level. Persons with this qualification use their knowledge of chemistry and engineering to operate and improve chemical processes in a way which is efficient, safe and profitable.

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics and at least (60-69%) for Physical Sciences.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	4
Additional subjects (excluding Life Orientation):	
Any three other vocational subjects with a competent (60-69%), totaling a final score of 11	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS score of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
For 2011: Any three other subjects with a final score of 13 **As from 2012:** Any three other subjects with a final score of 12	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

b. Minimum duration: Three years.

c. Presentation and campus: Pretoria Campus (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 100% of the practical sessions. Students must pass the practical component of a subject to be admitted to the examination.
i.	Safety wear:	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 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.)

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

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

EPS101T	Entrepreneurial Skills*	(0,000)

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**

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

REMARKS

a. Admission requirement(s) and selection criteria:
See qualification NDCE03.

b. Minimum duration: Three and a half years.

c. Presentation and campus: Pretoria Campus (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 100% of the practical sessions. Students must pass the practical component of a subject to be admitted to the examination.

h. Safety wear: 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 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)
FPCOS02	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.

3.3 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CHEMICAL
Qualification code: BTCE02

Purpose for the qualification:
To award the qualification of Baccalaureus Technologiae: Engineering: Chemical to technologists in South Africa by equipping students with high education, fundamentals of Chemical Engineering interdisciplinary knowledge, awareness of local industrial needs, skills in lifelong learning, communication and leadership.

REMARKS

a.	Admission requirement(s):	A National Diploma: Engineering: Chemical with Stage Separation or an NQF level 6 bachelor's degree in Chemical Engineering 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:	Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.
c.	Minimum duration:	One year.
d.	Presentation and campus:	Pretoria Campus (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.	Safety wear:	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.	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**

3.4 MAGISTER TECHNOLOGIAE: ENGINEERING: CHEMICAL
Qualification code: MTCE95

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Engineering: Chemical degree or an NQF level 7 bachelor's or honours degree in Chemical Engineering 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: A personal interview with a departmental selection panel.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (research).

e. Structure: The qualification consists of a research project that must be recorded in the form of a dissertation.

f. Re-registration: Students must re-register for this qualification every year.

g. Subject credits: Subject credits are shown in brackets after each subject.

CODE	SUBJECT	CREDIT
ECH500T	Dissertation: Engineering: Chemical	(1,000)
ECH500R	Dissertation: Engineering: Chemcial (re-registration)	(0,000)

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

3.5 DOCTOR TECHNOLOGIAE: ENGINEERING: CHEMICAL
Qualification code: DTCE96

REMARKS

a. Admission requirement(s): A Magister Technologiae: Engineering: Chemical or an NQF level 8 master's degree in Chemical Engineering 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: A personal interview with a departmental selection panel.

c. Duration: A minimum of two years and a maximum of five years.

d. Presentation and campus: Pretoria Campus (research).

e. Structure: The qualification consists of a research project that must be recorded in the form of a thesis.

f. Re-registration: Students must re-register for this qualification every year.

g. 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)

TOTAL CREDITS FOR THE QUALIFICATION: **2,000**

3.6 NATIONAL DIPLOMA: ENGINEERING: METALLURGY
Qualification code: NDMY03

Purpose for the qualification:
The purpose of the programme is to impart to students the broad foundational knowledge of the different aspects of Metallurgical Engineering at the level of theories of the various Metallurgical Engineering Science and Technology, as well as the level of practical appreciation of such via laboratory demonstrations and activities, work visits and industrial experiential learning. The link between the theories and what is obtained in a broad representation of the Metallurgical Engineering industries is thus expected to be appreciated throughout the course. Completion of the programme leads to the award of the National Diploma which qualifies the graduate for registration as an Engineering Technician with the Engineering Council of South Africa.

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics and at least (60-69%) for Physical Sciences.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	4
Additional subjects (excluding Life Orientation):	
Any three other vocational subjects with a competent (60-69%), totaling a final score of 11	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
For 2011: Any three other subjects with a final score of 13 **As from 2012:** Any three other subjects with a final score of 12	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

b. Minimum duration: Three years.

c. Presentation and campus: Pretoria Campus (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 100% of the practicals. Students must pass the practical component of a subject to be admitted to the examination.
i.	Safety wear:	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 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.

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)	
PMU201T	Practical Metallurgy II	(0,080)*	Metallurgy I Physical Metallurgy I
RFC201T	Refractories II	(0,067)*	

TOTAL CREDITS FOR THE SEMESTER: 0,500

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

MTE301T	Mathematics: Chemical Engineering III*	(0,000)	Mathematics II

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

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

GEO141T	Geology I	(0,000)*

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**

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

REMARKS

a. Admission requirement(s) and selection criteria:
See qualification NDMY03.

b. Minimum duration: Three and a half years.

c. Presentation and campus: Pretoria Campus (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 100% of the practicals. Students must pass the practical component of a subject to be admitted to the examination.

h. Safety wear: 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 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	PREREQUISITE SUBJECT(S)
FPCHE03	Chemistry (Extended) IA	(0,083)	
FPCOS02	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
PMU201T	Practical Metallurgy II	(0,083)	Metallurgy (Extended) I Physical Metallurgy I
RFC201T	Refractories II	(0,083)	

TOTAL CREDITS FOR THE SEMESTER: 0,498

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

MTE301T	Mathematics: Chemical Engineering III	(0,000)	Mathematics II

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

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

GEO141T	Geology I	(0,000)

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**	

3.8 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: METALLURGY
Qualification code: BTMY02

Purpose for the qualification:
To build up on the broad foundational knowledge of the different aspects of Metallurgical Engineering which students acquired from their qualifying levels of study, to the level of the application of theories in a specific Metallurgical Engineering Science and Technology area, as well as to the level of practical demonstration of such ability via laboratory investigation and basic design endeavours. The application of theories to control what is obtained in specific Metallurgical Engineering industries is thus expected in going through the course. Awarding the Baccalaureus Technologiae: Engineering: Metallurgical on completion of the programme qualifies the graduate for registration as an Engineering Technologist with the Engineering Council of South Africa (ECSA).

REMARKS

a. Admission requirement(s): A National Diploma: Engineering: Metallurgy with Hydrometallurgy or Mineral Processing, or an NQF level 6 bachelor's degree in Metallurgy obtained from a South African university. Any relevant NQF 6 level bachelor's degree or diploma in Science, Engineering or Technology 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: Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.

c. Minimum duration: One year.

d. Presentation and campus: Pretoria Campus (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. Safety wear: 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.)

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**

3.9 MAGISTER TECHNOLOGIAE: ENGINEERING: METALLURGY
Qualification code: MTMY96

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Engineering: Metallurgy degree or an NQF level 7 bachelor's or honours degree in Metallurgy 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: A personal interview with a departmental selection panel.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (research).

e. Structure: The qualification consists of a research project that must be recorded in the form of a dissertation.

f. Re-registration: Students must re-register for this qualification every year.

g. 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)

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

3.10 DOCTOR TECHNOLOGIAE: ENGINEERING: METALLURGY
Qualification code: DTMY96

REMARKS

a. Admission requirement(s): A Magister Technologiae: Engineering: Metallurgy or an NQF level 8 master's degree in Metallurgy 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: A personal interview with a departmental selection panel.

c. Duration: A minimum of two years and a maximum of five years.

d. Presentation and campus: Pretoria Campus (research).

e. Structure: The qualification consists of a research project that must be recorded in the form of a thesis.

f. Re-registration: Students must re-register for this qualification every year.

g. 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)

TOTAL CREDITS FOR THE QUALIFICATION: **2,000**

3.11 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: REFRACTORIES
Qualification code: BTER01

Purpose for the qualification:
The purpose of the programme is to award the qualification of Baccalaureus Technologiae: Engineering: Refractories to Technologists in South Africa by equipping students with the fundamentals of Refractories, industrial needs and skills in lifelong learning, communication and leadership.

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, a National Diploma: Ceramics Technology or an equivalent qualification. A prospective student who has a National Diploma: Ceramics Technology will have to pass Engineering Drawing prior to commencing with this programme.
b.	Selection criteria:	A personal interview with a departmental selection panel.
c.	Minimum duration:	One year.
d.	Presentation and campus:	Arcadia Campus (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

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)
RMR201A	**Research Methodology: Natural Sciences**	
RMR20XA	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)
RMR201A	**Research Methodology: Natural Sciences**	
RMR20YA	Research Methodology: Natural Sciences: Statistics	(0,050)
TOTAL CREDITS FOR THE SEMESTER:		0,550
TOTAL CREDITS FOR THE QUALIFICATION:		**1,000**

3.12 SUBJECT INFORMATION

Syllabus content subject to change to accommodate industry changes.

SUBJECT NAME: APPLIED MINERAL PROCESSING II
SUBJECT CODE: ANP201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Introduction to ore preparation, chemical and physical separation of ores.

SUBJECT NAME: APPLIED MINERAL PROCESSING III
SUBJECT CODE: ANP301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Equipment sizing. Power consumption. Industrial flow sheets. Environmental impact.

SUBJECT NAME: APPLIED MINERAL PROCESSING IV
SUBJECT CODE: ANP401T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Project that consists of a mineral processing plant design. Cost estimation. Metallurgical plant commissioning.

SUBJECT NAME: APPLIED REFRACTORIES IV
SUBJECT CODE: ARF401T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CHEMICAL ENGINEERING TECHNOLOGY IIIA
SUBJECT CODE: CET33AT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Combined mass and energy balances, introduction to heat and mass transfer, fluid dynamics, pressure drops in pipes (Bernoulli's equation), humidity.

SUBJECT NAME: CHEMICAL ENGINEERING TECHNOLOGY IIIB
SUBJECT CODE: CET33BT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Gas absorption, distillation, evaporation, drying and filtration.

SUBJECT NAME: CHEMICAL ENGINEERING TECHNOLOGY: CHEMICAL PRINCIPLES (EXTENDED) II
SUBJECT CODE: FPCET01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CHEMICAL ENGINEERING TECHNOLOGY: CHEMICAL PRINCIPLES II
SUBJECT CODE: CET20XT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Basic principles and calculation in chemical and metallurgical engineering: units and dimensions, chemical equation and stoichiometry. Gas laws. Material and energy balances.

SUBJECT NAME: CHEMICAL ENGINEERING TECHNOLOGY: FLUID FLOW IV
SUBJECT CODE: CET40XT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CHEMICAL ENGINEERING TECHNOLOGY: HEAT AND MASS TRANSFER IV
SUBJECT CODE: CET40YT
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Introduction to conduction, convection and radiation. Steady-state one-dimensional conduction. Steady-state conduction in multiple dimensions. Condensation and boiling heat transfer. Mass transfer.

SUBJECT NAME: CHEMICAL ENGINEERING TECHNOLOGY: METALLURGICAL PRINCIPLES II
SUBJECT CODE: CET20YT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Introduction to mineral processing: sample preparation, particle size analysis, comminution, crushing, grinding, industrial screening, and classification. Overview of concentration techniques: density, magnetic, electrostatic separations, froth flotation.

SUBJECT NAME: CHEMICAL ENGINEERING TECHNOLOGY: UNIT OPERATIONS IV
SUBJECT CODE: CET40ZT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CHEMICAL PLANT IIIA
SUBJECT CODE: CMP33AT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Corrosion, materials technology, water treatment, mechanical separation, equipment, size reduction, material handling and storage, environmental protection.

SUBJECT NAME: CHEMICAL PLANT IIIB
SUBJECT CODE: CMP33BT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Piping, pumps, compressors, fans, heat exchangers, combustion, mixing and cooling towers.

SUBJECT NAME: CHEMICAL PROCESS DESIGN: EQUIPMENT DESIGN IV
SUBJECT CODE: CPD40XT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CHEMICAL PROCESS DESIGN: PLANT DESIGN IV
SUBJECT CODE: CPD40YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CHEMICAL PROCESS DESIGN: PRINCIPLES III
SUBJECT CODE: CPP301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Process design development. Flow diagrams.

SUBJECT NAME: CHEMICAL PROCESS INDUSTRIES II
SUBJECT CODE: CPI201T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Coal processing (compulsory). Petroleum refining (compulsory). Synthetic rubber. Plastics, paper and pulp. Sugar refining. Agrochemicals. Iron and steel (compulsory). Heavy chemicals (compulsory).

SUBJECT NAME: CHEMISTRY (EXTENDED) IA
SUBJECT CODE: FPCHE03
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CHEMISTRY IA
SUBJECT CODE: CHE141B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMMUNICATION SKILLS (EXTENDED) I
SUBJECT CODE: FPCOS02
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMMUNICATION SKILLS I
SUBJECT CODE: COS101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Communication theory. Oral presentation. Technical writing skills. Group communication skills.

SUBJECT NAME: COMPUTER SKILLS (EXTENDED) I
SUBJECT CODE: FPCSK02
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
Operating systems (Windows Environment); Basic word-processing skills (MS-Word); Spreadsheets (MS-Excel); Presentations tools (MS PowerPoint); Web Site Administration (FrontPage); Database Management (MS Access); Communications, connectivity, the internet and the Web; Components of a microcomputer; Application of software; Managing personal computers.

SUBJECT NAME: COMPUTER SKILLS I
SUBJECT CODE: CSK101B
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Components of a microcomputer. Application of software. Managing personal computers.

SUBJECT NAME: CORROSION III
SUBJECT CODE: CRS301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DRAWING: CHEMICAL ENGINEERING (EXTENDED) I
SUBJECT CODE: FPDCE01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DRAWING: CHEMICAL ENGINEERING I
SUBJECT CODE: DCE111T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ENGINEERING PHYSICS II
SUBJECT CODE: EPH201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Fluid flow, ideal and viscous fluids, heat transfer, hygrometry, nuclear reactions, electrical principles, practical work.

SUBJECT NAME: ENTREPRENEURIAL SKILLS
SUBJECT CODE: EPS101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Types of businesses. Management functions. Planning, organising, guidance, control. Budgeting. Accounting. Administration. Banking. Personnel management. Customer relations.

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1ECH
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Students must complete a work-related project at the employer that has been approved by the University.

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1MET
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Six months of practical experience in the industry.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2ECH
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Students must complete a work-related project at the employer that has been approved by the University.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2MET
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Six months of practical experience in the industry.

SUBJECT NAME: EXTRACTION OF NON-FERROUS METALS II
SUBJECT CODE: ENF201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: EXTRACTION OF NON-FERROUS METALS III
SUBJECT CODE: ENF311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Copper, gold, aluminium, lead, tin and zinc. Calculations. Laboratory practice. Casting of non-ferrous metals.

SUBJECT NAME: EXTRACTION OF NON-FERROUS METALS IV
SUBJECT CODE: ENF401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: FERRO-ALLOY TECHNOLOGY II
SUBJECT CODE: FAT201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Iron and steel production, blast furnace iron-making. Steel production. Ferro-alloy technology. Söderberg paste and electrodes. Separation processes. Furnace design.

SUBJECT NAME: FERRO-ALLOY TECHNOLOGY III
SUBJECT CODE: FAT311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: FERRO-ALLOY TECHNOLOGY IV
SUBJECT CODE: FAT411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Pyro-metallurgy. Stainless steel production. Non-ferrous metals. Mathematical modelling.

SUBJECT NAME: GEOLOGY I
SUBJECT CODE: GEO141T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Introduction to earth sciences. Physical geology. Geomorphology. Pedology. Introduction to environmental geology.

SUBJECT NAME: INORGANIC CHEMISTRY II
SUBJECT CODE: ICH231T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MANAGEMENT SKILLS I
SUBJECT CODE: MSK121T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Self-management, organisational environment, introduction to leadership and management principles.

SUBJECT NAME: MATHEMATICS (EXTENDED) I
SUBJECT CODE: FPMAT04
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
Basic algebra, functions, exponents and logarithm, differential calculus, trigonometry, geometry. Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS I
SUBJECT CODE: MAT171T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS II
SUBJECT CODE: MAT271T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Revision of differentiation. Differentiation of functions with more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination).

SUBJECT NAME: MATHEMATICS: CHEMICAL ENGINEERING III
SUBJECT CODE: MTE301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Revision of first-order ODEs. Systems of linear ODEs. Higher-order ODEs with constant coefficients. RK (Runge-Kutta) methods. Phase place analyses. Fourier series. Laplace transforms.

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING (EXTENDED) I
SUBJECT CODE: FPMDR01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING I
SUBJECT CODE: MDR101C
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: METALLURGICAL CHEMISTRY II
SUBJECT CODE: MCI201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: METALLURGICAL THERMODYNAMICS II
SUBJECT CODE: MGH201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: METALLURGICAL THERMODYNAMICS III
SUBJECT CODE: MGH301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: METALLURGY (EXTENDED) I
SUBJECT CODE: FPMEY01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: METALLURGY I
SUBJECT CODE: MEY101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MINERAL PROCESSING: CHEMICAL PRINCIPLES (EXTENDED) II
SUBJECT CODE: FPMNP01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MINERAL PROCESSING: CHEMICAL PRINCIPLES II
SUBJECT CODE: MNP20XT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MINERAL PROCESSING: METALLURGICAL PRINCIPLES II
SUBJECT CODE: MNP20YT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ORGANIC CHEMISTRY II
SUBJECT CODE: OCH221T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Aliphatic hydrocarbons. Benzene. Alkyl and aryl halides. Alkanols and alkoxy alkanes. Phenols. Alkanals and alkanones. Carboxylic acids and derivatives. Amines. Practical organic chemistry.

SUBJECT NAME: PHYSICAL CHEMISTRY II
SUBJECT CODE: PCB221T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Gases (ideal and non-ideal). Liquid surface tension, viscosity, additive properties. Chemical kinetics. Chemical equilibrium. Colloids. Colligative properties of solutions. Electrochemistry. Practical physical chemistry.

SUBJECT NAME: PHYSICAL METALLURGY I
SUBJECT CODE: PML101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Binary phase diagrams and their interpretation, phase reactions, equilibria and non-equilibrium solidification of F3-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.

SUBJECT NAME: PHYSICS (EXTENDED) IA
SUBJECT CODE: FPPHU03
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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. A general physics qualification with applications in the biological sciences. This includes, inter alia, general laws of movement, mechanics, heat, hydrodynamics, electricity and magnetism, wave motion, and nuclear physics.

SUBJECT NAME: PHYSICS IA
SUBJECT CODE: PHU161B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
A general physics qualification with applications in the biological sciences. This includes, inter alia, general laws of movement, mechanics, heat, hydrodynamics, electricity and magnetism, wave motion, and nuclear physics.

SUBJECT NAME: PRACTICAL METALLURGY II
SUBJECT CODE: PMU201T
EVALUATION METHOD: PRACTICAL
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROCESS CONTROL III
SUBJECT CODE: PCT301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Process and instrumentation diagram, instrumentation, control, typical control systems, alarm and safety, Hazop studies.

SUBJECT NAME: PROCESS CONTROL IV
SUBJECT CODE: PCT401B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PRODUCTION ENGINEERING: CHEMICAL INDUSTRY IV
SUBJECT CODE: PCI401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROJECT: CHEMICAL ENGINEERING IV
SUBJECT CODE: PJC401T
EVALUATION METHOD: PROJECT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROJECT: METALLURGY IV
SUBJECT CODE: PJM401T
EVALUATION METHOD: PROJECT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: QUALITY CONTROL II
SUBJECT CODE: QCL221T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Fundamentals of statistics. Statistical process control. Product acceptance (sampling). Quality engineering. Quality and economy. Computers and quality.

SUBJECT NAME: REACTOR TECHNOLOGY IV
SUBJECT CODE: REA401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: REFRACTORIES II
SUBJECT CODE: RFC201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: REFRACTORIES III
SUBJECT CODE: RFC321T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Raw materials for monolithic refractories. Manufacture and properties of monolithic refractories. Wear mechanisms of monolithic refractories. Design, applications and installations.

SUBJECT NAME: REFRACTORIES ENGINEERING IVA
SUBJECT CODE: REF40AT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: REFRACTORIES ENGINEERING IVB
SUBJECT CODE: REF40BT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Refractory practice. Design properties: thermal and electrical. Design properties: mechanical.

SUBJECT NAME: REFRACTORIES ENGINEERING PRACTICE IV
SUBJECT CODE: RFP401T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Suitable project relating to the specific refractories industry where the student is employed.

SUBJECT NAME: RESEARCH METHODOLOGY: NATURAL SCIENCES: REFRACTORIES
SUBJECT CODE: RMR20XA
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: RESEARCH METHODOLOGY: NATURAL SCIENCES: STATISTICS
SUBJECT CODE: RMR20YA
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Statistical methods for the preparation of, and working with data, including descriptive statistical methods.

SUBJECT NAME: STRENGTH OF MATERIALS II
SUBJECT CODE: SMM201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THERMODYNAMICS: APPLIED III
SUBJECT CODE: TDA301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Heating and expansion. Nozzles. Refrigeration and cooling. Steam generation theory. Laboratory work. Combustion engines.

SUBJECT NAME: THERMODYNAMICS: CHEMICAL ENGINEERING III
SUBJECT CODE: TCE301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

4. DEPARTMENT OF CIVIL ENGINEERING

4.1 NATIONAL DIPLOMA: ENGINEERING: CIVIL
Qualification code: NDCI03

Purpose for the qualification:
To train well qualified diplomats who are competent to complement the duties of professional technologists and engineers in the planning, design construction and maintenance of Civil Engineering-related works.

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics and at least (60-69%) for Physical Sciences.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	4
Additional subjects (excluding Life Orientation):	
Any three other vocational subjects with a competent (60-69%), totaling a final score of 11	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
For 2011: Any three other subjects with a final score of 13 **As from 2012:** Any three other subjects with a final score of 12	
TOTAL APS SCORE:	**23**

Assessment procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

b. Minimum duration: Three years.

c. Presentation and campus: Pretoria Campus (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 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. 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 OR SECOND 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**	

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

REMARKS

a. Admission requirement(s) and selection criteria:
See qualification NDCI03.

b. Minimum duration: Three and a half years.

c. Presentation and campus: Pretoria Campus (day classes).

d. Intake for the qualification: January only.

e. Readmission: See Chapter 3 of the Students' Rules and Regulations.

f. Experiential Learning I and II: See 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. 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)
FPCOS02	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**

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.

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

Purpose for 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 an NQF level 6 diploma or bachelor's degree in Civil Engineering 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:	Selection is based on a personal interview with a departmental selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.
c.	Minimum duration:	One year.
d.	Presentation and campus:	Pretoria Campus (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. They must take a minimum of five subjects in their particular field of specialisation, with the balance 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, should not register for Concrete Technology IV or Asphalt Technology IV.

FIRST SEMESTER (2011)

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

SECOND SEMESTER (2011)

PJG401T	Project Management: Civil IV	(0,125)

FIRST SEMESTER (2012)

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.

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

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

Purpose for the qualification:
To become a competent Civil Engineering Technologist. The qualified graduate will be able to provide Environmental 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 diploma or bachelor's degree in Civil Engineering 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:	Selection is based on a personal interview with a departmental selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.
c.	Minimum duration:	One year.
d.	Presentation and campus:	Pretoria Campus (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 prefers not to register with ECSA must take a minimum of five subjects in this particular field of specialisation, with the balance 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, should not register for Concrete Technology IV or Asphalt Technology IV.

FIRST SEMESTER (2011)

CODE	SUBJECT	CREDIT
SIA401T	Social Environmental Studies: Civil IV	(0,250)

SECOND SEMESTER (2011)

ENR401T	Environmental Engineering: Civil IV	(0,250)

FIRST SEMESTER (2012)

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)

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

4.5 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: GEOTECHNICAL ENGINEERING
Qualification code: BTGO02

Purpose for the qualification:
To become a competent Civil Engineering Technologist. The qualified graduate will be able to provide Geotechnical 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 diploma or bachelor's degree in Civil Engineering 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: Selection is based on a personal interview with a departmental selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.

c.	Minimum duration:	One year.
d.	Presentation and campus:	Pretoria Campus (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. They must take a minimum of five subjects in their particular field of specialisation, with the balance 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, should not register for Concrete Technology IV or Asphalt Technology IV.

FIRST SEMESTER (2011)

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

SECOND SEMESTER (2011)

AGM401T	Applied Geomechanics IV	(0,125)

FIRST SEMESTER (2012)

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

SECOND SEMESTER (2012)

FDE401T	Foundation Engineering IV	(0,125)

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

4.6 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: STRUCTURAL ENGINEERING
Qualification code: BTSQ02

Purpose for the qualification:
To become a competent Civil Engineering Technologist. The qualified graduate will be able to provide Structural 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 diploma or bachelor's degree in Civil Engineering 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:	Selection is based on a personal interview with a departmental selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.
c.	Minimum duration:	One year.
d.	Presentation and campus:	Pretoria Campus (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 that are: 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. However, for ease of Professional Registration as Professional Structural Engineering Technologist, it is strongly recommended that the students take all the mandatory eight subjects from the field of Structural Engineering.

FIRST SEMESTER (2011)

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

SECOND SEMESTER (2011)

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

FIRST SEMESTER (2012)

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)

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

4.7 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: TRANSPORTATION ENGINEERING
Qualification code: BTTO02

Purpose for 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.

REMARKS

a.	Admission requirement(s):	A National Diploma: Engineering: Civil or an NQF level 6 diploma or bachelor's degree in Civil Engineering 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:	Selection is based on a personal interview with a departmental selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.
c.	Minimum duration:	One year.
d.	Presentation and campus:	Pretoria Campus (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. They must take a minimum of five subjects in their particular field of specialisation, with the balance 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, should not register for Concrete Technology IV or Asphalt Technology IV.

FIRST SEMESTER (2011)

CODE	SUBJECT	CREDIT
TSP401T	Transportation Planning IV	(0,125)
TTN401T	Transportation Technology IV	(0,125)

SECOND SEMESTER (2011)

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

FIRST SEMESTER (2012)

GDE401T	Geometric Design IV	(0,125)

SECOND SEMESTER (2012)

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

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

4.8 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: URBAN ENGINEERING

Qualification code: BTUB02

Purpose for the qualification:
To become a competent Civil Engineering Technologist. The qualified graduate will be able to provide Urban 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 diploma or bachelor's degree in Civil Engineering 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: Selection is based on a personal interview with a departmental selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP).
Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.

c. Minimum duration: One year.

d.	Presentation and campus:	Pretoria Campus (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. They must take a minimum of five subjects in their particular field of specialisation, with the balance 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, should not register for Concrete Technology IV or Asphalt Technology IV.

FIRST SEMESTER (2011)

CODE	SUBJECT	CREDIT

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

SECOND SEMESTER (2011)

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

FIRST SEMESTER (2012)

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)

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

4.9 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL: WATER ENGINEERING
Qualification code: BTCW02

Purpose for 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 diploma or bachelor's degree in Civil Engineering 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:	Selection is based on a personal interview with a departmental selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.
c.	Minimum duration:	One year.
d.	Presentation and campus:	Pretoria Campus (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. They must take a minimum of five subjects in their particular field of specialisation, with the balance 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, should not register for Concrete Technology IV or Asphalt Technology IV.

FIRST SEMESTER (2011)

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

SECOND SEMESTER (2011)

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

FIRST SEMESTER (2012)

HDL401T	Hydraulics IV	(0,125)
HYD401T	Hydrology IV	(0,125)

SECOND SEMESTER (2012)

IRR401T	Irrigation IV	(0,125)

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

4.10 MAGISTER TECHNOLOGIAE: ENGINEERING: CIVIL
Qualification code: MTCI95

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Engineering: Civil degree or an NQF level 7 bachelor's or honours degree in Civil Engineering obtained from a South African university with an aggregate of 60% for all subjects. Candidates with less than 60% but more than 55% should have completed a minimum of one year of industrial experience in the desired field of specialisation.

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.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (research).

e. Content: This programme comprises a research project with a dissertation, subject to the student having already passed Research Methodology. In the dissertation, the student should prove that he or she understands a particular problem in the industry to which his or her research applies and is 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.

f. 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.

g. 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)

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

4.11 DOCTOR TECHNOLOGIAE: ENGINEERING: CIVIL
Qualification code: DTCI96

REMARKS

a. Admission requirement(s): A Magister Technologiae: Engineering: Civil or an NQF level 8 master's degree in Civil Engineering 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.

c. Duration: A minimum of two years and a maximum of five years.

d. Presentation and campus: Pretoria Campus (research).

e. Content: This programme comprises an advanced research project with a thesis. The thesis should give proof of the student's original creative thinking and problem-solving abilities, and prove that he or she 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.

f. 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)

TOTAL CREDITS FOR THE QUALIFICATION: **2,000**

4.12 SUBJECT INFORMATION

Syllabus content subject to change to accommodate industry changes.

SUBJECT NAME: APPLIED GEOMECHANICS IV
SUBJECT CODE: AGM401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Soil mechanics: properties of soil, testing, site investigation. Lateral earth support. Buried structures. Ground improvement. In-situ tests. Project.

SUBJECT NAME: APPLIED MECHANICS (EXTENDED) I
SUBJECT CODE: FPAME01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: APPLIED MECHANICS I
SUBJECT CODE: AME111T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ASPHALT TECHNOLOGY IV
SUBJECT CODE: AHT401T
EVALUATION METHOD: 1 X 4-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Rehabilitation. Applications and design. Influence of the traffic and the environment. Project.

SUBJECT NAME: COMMERCIAL LAW: CIVIL
SUBJECT CODE: CLC101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMMUNICATION SKILLS (EXTENDED) I
SUBJECT CODE: FPCOS02
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMMUNICATION SKILLS I
SUBJECT CODE: COS101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence.

SUBJECT NAME: COMPUTER SKILLS (EXTENDED) I
SUBJECT CODE: FPCSK02
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
Basic and advanced knowledge on word-processing (MS-Word); Basic and Advanced skills on 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 (Operating Systems Theory); Integrating objects between MS Word, Excel, PowerPoint and Access.

SUBJECT NAME: COMPUTER SKILLS I
SUBJECT CODE: CSK101E
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Components of a microcomputer system, engineering applications of software. Managing personal computers.

SUBJECT NAME: CONCRETE TECHNOLOGY IV
SUBJECT CODE: CCN401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Properties and materials. Production and supply. Special applications. Testing.

SUBJECT NAME: CONSTRUCTION MATERIALS (EXTENDED) I
SUBJECT CODE: FPCSM01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MATERIALS I
SUBJECT CODE: CSM101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONSTRUCTION MATERIALS TECHNOLOGY IV
SUBJECT CODE: KMT401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Concrete technology, asphalt and bitumen technology, other materials, testing.

SUBJECT NAME: CONSTRUCTION METHODS I
SUBJECT CODE: KME101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DOCUMENTATION III
SUBJECT CODE: DOC301T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 45 hours
OVERVIEW OF SYLLABUS:
Costing, writing of specifications and the application of standardised specifications. Computer-aided applications. Contractual aspects, payment certificates.

SUBJECT NAME: DRAWING (EXTENDED) I
SUBJECT CODE: FPDRW01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DRAWING I
SUBJECT CODE: DRW101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Drawing office practice. Introduction to draughtsmanship, projections (orthographic and isometric), intersections of surfaces, graphic determination of forces in frames, topographical drawings, SABS specification.

SUBJECT NAME: DRAWING II
SUBJECT CODE: DRW201T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: EARTHWORKS DESIGN IV
SUBJECT CODE: EWD401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Materials selection. Design and construction of embankments. Design and construction of cuttings. Environmental impact control. Problem soils. Compaction equipment and techniques.

SUBJECT NAME: ENVIRONMENTAL ENGINEERING: CIVIL IV
SUBJECT CODE: ENR401T
EVALUATION METHOD: 2 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Environmental chemistry, environmental microbiology, ecology, environmental engineering, project.

SUBJECT NAME: ENVIRONMENTAL MANAGEMENT FOR ENGINEERS: CIVIL IV
SUBJECT CODE: ENN401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
ISO 14000, environmental impact assessment, integrated environmental management, environmental audits, case studies, project.

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1ECI
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: Minimum of 24 weeks
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2ECI
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: Minimum of 24 weeks
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: FINANCIAL MANAGEMENT III
SUBJECT CODE: FMN301T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: FOUNDATION ENGINEERING IV
SUBJECT CODE: FDE401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Shallow and deep foundation design, lateral earth support.

SUBJECT NAME: GEOLOGY: CIVIL IV
SUBJECT CODE: GEC401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Advanced engineering geology, rock mechanics, geotechnical instrumentation, geophysical methods.

SUBJECT NAME: GEOMETRIC DESIGN IV
SUBJECT CODE: GDE401T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: GEOTECHNICAL ENGINEERING II
SUBJECT CODE: GTE201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: GEOTECHNICAL ENGINEERING III
SUBJECT CODE: GTE301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: HYDRAULICS IV
SUBJECT CODE: HDL401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Hydrodynamics, hydraulic machinery (pumps, turbines, etc.), hydraulic models. Open-channel hydraulics, fluvial hydraulics, wave hydraulics.

SUBJECT NAME: HYDROGEOLOGY III
SUBJECT CODE: HGE301B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: HYDROLOGY IV
SUBJECT CODE: HYD401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Introduction to meteorology, groundwater, surface water, water resources analysis, South African hydrology.

SUBJECT NAME: INDUSTRIAL RELATIONS AND NEGOTIATION II
SUBJECT CODE: IRN201B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Industrial relations. Strike management. Negotiation and dispute handling in the following:
- Contractor/client and contractor/subcontractor relations
- Contractor/professional team relations
- Management/personnel relations
- Project manager/other parties relations

SUBJECT NAME: IRRIGATION IV
SUBJECT CODE: IRR401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Soil water and plant irrigation, types of systems. Irrigation scheduling, irrigation design (feasibility studies), irrigation in South Africa, environmental impact of irrigation, design project.

SUBJECT NAME: MANAGEMENT: CIVIL I
SUBJECT CODE: MNC101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 45 hours
OVERVIEW OF SYLLABUS:
Composition of the civil engineering industry. Types of contracts, tenders, management principles, productivity. Office and site administration, quality control. Elementary economics and financial accounting.

SUBJECT NAME: MANAGEMENT: CIVIL II
SUBJECT CODE: MNC201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MANAGEMENT PRINCIPLES AND PRACTICE IV
SUBJECT CODE: MPP401B
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MATHEMATICS (EXTENDED) I
SUBJECT CODE: FPMAT04
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
Basic algebra, functions, exponents and logarithm, differential calculus, trigonometry, geometry. Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS I
SUBJECT CODE: MAT171T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS II
SUBJECT CODE: MAT271T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Revision of differentiation. Differentiation of functions with more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination).

SUBJECT NAME: PAVEMENT TECHNOLOGY IV
SUBJECT CODE: PTY401T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Pavement design factors (gravel, flexible, rigid), pavement construction (gravel, flexible, rigid), pavement assessment and rehabilitation, pavement management, project.

SUBJECT NAME: PRE-STRESSED CONCRETE DESIGN IV
SUBJECT CODE: PCG401T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Design of pre-stressed concrete structures, computer applications.

SUBJECT NAME: PRINCIPLES OF DAM ENGINEERING IV
SUBJECT CODE: PDE401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Geological and foundation considerations, design principles, dam safety, seepage, grouting and drainage, project.

SUBJECT NAME: PROJECT MANAGEMENT: CIVIL IV
SUBJECT CODE: PJG401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Planning of projects (civil and building). Project management. Quality and time management. Management systems. Computer applications. Project.

SUBJECT NAME: REINFORCED CONCRETE AND MASONRY DESIGN III
SUBJECT CODE: RCM301T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Design of reinforced concrete structures, beams, slabs, columns, retaining walls, foundations. Design of unreinforced masonry structures, walls, columns. Application of empirical rules. Design projects.

SUBJECT NAME: REINFORCED CONCRETE DESIGN IV
SUBJECT CODE: RCD401T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Design of reinforced concrete structures, computer applications.

SUBJECT NAME: RETICULATION DESIGN AND MANAGEMENT IV
SUBJECT CODE: RDA401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: SOCIAL ENVIRONMENTAL STUDIES: CIVIL IV
SUBJECT CODE: SIA401T
EVALUATION METHOD: 2 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SOIL AND GROUND WATER POLLUTION: CIVIL IV
SUBJECT CODE: SOI401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Sources of pollution, fluid flow and the transport of solute in porous media, remediation of contaminated groundwater, sanitation of polluted soils. Project.

SUBJECT NAME: SOLID WASTE MANAGEMENT IV
SUBJECT CODE: SWM401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRUCTURAL ANALYSIS II
SUBJECT CODE: SAS201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRUCTURAL ANALYSIS III
SUBJECT CODE: SAS301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRUCTURAL ANALYSIS IV
SUBJECT CODE: SAS401T
EVALUATION METHOD: 1 X 4-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Advanced structural analysis methods, applicable computer applications.

SUBJECT NAME: STRUCTURAL MASONRY DESIGN IV
SUBJECT CODE: STM401T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Design of unreinforced and reinforced structural masonry structures. Detailing.

SUBJECT NAME: STRUCTURAL STEEL AND TIMBER DESIGN III
SUBJECT CODE: SST301T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRUCTURAL STEEL DESIGN IV
SUBJECT CODE: SSE401T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Design of structural steel structures, computer applications.

SUBJECT NAME: STRUCTURAL TIMBER DESIGN IV
SUBJECT CODE: STD401T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Design of timber structures. Computer applications.

SUBJECT NAME: SURVEYING: CIVIL: PRACTICAL II
SUBJECT CODE: SUC20YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: CIVIL: THEORY II
SUBJECT CODE: SUC20XT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 45 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: PRACTICAL (EXTENDED) I
SUBJECT CODE: FPSURZT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 200 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: PRACTICAL I
SUBJECT CODE: SUR11ZT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 100 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: THEORY (EXTENDED) I
SUBJECT CODE: FPSURYT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 150 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: THEORY I
SUBJECT CODE: SUR11YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 75 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THEORY OF STRUCTURES II
SUBJECT CODE: TSC211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 75 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THEORY OF STRUCTURES IV
SUBJECT CODE: TSC411T
EVALUATION METHOD: 1 X 4-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Advanced structural analysis methods, applicable computer applications.

SUBJECT NAME: TRAFFIC ENGINEERING IV
SUBJECT CODE: TFE401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: TRANSPORTATION ENGINEERING II
SUBJECT CODE: TEN201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: TRANSPORTATION ENGINEERING III
SUBJECT CODE: TEN301T
EVALUATION METHOD: 1 X 4-HOUR PAPER
TOTAL TUITION TIME: ± 75 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: TRANSPORTATION PLANNING IV
SUBJECT CODE: TSP401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Planning theory and technique, transport models, data retrieval, assessment, environmental planning and characterisation, development control, route planning, transport impact studies. Project.

SUBJECT NAME: TRANSPORTATION TECHNOLOGY IV
SUBJECT CODE: TTN401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Transport policies, transportation systems, terminals, public transport, private transport, freight transport, vehicle and driver characteristics. Project.

SUBJECT NAME: URBAN PLANNING AND DESIGN IV
SUBJECT CODE: UPD401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: WASTEWATER TREATMENT TECHNOLOGY IV
SUBJECT CODE: WWT401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Wastewater properties, treatment processes, treatment plant design, environmental factors, plant operation and management. Design project.

SUBJECT NAME: WATER ENGINEERING II
SUBJECT CODE: WEN201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: WATER ENGINEERING III
SUBJECT CODE: WEN301T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: WATER RESOURCE MANAGEMENT: CIVIL IV
SUBJECT CODE: WAT401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Water resources, river engineering, limnological aspects, estuaries aspects, water quality modelling, catchment management, project.

SUBJECT NAME: WATER TREATMENT TECHNOLOGY IV
SUBJECT CODE: WTT401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 32 hours
OVERVIEW OF SYLLABUS:
Properties of water, treatment processes, treatment site design, recalculation, re-use, recovery and conservation of water, environmental factors.

5. DEPARTMENT OF ELECTRICAL ENGINEERING

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.

5.1 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL
Qualification code: NDEE03

Purpose for the qualification:
To train technicians in the field of electrical engineering to solve well defined problems through the use of theoretical knowledge and practical skills.

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics and at least (60-69%) for Physical Sciences.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	4
Additional subjects (excluding Life Orientation):	
Any three other vocational subjects with a competent (60-69%), totaling a final score of 11	
TOTAL APS SCORE:	**23**

Assessment procedure: Candidates with an APS score of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS score of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
For 2011: Any three other subjects with a final score of 13 **As from 2012:** Any three other subjects with a final score of 12	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS score of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

b. Minimum duration: Three years.

c.	Presentation and campus:	eMalahleni and Pretoria campuses (day or evening classes, subject to a sufficient number of students). Mbombela Campus (day classes – no new intake at this campus as from 2009).
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.	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.
h.	Government Certificate of Competence:	Enquiries: Department of Electrical Engineering.
i.	Experiential Learning I and II:	See Chapter 5 of Students' Rules and Regulations.
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 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 SUBJECTS(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 consult the subject selection guide at the end of this qualification). 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 consult the subject selection guide at the end of this qualification). 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**

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

SECOND SEMESTER
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 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, Electronic Communication II and Electronics III.

SECOND SEMESTER
Control Systems III, Digital Systems III, Logic Design III and Software 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, Electronic Communication II and Electronics III.

SECOND SEMESTER
Control Systems III, Digital Systems III, Electronic Communication III and Software Design 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, Electrical Engineering III and Electrical Machines II.

SECOND SEMESTER
Control Systems III, Electrical Distribution III, Electrical Machines III and Electrical Protection 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, Electronics III and Process Instrumentation II.

SECOND SEMESTER
Control Systems III, Digital Systems III, Power Electronics III and Process Instrumentation III.

TELECOMMUNICATION ENGINEERING
Field Description:
The student who has completed his or her 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 and maintain design, implement and commission RF systems, telecommunication, satellite and cellular telecommunication systems. Possible employers are electronic system companies and general electronic application companies that operate in all fields such as Telkom, cell phone companies and telematic design companies.

FIRST SEMESTER
Digital Systems II, Electronic Communication II and Digital Communication II.

SECOND SEMESTER
Digital Systems III, Electronic Communication III, Electronics III and Radio Engineering III.

OWN CHOICE
(**Please note:** Students taking this option must ensure that their subject choices will enable them to do the Baccalaureus Technologiae: Engineering: Electrical, if they so require).

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 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.

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

SECOND SEMESTER
Four subjects from those provided in the optional subject list for year two, semester two.

5.2 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL (EXTENDED CURRICULUM PROGRAMME WITH FOUNDATION PROVISION)
Qualification code: NDEEF0

REMARKS

a. Admission requirement(s) and selection criteria:
See qualification NDEE03.

b. Minimum duration: Three and a half years.

c. Presentation and campus: eMalahleni and Pretoria campuses (day classes).

d. Intake for the qualification: January only.

e. Readmission: See Chapter 3 of Students' Rules and Regulations.

f. 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.

g. Government Certificate of Competence: Enquiries: Department of Electrical Engineering.

h. Experiential Learning I and II: See Chapter 5 of Students' Rules and Regulations.

i. 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
FPCOS02	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**

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.

5.3 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: ELECTRICAL
Qualification code: BTEE01

Purpose for the qualification:
To train technologists in the field of electrical engineering to solve ill defined problems. This requires a higher level of proficiency than that required in the National Diploma in a particular field of specialisation in an engineering technology.

REMARKS

a.	Admission requirement(s):	**For 2011:** A National Diploma: Engineering: Electrical or an NQF level 6 diploma or a bachelor's degree in Electrical Engineering obtained from a South African university. **As from 2012:** A National Diploma: Engineering: Electrical or an NQF level 6 diploma or a bachelor's degree in Electrical Engineering obtained from a South African university with an average of 60% in the exit level subjects. A student without an average of 60% has to provide a portfolio of three years' relevant work experience in order to be considered for selection. 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 or academic department 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:	Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.
c.	Minimum duration:	One year.
d.	Presentation and campus:	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.	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.

i. 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).

j. Government Certificate of Competence: Enquiries: Department of Electrical Engineering.

k. 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
IPR410T	Industrial Project IV (year subject)	(0,300)	Design Project III
IPR412R	Industrial Project IV (re-registration)	(0,000)	
	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
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 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.

5.4.1 NATIONAL DIPLOMA: ENGINEERING: MECHANICAL AND NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL
Qualification code: NDDM01

5.4.2 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL AND BACCALAUREUS TECHNOLOGIAE: ENGINEERING: ELECTRICAL
Qualification code: BTDM96

NO NEW REGISTRATIONS FOR THESE QUALIFICATIONS ARE ACCEPTED AS FROM 2009. STUDENTS WHO ARE CURRENTLY REGISTERED FOR THESE QUALIFICATIONS HAVE UNTIL 2016 (FOR NDDM01) AND 2010 (FOR BTDM96) TO OBTAIN IT, SUBJECT TO THE STIPULATIONS OF REGULATION 3.1.1 ON THE MAXIMUM DURATION OF STUDY.

Phase-out dates: 31 December 2016 for NDDM01
30 June 2013 for BTDM96

Please consult the Prospectus of the Department of Mechanical Engineering for information relating to this qualification.

5.5 MAGISTER TECHNOLOGIAE: ENGINEERING: ELECTRICAL (Structured)
Qualification code: MTEES0

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 bachelor's or honours degree in Electrical Engineering with an aggregate of 60% for the final year of study 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.	Recommended subject(s):	Software Engineering IV and at least two specialisation subjects.
c.	Selection criteria:	Admission is competitive and depends on available space. Prospective students may be required to pass an admission test.
d.	Minimum duration:	A minimum of one year and a maximum of three years.
e.	Presentation and campus:	Pretoria Campus (block-based classes).
f.	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
g.	Subject credits:	Subject credits are shown in brackets after each subject.
h.	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)
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)
RPM500R	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)
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

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Engineering: Electrical or an NQF level 7 bachelor's or honours degree in Electrical Engineering 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.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (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)

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

5.7 DOCTOR TECHNOLOGIAE: ENGINEERING: ELECTRICAL
Qualification code: DTEE96

REMARKS

a. Admission requirement(s): A Magister Technologiae: Engineering: Electrical or an NQF level 8 master's degree in Electrical Engineering 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.

c. Duration: A minimum of two years and a maximum of five years.

d. Presentation and campus: Pretoria Campus (research).

e. 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

f. 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)

TOTAL CREDITS FOR THE QUALIFICATION: **2,000**

5.8 MSC (ELECTRONIC ENGINEERING)
Qualification code: PGEE04

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 bachelor's or honours degree in Electrical Engineering with a aggregate of 60% for the final year of study 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 Department of Electrical Engineering and the Faculty of Engineering and the Built Environment reserve 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: Admission is competitive and is dependent on available space. Prospective students may be requested to pass an admission test.

d. Minimum duration: Two years.

e. Presentation and campus: Pretoria Campus.

f. 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

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 bachelor's or honours degree in Electrical Engineering with an aggregate of 60% for the final year of study 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 Department of Electrical Engineering and the Faculty of Engineering and the Built Environment reserve 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: Admission is competitive and depends on available space. Prospective students may be requested to pass an admission test.

d. Minimum duration: Two years.

e. Presentation and campus: Pretoria Campus.

f. 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)

5.10 SUBJECT INFORMATION

Syllabus content subject to change to accommodate industry changes.

SUBJECT NAME: ADVANCED CONTROL SYSTEMS V
SUBJECT CODE: ESI5010
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
A selection of advanced control system topics, such as fuzzy control, optimal and multivariable control, robust and non-linear control.

SUBJECT NAME: ADVANCED EMBEDDED SYSTEMS V
SUBJECT CODE: ESI5011
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
A selection of advanced embedded system topics, such as multi and co-processor design, real-time and high-speed design.

SUBJECT NAME: BIO-SYSTEMS I
SUBJECT CODE: BIS101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CLINICAL ENGINEERING TECHNOLOGY MANAGEMENT IV
SUBJECT CODE: CTM401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Environment, research and development, the manufacturing process, acquisition, commissioning, support, replacement, communication skills, personnel structures, professional ethics.

SUBJECT NAME: COMMUNICATION SKILLS (EXTENDED) I
SUBJECT CODE: FPCOS02
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMMUNICATION SKILLS I
SUBJECT CODE: COS101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence.

SUBJECT NAME: COMPUTER NETWORKS IV
SUBJECT CODE: CNW401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Introduction, electrical interfacing, local area networks (LAN), wide area networks (WAN), Internet.

SUBJECT NAME: COMPUTER SKILLS (EXTENDED) I
SUBJECT CODE: FPCSK02
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
Basic and advanced knowledge on word-processing (MS-Word); Basic and Advanced skills on 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 (Operating Systems Theory); Integrating objects between MS Word, Excel, PowerPoint and Access.

SUBJECT NAME: COMPUTER SKILLS I
SUBJECT CODE: CSK101C
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 36 hours
OVERVIEW OF SYLLABUS:
Students have to acquire theory and practical skills and knowledge. Theory knowledge to be learned are Personal Computer Basics, Managing Computer Contents, Display Devices, Internet Privacy and Security, Connectors and Adapters, Network Basics, Multimedia Devices, Processors and Memory, Data Storage Devices, Network Security Overview and Safety. Practical skills to be acquired are Operating System XP and Application Software Microsoft Office Suite 2007 which include Microsoft Word, Microsoft Excel and MS PowerPoint.

SUBJECT NAME: CONTROL SYSTEMS III
SUBJECT CODE: CSY321T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: CONTROL SYSTEMS IV
SUBJECT CODE: CSY401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: CONTROL SYSTEMS V
SUBJECT CODE: CSY501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
System modelling, discrete-time analysis and digital controller design.

SUBJECT NAME: CONVERSION SYSTEMS V
SUBJECT CODE: CVS501T, ESI5027
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Converter theory, electromechanical systems, electric materials, EM field calculation, distribution (non-linear and transient problems, numerical methods, applications), transmission, planning and design.

SUBJECT NAME: DESIGN PROJECT: HEAVY CURRENT III
SUBJECT CODE: DPJ30ZT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DESIGN PROJECT: LIGHT CURRENT III
SUBJECT CODE: DPJ30YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DIGITAL COMMUNICATION II
SUBJECT CODE: DCO201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Networks; OSI Model; Implementation; Protocols; Services.

SUBJECT NAME: DIGITAL COMMUNICATION V
SUBJECT CODE: ESI5001
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DIGITAL COMMUNICATIONS V
SUBJECT CODE: DCO501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DIGITAL CONTROL V
SUBJECT CODE: ESI5003
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
System modelling, discrete-time analysis and digital controller design.

SUBJECT NAME: DIGITAL CONTROL SYSTEMS IV
SUBJECT CODE: DCS401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DIGITAL ELECTRONICS V
SUBJECT CODE: ESI5002
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Analysis of advanced digital electronic circuits, best practice design and prototyping principles.

SUBJECT NAME: DIGITAL SIGNAL PROCESSING IV
SUBJECT CODE: DSP401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DIGITAL SYSTEMS I
SUBJECT CODE: DSY131T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DIGITAL SYSTEMS II
SUBJECT CODE: DSY231T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: DIGITAL SYSTEMS III
SUBJECT CODE: DSY341T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL DISTRIBUTION III
SUBJECT CODE: ELD331T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
The principles and operation of different types of power stations and substations. High-voltage transmission lines, switchgear, cables, isolators, line supports, feeders and busbars.

SUBJECT NAME: ELECTRICAL ENGINEERING (EXTENDED) I
SUBJECT CODE: FPEEN01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 140 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL ENGINEERING I
SUBJECT CODE: EEN111T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL ENGINEERING II
SUBJECT CODE: EEN211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL ENGINEERING III
SUBJECT CODE: EEN311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL MACHINES AND DRIVES V
SUBJECT CODE: EEM501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.).

SUBJECT NAME: ELECTRICAL MACHINES II
SUBJECT CODE: EMA241T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL MACHINES III
SUBJECT CODE: EMA341T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL MACHINES IV
SUBJECT CODE: EMA411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL PROTECTION III
SUBJECT CODE: EPC321T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRICAL PROTECTION IV
SUBJECT CODE: EPC401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRONIC COMMUNICATION II
SUBJECT CODE: ETC221T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRONIC COMMUNICATION III
SUBJECT CODE: ETC301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRONIC COMMUNICATION IV
SUBJECT CODE: ETC401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRONICS (EXTENDED) I
SUBJECT CODE: FPELC01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 140 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRONICS I
SUBJECT CODE: ELC111T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRONICS II
SUBJECT CODE: ELC211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRONICS III
SUBJECT CODE: ELC331T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTRONICS IV
SUBJECT CODE: ELC411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: EMBEDDED SYSTEMS V
SUBJECT CODE: EDD501T, ESI5004
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
VHDL and FPGA design and real-time DSP implementation.

SUBJECT NAME: ENERGY SYSTEMS AND TECHNOLOGY V
SUBJECT CODE: EGS501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Modelling of alternative energy sources and corresponding technological options.

SUBJECT NAME: ENGINEERING ANALYSIS V
SUBJECT CODE: EAN501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Signal spaces, mappings, deterministic signal theory, stochastic signal theory.

SUBJECT NAME: ENGINEERING MANAGEMENT IV
SUBJECT CODE: EGM411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ENGINEERING MATHEMATICS IV
SUBJECT CODE: EMT451T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: ENGINEERING SCIENCE (EXTENDED) I
SUBJECT CODE: FPESL01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 140 hours
OVERVIEW OF SYLLABUS:
Light, reflection, thin lenses, prisms and dispersion, aberration, combined lenses, optical instruments, interference, deflection. Kinetics. Vectors, linear movement, gyroscope. Gravitation. Electricity. Electromagnetism and fields, alternating current. Electromagnetic waves. Phase differences modulation. Laser: Simple theory, types and application. (For information pertaining to the Foundation component of this subject, the Head of the Department must be contacted).

SUBJECT NAME: ENGINEERING SCIENCE I
SUBJECT CODE: ESL111T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Light, reflection, thin lenses, prisms and dispersion, aberration, combined lenses, optical instruments, interference, deflection. Kinetics. Vectors, linear movement, gyroscope. Gravitation. Electricity. Electromagnetism and fields, alternating current. Electromagnetic waves. Phase differences modulation. Laser: Simple theory, types and application.

SUBJECT NAME: ENTREPRENEURSHIP IV
SUBJECT CODE: ENT401B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Industrial.)

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1EEH
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Industry-related training, as determined by the industry and the University.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2EEH
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Industry-related training, as determined by the industry and the University.

SUBJECT NAME: FRENCH LANGUAGE SKILLS
SUBJECT CODE: ESI5007
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Conversational French for beginners.

SUBJECT NAME: HIGH-FREQUENCY SYSTEMS V
SUBJECT CODE: ESI5005, HFS501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
HF system fundamentals and analysis, measurement principles and propagation models.

SUBJECT NAME: HIGH-VOLTAGE ENGINEERING IV
SUBJECT CODE: HVE401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: IMAGE ANALYSIS V
SUBJECT CODE: ESI5012
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Image formation, frequency domain analysis, neighbourhood processing, texture, segmentation, shape, feature extraction, transformation and classification.

SUBJECT NAME: IMAGE ANALYSIS SYSTEMS V
SUBJECT CODE: IAS501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Image formation, frequency domain analysis, neighbourhood processing, texture, segmentation, shape, feature extraction, transformation and classification.

SUBJECT NAME: INDUSTRIAL PROJECT IV
SUBJECT CODE: IPR410T
EVALUATION METHOD: PROJECT
TOTAL TUITION TIME: 12 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: LOGIC DESIGN III
SUBJECT CODE: LOD311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Designing programmable logic matrixes (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.

SUBJECT NAME: MACHINE INTELLIGENCE V
SUBJECT CODE: ESI5013, MII501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MANAGEMENT V
SUBJECT CODE: ESI5006
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Project management, marketing, business strategies, financial planning, new product development and engineering research methodology.

SUBJECT NAME: MATHEMATICS (EXTENDED) I
SUBJECT CODE: FPMAT04
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 140 hours
OVERVIEW OF SYLLABUS:
Basic algebra, functions, exponents and logarithm, differential calculus, trigonometry, geometry. Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS I
SUBJECT CODE: MAT171T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS II
SUBJECT CODE: MAT271T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Revision of differentiation (Mathematics I). Differentiation of functions with more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination).

SUBJECT NAME: MATHEMATICS III
SUBJECT CODE: MAT351T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
First-order ordinary differential equations. Higher-order differential equations. Laplace transforms. Infinite series. Fourier series. Matrix analysis. Probability and statistics. Elements of analytic geometry in 2D and 2D space.

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING I
SUBJECT CODE: MDR101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Mechanical.)

SUBJECT NAME: MECHANICS I
SUBJECT CODE: MHC101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MEDICAL EQUIPMENT II
SUBJECT CODE: MEQ211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Introduction to medical equipment and medical systems.

SUBJECT NAME: MEDICAL EQUIPMENT: EQUIPMENT III
SUBJECT CODE: MEQ33XT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MEDICAL EQUIPMENT: EQUIPMENT IV
SUBJECT CODE: MEQ40XT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MEDICAL EQUIPMENT: SYSTEMS III
SUBJECT CODE: MEQ33YT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MEDICAL EQUIPMENT: SYSTEMS IV
SUBJECT CODE: MEQ40YT
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Advanced transducers and sensors, advanced measurement and analysis techniques, modern imaging systems.

SUBJECT NAME: MICRO-CONTROLLER SYSTEMS IV
SUBJECT CODE: MCS401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MICROSYSTEMS DESIGN IV
SUBJECT CODE: MSD401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MICROWAVE COMMUNICATION III
SUBJECT CODE: MWC301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MICROWAVE ENGINEERING IV
SUBJECT CODE: MWE401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: NETWORK SYSTEMS IV
SUBJECT CODE: NSY401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 20 hours
OVERVIEW OF SYLLABUS:
A study of wireless networks, including spread-spectrum analyses, roaming and hand-over. (Subject taken from Engineering: Computer Systems.)

SUBJECT NAME: NUMERICAL METHODS AND STATISTICS IV
SUBJECT CODE: NMS401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Mathematical basics, non-linear equations, ordinary differential equations, interpolation, numerical integration, sampling, descriptive statistics, regression analysis, probability.

SUBJECT NAME: OPTO-ELECTRONICS IV
SUBJECT CODE: OET401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POWER ANALYSIS V
SUBJECT CODE: PWN501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Power flow analysis, stability analysis of power systems, control of power systems.

SUBJECT NAME: POWER ELECTRONICS III
SUBJECT CODE: PWE311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POWER ELECTRONICS IV
SUBJECT CODE: PWE411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POWER SYSTEMS IV
SUBJECT CODE: PWS401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POWER SYSTEMS V
SUBJECT CODE: PWS501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Generation theory, transmission and distribution theory, interconnection of power systems.

SUBJECT NAME: PROCESS INSTRUMENTATION II
SUBJECT CODE: PCM221T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROCESS INSTRUMENTATION III
SUBJECT CODE: PCM321T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROCESS INSTRUMENTATION IV
SUBJECT CODE: PCM401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROJECTS I
SUBJECT CODE: PJT101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROJECTS II
SUBJECT CODE: PJT201T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
The planning, design, layout, construction, testing, documentation and oral presentation of a complete project.

SUBJECT NAME: RADIO ENGINEERING III
SUBJECT CODE: RAE311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Radio frequency amplifiers. Amplitude and angle modulation, as well as demodulation. Frequency conversion and mixing. Receivers. Basic antenna theory and practical antennae.

SUBJECT NAME: RADIO ENGINEERING IV
SUBJECT CODE: RAE411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: REAL-TIME SIGNAL PROCESSING V
SUBJECT CODE: ESI5014
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Advanced signal processing concepts (adaptive filtering, multirate processing and wavelets, filter banks etc.) with the emphasis on real-time DSP implementation.

SUBJECT NAME: REAL-TIME SYSTEMS V
SUBJECT CODE: RTS501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Advanced signal processing concepts (adaptive filtering, multirate processing and wavelets, filter banks, etc.) with the emphasis on real-time DSP implementation.

SUBJECT NAME: RESEARCH METHODOLOGY
SUBJECT CODE: RMD501C
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 45 hours
OVERVIEW OF SYLLABUS:
Research methods and approaches, information-gathering approaches, writing research reports.

SUBJECT NAME: RF DESIGN V
SUBJECT CODE: ESI5009
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
RF component design principles and analysis.

SUBJECT NAME: SATELLITE COMMUNICATIONS IV
SUBJECT CODE: SCO401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SCIENTIFIC COMPUTING V
SUBJECT CODE: ESI5026, SII501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Scientific computing fundamentals, simulation, C++, Matlab, Simulink and Scilab.

SUBJECT NAME: SIGNAL PROCESSING IV
SUBJECT CODE: SPR401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SIGNAL THEORY V
SUBJECT CODE: ESI5021
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Signal spaces, mappings, deterministic signal theory and stochastic signal theory.

SUBJECT NAME: SOFTWARE DESIGN II
SUBJECT CODE: SFD201T
EVALUATION METHOD: PRACTICAL
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Developing and applying structured programming. Programming concepts covered in Programming I in greater detail. These include data management (static, dynamic), functions, I/O files, structures. Additional topics, such as port communications and embedded programming, may be covered. The subject is very practical, and assessment is based on a number of programming tasks completed during the semester.

SUBJECT NAME: SOFTWARE DESIGN III
SUBJECT CODE: SFD301T
EVALUATION METHOD: PRACTICAL
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
The basic principles of object-orientated programming. The basic principles of object-orientated programming, such as creation of abstract data types (ADTs), inheritance, polymorphism, operator overloading and templates. The basics of graphics, which is used to illustrate many of the object-orientated principles. 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.

SUBJECT NAME: SOFTWARE ENGINEERING IV
SUBJECT CODE: SFE401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SOFTWARE ENGINEERING V
SUBJECT CODE: ESI5022
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Software engineering fundamentals, UML design principles and operating system basics.

SUBJECT NAME: SPECIAL TOPICS I
SUBJECT CODE: ESI5023, SEI501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Special topics based on a selection of seminal research papers from a chosen field.

SUBJECT NAME: SPECIAL TOPICS II
SUBJECT CODE: ESI5024
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Special topics based on a selection of seminal research papers from a chosen field.

SUBJECT NAME: SPECIAL TOPICS III
SUBJECT CODE: ESI5025
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Special topics based on a selection of seminal research papers from a chosen field.

SUBJECT NAME: STRENGTH OF MATERIALS II
SUBJECT CODE: SMT211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Mechanical.)

SUBJECT NAME: TELECOMMUNICATIONS V
SUBJECT CODE: TMM501T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Fixed networks, mobile networks, RF and optical networks.

SUBJECT NAME: TELECOMMUNICATION NETWORKS V
SUBJECT CODE: ESI5008
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Fixed networks, mobile networks, RF and optical networks.

SUBJECT NAME: TELEVISION III
SUBJECT CODE: TLV311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Fundamentals of television: Light theory and colometry, formation of picture rhaster, 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.

SUBJECT NAME: TELEVISION ENGINEERING IV
SUBJECT CODE: TVE401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
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, Huffmann 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.

6. DEPARTMENT OF GEOMATICS

6.1 NATIONAL DIPLOMA: CARTOGRAPHY
Qualification code: NDKA03

THERE WILL BE NO NEW INTAKES IN 2011. PLEASE CONTACT THE HEAD OF THE DEPARTMENT FOR FURTHER INFORMATION.

Phase-out dates: 31 December 2014

Presentation and campus: Pretoria Campus (day classes).

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.**
- **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**	

6.2 NATIONAL DIPLOMA: SURVEYING
Qualification code: NDSU03

Purpose for 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): **For students who obtained a Senior Certificate before 2008:**
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.

For students who have obtained a National Senior Certificate since 2008:
A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

b. Selection criteria (Admission Point Score):

Assessment procedures:
Candidates with an APS score of 24+ will be accepted on condition that the marks they obtained in the final school examination (Grade 12 examination) are the same as or higher than the marks used for the conditional selection process. Applicants with an APS score from 20 to 23 will be required to undergo additional assessment (potential assessment) to gain access to a National Diploma.

FOR STUDENTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:

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

Total APS: 24 (six subjects).

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

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
Any three other subjects with a final score of 13	
TOTAL APS SCORE:	**24**

c. Minimum duration: Three years.

d. Presentation and campus: Pretoria Campus (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. 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 Chapter 5 of Students' Rules and Regulations.

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 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	(0,033)	Surveying I
TOTAL CREDITS FOR THE SEMESTER:		0,449	
TOTAL CREDITS FOR THE FIRST YEAR:		**1,032**	

SECOND YEAR

FIRST SEMESTER

EXP1SUR	Experiential Learning I	(0,500)	Surveying I
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

EXP2SUR	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

CSJ301T	**Control Surveying Project III***		
CSJ30YT	Control Surveying: Project IIIA**	(0,063)*	Surveying II
CGH301T	Cartography III	(0,073)*	
COA301T	Computer Applications III	(0,100)	Computer Skills I Surveying II
MNC101T	Management: Civil I	(0,050)*	
SMI301T	Stereo Mapping III	(0,073)*	Photogrammetry II
STA111T	Statistics I	(0,084)*	
TOTAL CREDITS FOR THE SEMESTER:		0,443	

SECOND SEMESTER

AJE301T	Adjustment of Errors III	(0,083)*	Mathematics II Statistics I
CSJ301T	**Control Surveying Project III***		
CSJ30ZT	Control Surveying: Project IIIB** (offered in both semesters)	(0,040)	Surveying II
CSU301T	Cadastral Surveying III	(0,100)	Survey Drawing II
GIS301T	Geographic Information Systems III*	(0,083)	
PHO331T	Photogrammetry III	(0,072)*	Photogrammetry II
SUR331T	**Surveying III**		
SUR33XT	Surveying: Precise III	(0,040)	Surveying II
SUR33YT	Surveying: Geometric III	(0,045)	Surveying II
SUR33WT	Surveying: Theory III	(0,062)*	Surveying II
TOTAL CREDITS FOR THE SEMESTER:		0,525	
TOTAL CREDITS FOR THE THIRD YEAR:		**0,968**	

6.3 BACCALAUREUS TECHNOLOGIAE: SURVEYING
Qualification code: BTSU02

REMARKS

a. Admission requirement(s): A National Diploma: Surveying or an NQF level 6 diploma or bachelor's degree in Engineering Surveying 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: Candidates who meet the minimum academic requirements might be invited for a personal interview with a panel consisting of the Head of the Department and at least two other senior academic staff members.

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.
- Acceptance will be subject to available capacity and the student enrolment plan (SEP).
- Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.

c. Minimum duration: One year.

d. Presentation and campus: Pretoria Campus (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. 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).

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.)

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

FIRST SEMESTER (2011)

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

SECOND SEMESTER (2011)

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

FIRST SEMESTER (2012)

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)*

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

6.4 SUBJECT INFORMATION

Syllabus content subject to change to accommodate industry changes.

SUBJECT NAME: ADJUSTMENT OF ERRORS III
SUBJECT CODE: AJE301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Law of propagation of errors. Least squares. Applications to surveying and photogrammetry. Network adjustments, constrained networks, free networks, preanalysis, analysis of results.

SUBJECT NAME: CADASTRAL SURVEYING III
SUBJECT CODE: CSU301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Introduction to property law. Application of act directly pertaining to surveying and act affecting surveying indirectly. (Subject taken from Surveying for Cartography.)

SUBJECT NAME: CARTOGRAPHIC TECHNIQUES: PRACTICAL III
SUBJECT CODE: CGQ30YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 96 hours
OVERVIEW OF SYLLABUS:
A cartographic project that reflects cartographic knowledge. Compilation of project in the form of an atlas.

SUBJECT NAME: CARTOGRAPHIC TECHNIQUES: THEORY III
SUBJECT CODE: CGQ30XT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
Sources of data, compilation. Image forming, cartographic materials, cartographic and photo-mechanical equipment (uses and care). Cartographic systems. Cartographic production. Revision methods. Copyright legislation.

SUBJECT NAME: CARTOGRAPHY III
SUBJECT CODE: CGH301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Types of maps and their uses. Cartographic representation: colour. Map design: problems and control, purpose. Applications. Analysis and interpretation of maps. International cartography. (Subject taken from Cartography for Surveying.)

SUBJECT NAME: COMMUNICATION SKILLS I
SUBJECT CODE: COS101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
Communication theory, non-verbal communication (body language). Oral presentations, interviews, Technical reports and correspondence.

SUBJECT NAME: COMPUTER APPLICATIONS III
SUBJECT CODE: COA301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 96 hours
OVERVIEW OF SYLLABUS:
Program writing and program development in a high-level language (e.g. Turbo Basic, Turbo Pascal), subroutines, functions, files. Applications: use of software for project assignments. Database management systems: dBase IV, manipulation of data.

SUBJECT NAME: COMPUTER SKILLS I
SUBJECT CODE: CSK101G
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
Components of a microcomputer system. Engineering applications of software. Managing personal computers.

SUBJECT NAME: CONTROL SURVEYING: PROJECT IIIA
SUBJECT CODE: CSJ30YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Instrument checks and adjustments. Networks: scale enlargement, t-T-correction, eccentric reductions, base extension, trilateration, auxiliary points, short-leg traverses, external orientation. Trigonometric levelling.

SUBJECT NAME: CONTROL SURVEYING: PROJECT IIIB
SUBJECT CODE: CSJ30ZT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 96 hours
OVERVIEW OF SYLLABUS:
Project: Setting-out circular, compound, reverse and transition curves. Setting-out vertical curves. Photo control.

SUBJECT NAME: DRAWING I
SUBJECT CODE: DRW101B
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 96 hours
OVERVIEW OF SYLLABUS:
Drawing office practice, projections (orthographic and isometric), topographical drawings, specifications.

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1CAR, EXP1SUR
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
To meet the requirements of the National Diploma, students must complete at least one year of applicable experiential learning, which will be evaluated by the Department.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2CAR, EXP2SUR
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
To meet the requirements of the National Diploma, students must complete at least one year of applicable experiential learning, which will be evaluated by the Department.

SUBJECT NAME: FINANCIAL MANAGEMENT
SUBJECT CODE: FMN141T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
Costing, budgeting, cash flow, current value, inflation and building up of hire rates.

SUBJECT NAME: GEODESY IV
SUBJECT CODE: GED401T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
Transformation of two-dimensional coordinates. Coordinate systems in three dimensions. Rotation in three dimensions, spherical trigonometry. Coordinate systems. Geodetic surveying, principles. Principles of satellite positioning with special emphasis on the global positioning system and relating GPS and conventional surveys. Introduction to spherical astronomy.

SUBJECT NAME: GEOGRAPHIC INFORMATION SYSTEMS III
SUBJECT CODE: GIS301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
Fundamentals of GIS. Spatial concepts. Spatial data. GIS hardware and software. Data input. Data analysis. GIS output. Practical applications of GIS.

SUBJECT NAME: GEOGRAPHIC INFORMATION SYSTEMS IV
SUBJECT CODE: GIS401T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
Nature of geo-referenced information. Uses, advantages and disadvantages. Data capturing and manipulation techniques. Presentation and management of information. Applications.

SUBJECT NAME: GEOGRAPHY I
SUBJECT CODE: GEG111T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Astronomical geography. Geomorphology. Climatology. South Africa: topography, settlements, maps.

SUBJECT NAME: GEOMETRIC DESIGN IV
SUBJECT CODE: GDE401T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
Principles and practice of road alignment. Intersection and interchange design.

SUBJECT NAME: MANAGEMENT: CIVIL I
SUBJECT CODE: MNC101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Types of contracts, tenders, management principles, productivity. Office and site administration. (Subject taken from Engineering: Civil.)

SUBJECT NAME: MAP PROJECTIONS II
SUBJECT CODE: MPJ201T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Introduction: the shape of the earth, isostasy, geoid, spheroid. Mathematical deductions from selected map projections. Conical projections and cylindrical projections.

SUBJECT NAME: MATHEMATICS I
SUBJECT CODE: MAT171T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 96 hours
OVERVIEW OF SYLLABUS:
Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS II
SUBJECT CODE: MAT271T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 96 hours
OVERVIEW OF SYLLABUS:
Revision of differentiation. Differentiation of functions from more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination).

SUBJECT NAME: PHOTOGRAMMETRY II
SUBJECT CODE: PHO211T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Applications, geometry of vertical photos, stereocopy, parallax, optics, cameras. Mapping - the approximate solution, elementary flight planning.

SUBJECT NAME: PHOTOGRAMMETRY III
SUBJECT CODE: PHO331T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Rectification of aerial photos, terrestrial photogrammetry, photo control for aerial triangulation. Photogrammetric flight planning project.

SUBJECT NAME: PHYSICS ID
SUBJECT CODE: PHU161E
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Light, reflection, lenses, prisms and dispersion, aberration, combined lenses, optical instruments, interference, deflection. Phase differences modulation. Laser: simple theory, types and applications.

SUBJECT NAME: PRACTICE MANAGEMENT IV
SUBJECT CODE: PMN411T
EVALUATION METHOD: 1 X 4-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROJECT MANAGEMENT: SURVEYING IV
SUBJECT CODE: PUY401T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: RESEARCH METHODOLOGY
SUBJECT CODE: RMD101L
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
Research planning and design. The research report, hypothesis testing, report formats.

SUBJECT NAME: STATISTICS I
SUBJECT CODE: STA111T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 96 hours
OVERVIEW OF SYLLABUS:
Descriptive and inferential statistics, standard deviations, regression, correlation, z- and t-tests, modus, medians, variance frequency, histogram.

SUBJECT NAME: STEREO MAPPING III
SUBJECT CODE: SMI301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Mapping – the precise solution, orientations, photo control, aerial triangulation methods.

SUBJECT NAME: SURVEY DRAWING II
SUBJECT CODE: SUD211T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Compilation and plotting of grids and graticule, topographic plans, plotting, scales, symbols. The production of longitudinal cross sections and mass haul diagrams.

SUBJECT NAME: SURVEYING IV
SUBJECT CODE: SUR411T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: CONTROL II
SUBJECT CODE: SUR21XT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
South African map series, cadastral information, triangulation, solving the triangle with sine drawing and solving the error figures, resection.

SUBJECT NAME: SURVEYING: ENGINEERING II
SUBJECT CODE: SUR21YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 45 hours
OVERVIEW OF SYLLABUS:
EDM and lasers. Levelling, setting out profiles and batters, horizontal curve calculations and setting out procedures.

SUBJECT NAME: SURVEYING: GEOMETRIC III
SUBJECT CODE: SUR33YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: PRACTICAL I
SUBJECT CODE: SUR11ZT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 72 hours
OVERVIEW OF SYLLABUS:
Setting up and levelling of the level and theodolite. Taking levelling readings and compiling the field book, tests of and adjustments to the different levelling instruments. Longitudinal sections, cross sections, traverse, topographic surveying. Drawing a plan and interpolation of the contours.

SUBJECT NAME: SURVEYING: PRACTICAL II
SUBJECT CODE: SUR21ZT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: PRECISE III
SUBJECT CODE: SUR33XT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 48 hours
OVERVIEW OF SYLLABUS:
Instrument adjustments. Spherical triangulation. Precise surveying. Precise levelling. Deformation measurements. Coordinate transformations.

SUBJECT NAME: SURVEYING: THEORY I
SUBJECT CODE: SUR11YT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: THEORY II
SUBJECT CODE: SUR21WT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 109 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SURVEYING: THEORY III
SUBJECT CODE: SUR33WT
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 208 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: TOWN PLANNING IV
SUBJECT CODE: TPN401T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 30 hours
OVERVIEW OF SYLLABUS:
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.

7. DEPARTMENT OF INDUSTRIAL ENGINEERING

7.1 NATIONAL DIPLOMA: ENGINEERING: INDUSTRIAL
Qualification code: NDEI03

The Purpose of qualification:
This qualification is intended for employment at technician level. Persons with this qualification will be competent in applying techniques related to Industrial Engineering that are aimed at the improvement of organisational effectiveness and efficiency in both the manufacturing and service industries.

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics and at least (60-69%) for Physical Sciences.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	4
Additional subjects (excluding Life Orientation):	
Any three other vocational subjects with a competent (60-69%), totaling a final score of 11	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
For 2011: Any three other subjects with a final score of 13 **As from 2012:** Any three other subjects with a final score of 12	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

b. Minimum duration: Three years.

c. Presentation and campus: Pretoria Campus (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 Chapter 5 of Students' Rules and Regulations.
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 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)	
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)	
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)	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**

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

REMARKS

a. Admission requirement(s) and selection criteria:
See qualification NDEI03.

b. Minimum duration: Three and a half years.

c. Presentation and campus: Pretoria Campus (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 Chapter 5 of Students' Rules and Regulations.

g. 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

EWK121T	Engineering Work Study I	(0,083)	
MAT271T	Mathematics II	(0,083)	Mathematics (Extended) I
MFR201T	Manufacturing Relations II (Extended) I	(0,083)	Engineering Communication
MME201T	Mechanical Manufacturing (Extended) I	(0,083)	Computer-Aided Draughting Engineering II 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)	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**	

7.3 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: INDUSTRIAL
Qualification code: BTEI03

The purpose of the qualification:
This qualification is intended for employment at technologist level. Persons with this qualification will be competent to make meaningful contributions to programmes focusing on productivity improvement, integrated manufacturing systems, operating information systems, and project and logistics management.

REMARKS

a. Admission requirement(s): A National Diploma: Engineering: Industrial or an NQF level 6 diploma or bachelor's degree in Industrial Engineering 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: Students will be admitted through the evaluation of a portfolio of evidence, as well as an interview with the Head of the Department and/or an admission panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.

c. Minimum duration: One year.

d. Presentation and campus: Pretoria Campus (block-based classes).

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.

FIRST SEMESTER

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

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**

7.4 MAGISTER TECHNOLOGIAE: ENGINEERING: INDUSTRIAL
Qualification code: MTEI95

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Engineering: Industrial or an NQF level 7 bachelor's or honours degree in Industrial Engineering obtained from a South African university. Mathematics II and Research Methodology are prerequisites.

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.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (research).

e. Dissertation: In the dissertation, the student must prove that he or she understands a particular problem in the industry in which he or she has done research, is able to analyse and set it out logically, arrive at logical conclusions or a diagnosis, and is 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.

f. 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)

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

7.5 DOCTOR TECHNOLOGIAE: ENGINEERING: INDUSTRIAL
Qualification code: DTEI96

REMARKS

a. Admission requirement(s): A Magister Technologiae: Engineering: Industrial or an NQF level 8 master's degree in Industrial Engineering 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.

c. Duration: A minimum of two years and a maximum of five years.

d. Presentation and campus: Pretoria Campus (research).

e. Thesis: An advanced research project with a thesis. In the thesis, the student must give proof of original and creative thinking and problem-solving. He or she must also be able to make a real contribution to the solving of a particular problem in the industry to which his or her research applies. The thesis must comply with the usual technical requirements and rules regarding scope, quality and layout.

f. 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)

TOTAL CREDITS FOR THE QUALIFICATION: **2,000**

7.6 BACCALAUREUS TECHNOLOGIAE: TECHNOLOGY MANAGEMENT
Qualification code: BTTE01

REMARKS

a. Admission requirement(s): A National Diploma: Engineering or an equivalent qualification.

b. Selection criteria: Admission is subject to evaluation by a panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.

c. Minimum duration: One year.

d. Presentation and campus: Pretoria Campus (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 SUBJECT

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**

7.7 SUBJECT INFORMATION

Syllabus content subject to change to accommodate industry changes.

SUBJECT NAME: AUTOMATION III
SUBJECT CODE: ATM301B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Automation concept. Production works. Detroit automation. Jigs and fixtures. Automatic control of sizes. Press equipment. Numerical control. Hydrostatics. Hydraulic systems. Robotics.

SUBJECT NAME: BUSINESS ADMINISTRATION IVA
SUBJECT CODE: BAD40AB
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: BUSINESS ADMINISTRATION IVB
SUBJECT CODE: BAD40BB
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: BUSINESS LOGISTICS IV
SUBJECT CODE: BUL401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: COMPUTER-AIDED DRAUGHTING (EXTENDED) I
SUBJECT CODE: FPCAI01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMPUTER-AIDED DRAUGHTING I
SUBJECT CODE: CAI101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Introduction to computer-aided draughting (CAD), various software packages, compound drawings.

SUBJECT NAME: COSTING II
SUBJECT CODE: CSG201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Basic methods and a group of selected techniques of cost accounting for application in the business environment. The subject consists of two modules.

SUBJECT NAME: ELECTROTECHNOLOGY (EXTENDED) I
SUBJECT CODE: FPETT01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 226 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ELECTROTECHNOLOGY I
SUBJECT CODE: ETT101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 113 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Mechanical.)

SUBJECT NAME: ENGINEERING COMMUNICATION (EXTENDED) I
SUBJECT CODE: FPEGN01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ENGINEERING COMMUNICATION I
SUBJECT CODE: EGN101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence.

SUBJECT NAME: ENGINEERING WORK STUDY I
SUBJECT CODE: EWK121T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ENGINEERING WORK STUDY II
SUBJECT CODE: EWK221T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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). Value analysis.

SUBJECT NAME: ENGINEERING WORK STUDY III
SUBJECT CODE: EWK321T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Performance improvement programs. Systems for management.

SUBJECT NAME: ENTREPRENEURSHIP IV
SUBJECT CODE: ENT401B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
Introduction to strategic management. 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.

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1IEN
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2IEN
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: FACILITY LAYOUT AND MATERIALS HANDLING II
SUBJECT CODE: FLM201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: FINANCE AND COST ACCOUNTING II
SUBJECT CODE: FCC201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: INDUSTRIAL ACCOUNTING III
SUBJECT CODE: IAC321T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Introduction to financial management. Financial analysis, planning and control. Working capital management. Investment decisions. Computer applications.

SUBJECT NAME: INDUSTRIAL ECONOMICS II
SUBJECT CODE: IES201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: INDUSTRIAL ENGINEERING SYSTEMS DESIGN II
SUBJECT CODE: IED201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: INDUSTRIAL LEADERSHIP III
SUBJECT CODE: ILE301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Leaders and management. Management planning, organising, leading and control.

SUBJECT NAME: INFORMATION SYSTEMS IV
SUBJECT CODE: ISY401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
Structure and strategic organisational role. Computer systems resources. Decision support systems and executive information systems. Development and implementation of information systems.

SUBJECT NAME: INTERNATIONAL LAW II
SUBJECT CODE: INL201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: INTERNATIONAL MARKETING II
SUBJECT CODE: INK201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Economic rationale of multi-trade business, international monetary system, international finance and accounting. Regional market agreements, economic, cultural, political and legal environment. International marketing research, global marketplace, product policy and planning, international pricing strategy, channels of distribution, advertising, multinational sales management, organisation, control and marketing planning and strategy.

SUBJECT NAME: LOGISTICS ENGINEERING IV
SUBJECT CODE: LEN401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
Introduction to logistics. Measurement of logistics. System operational requirements. Logistics in system design. System operation and support. Logistic support management. Projects.

SUBJECT NAME: MANUFACTURING RELATIONS II
SUBJECT CODE: MFR201T
EVALUATION METHOD: 1 X 3-OUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MATHEMATICS (EXTENDED) I
SUBJECT CODE: FPMAT04
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
Basic algebra, functions, exponents and logarithm, differential calculus, trigonometry, geometry. Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS I
SUBJECT CODE: MAT171T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS II
SUBJECT CODE: MAT271T
EVALUATION METHOD: 1 X 3-OUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Revision of differentiation (Mathematics I). Differentiation of functions with more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination). (Subject taken from Engineering: Mechanical.)

SUBJECT NAME: MATHEMATICS III
SUBJECT CODE: MAT351T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
First-order ordinary differential equations. Higher-order differential equations. Laplace transforms. Infinite series. Fourier series. Matrix analysis. Probability and statistics. Elements of analytic geometry in 2D and 2D space. (Subject taken from Engineering: Mechanical.)

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING (EXTENDED) I
SUBJECT CODE: FPMDR01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
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. Constructions of scales, ellipse, square screw thread. Isometric drawings. Oblique drawings. Developments of pipes. Curve of interpenetration of T-ends and pipe joints. Projections of prisms and pyramids. Drawing language, e.g. machining symbols. First-angle and third-angle orthographic projection drawings of single objects, assembly drawings and detail drawings.

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING I
SUBJECT CODE: MDR101B
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Printing. Freehand sketches. Constructions of scales, ellipse, square screw thread. Isometric drawings. Oblique drawings. Developments of pipes. Curve of interpenetration of T-ends and pipe joints. Projections of prisms and pyramids. Drawing language, e.g. machining symbols. First-angle and third-angle orthographic projection drawings of single objects, assembly drawings and detail drawings. (Subject taken from Engineering: Mechanical.)

SUBJECT NAME: MECHANICAL MANUFACTURING ENGINEERING (EXTENDED) I
SUBJECT CODE: FPMME01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL MANUFACTURING ENGINEERING I
SUBJECT CODE: MME101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL MANUFACTURING ENGINEERING II
SUBJECT CODE: MME201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Measurement. Operative practical testing. Quality and dimensional control. Gauging and measurement. Measuring instruments. Comparators. Surface measurement.

SUBJECT NAME: MECHANICS (EXTENDED) I
SUBJECT CODE: FPMHC01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS I
SUBJECT CODE: MHC101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: OPERATIONAL RESEARCH III
SUBJECT CODE: ORS321T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PRODUCTION ENGINEERING: INDUSTRIAL I
SUBJECT CODE: PEI111T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PRODUCTION ENGINEERING: INDUSTRIAL II
SUBJECT CODE: PEI211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Forecasting. Aggregate planning tactics. Just-in-time systems and purchasing management. Inventory management. Material requirements planning. Operations scheduling.

SUBJECT NAME: PRODUCTION TECHNOLOGY IV
SUBJECT CODE: PHY401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
Resources for advanced manufacturing. Use of more sophisticated technologies. Effective manufacturing equipment. Process planning and factory management. Computer-integrated manufacturing. Projects and computer applications.

SUBJECT NAME: PROJECT ENGINEERING IV
SUBJECT CODE: PJE401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROJECT RESEARCH IV
SUBJECT CODE: PJR401B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: QUALITATIVE TECHNIQUES I
SUBJECT CODE: QTQ101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: QUALITY ASSURANCE II
SUBJECT CODE: QAS201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: QUALITY ASSURANCE IV
SUBJECT CODE: QAS401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 40 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: RESEARCH METHODOLOGY
SUBJECT CODE: RMD100N
EVALUATION METHOD: PROJECT
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SYSTEMS DYNAMICS IV
SUBJECT CODE: SDN411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: TECHNOLOGY MANAGEMENT (A) IV
SUBJECT CODE: THY401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Communicative structures, mechanisms of behaviour, teamwork (leadership and membership), selection techniques, negotiating, problem-solving and decision-making, presentations.

SUBJECT NAME: TECHNOLOGY MANAGEMENT (B) IV
SUBJECT CODE: THY411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: Not available
OVERVIEW OF SYLLABUS:
Operations management: research, investment, production marketing, finance and accounting. Strategic management: innovating, renewing or discontinuing productions, mergers, closing, buying or selling companies.

8. DEPARTMENT OF MECHANICAL ENGINEERING

8.1 NATIONAL DIPLOMA: ENGINEERING: MECHANICAL
Qualification code: NDME05

Purpose for the qualification:
The purposes of the qualification are to train and qualify top-quality technicians and technologists in the field of Mechanical 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 learners in terms of enrichment of the person, status and recognition.

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics and at least (60-69%) for Physical Sciences.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	4
Additional subjects (excluding Life Orientation):	
Any three other vocational subjects with a competent (60-69%), totalling a final score of 11	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
For 2011: Any three other subjects with a final score of 13 **As from 2012:** Any three other subjects with a final score of 12	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

b. Minimum duration: Three years.

c. Presentation and campus: Pretoria Campus (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 Chapter 5 of Students' Rules and Regulations.
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 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)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	

SECOND SEMESTER

EXP2ENM	Experiential Learning II	(0,500)	Experiential Learning I
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE THIRD YEAR:		**1,000**	

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

REMARKS

a. Admission requirement(s) and selection criteria:
See qualification NDME05.

b. Minimum duration: Three and a half years.

c. Presentation and campus: Pretoria Campus (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 Chapter 5 of Students' Rules and Regulations.

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)
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

FMS211T	Fluid Mechanics II	(0,083)	Mathematics (Extended) I Mechanics (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	(0,083)	Mathematics (Extended) I Mechanics (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	(0,083)	Engineering Communication (Extended) I 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

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**

8.3 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL
Qualification code: BTME05

REMARKS

a. Admission requirement(s): A National Diploma: Engineering: Mechanical with an average of 60% or higher for the exit-level diploma subjects or an NQF level 6 bachelor's degree in Mechanical Engineering obtained from a South African university. However, this does not apply to students who registered for the National Diploma for the first time before 2007, and who have not interrupted their studies.

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: Admissions will be based on the evaluation of a portfolio of evidence, as well as an interview with the Head of the Department and/or a selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.

c. Minimum duration: One year.

d.	Presentation and campus:	Pretoria Campus (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.	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.

FIRST OR SECOND SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
EDP400T	Engineering Design Project IV (year subject)	(0,250)	

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

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**

8.4 NATIONAL DIPLOMA: ENGINEERING: MECHANICAL AND NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL

Qualification code: NDDM01

THE QUALIFICATIONS NATIONAL DIPLOMA: ENGINEERING: MECHANICAL AND NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL WILL BE AWARDED ON THE COMPLETION OF THE CURRICULUM SET OUT BELOW.

NO NEW REGISTRATIONS FOR THIS QUALIFICATION ARE ACCEPTED AS FROM 2009. STUDENTS WHO ARE CURRENTLY REGISTERED FOR THIS QUALIFICATION HAVE UNTIL 2016 TO OBTAIN IT, SUBJECT TO THE STIPULATIONS OF REGULATION 3.1.1 ON THE MAXIMUM DURATION OF STUDY.

Phase-out date: 31 December 2016

Presentation and campus: eMalahleni and Pretoria campuses (day classes).

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)
COS101T	Communication Skills I	(0,050)	
CSK101C	Computer Skills I	(0,050)	
EEN111T	Electrical Engineering I	(0,100)	
ELC111T	Electronics I	(0,100)	
MAT171T	Mathematics I	(0,100)	
MDR101T	Mechanical Engineering Drawing I	(0,061)*	
MHC101T	Mechanics I	(0,060)*	
TOTAL CREDITS FOR THE SEMESTER:		0,521	

SECOND SEMESTER

CAI101T	Computer-Aided Draughting I*	(0,050)*	
DSY131T	Digital Systems I	(0,100)	
EEN211T	Electrical Engineering II	(0,100)	Electrical Engineering I
MAT271T	Mathematics II	(0,100)	Mathematics I
MME101T	Mechanical Manufacturing Engineering I	(0,050)*	
PGG111T	Programming I*	(0,100)	
TOTAL CREDITS FOR THE SEMESTER:		0,500	
TOTAL CREDITS FOR THE FIRST YEAR:		**1,021**	

SECOND YEAR

FIRST SEMESTER

DSY231T	Digital Systems II	(0,100)	Digital Systems I
EEN311T	Electrical Engineering III	(0,100)	Electrical Engineering II
ELC211T	Electronics II	(0,100)	Electronics I
EMA241T	Electrical Machines II	(0,100)	Electrical Engineering II
SMT211T	Strength of Materials II	(0,083)	Mathematics I Mechanics I
TOTAL CREDITS FOR THE SEMESTER:		0,483	

SECOND SEMESTER

DPJ301T	Design Project III	(0,100)	Digital Systems II Electrical Engineering II Electronics II
ELD331T	Electrical Distribution III	(0,100)	Electrical Engineering II
FMS211T	Fluid Mechanics II	(0,083)	Mathematics I Mechanics I
MMH211T	Mechanics of Machines II	(0,083)	Mathematics I Mechanics I
PWE311T	Power Electronics III	(0,100)	Electronics II
TDN201T	Thermodynamics II	(0,083)	
TOTAL CREDITS FOR THE SEMESTER:		0,549	
TOTAL CREDITS FOR THE SECOND YEAR:		**1,032**	

THIRD YEAR

FIRST SEMESTER

FMS331T	Fluid Mechanics III	(0,083)	Communication Skills I Fluid Mechanics II
MAT351T	Mathematics III	(0,100)	Mathematics II
MED201T	Mechanical Engineering Design II	(0,083)	Communication Skills I Computer-Aided Draughting I Mechanical Engineering Drawing I Mechanical Manufacturing Engineering I Mechanics I Strength of Materials II
MMH331T	Mechanics of Machines III	(0,083)	Communication Skills I Mechanics of Machines II
SMT331T	Strength of Materials III	(0,083)	Communication Skills I Strength of Materials II
TDN321T	Thermodynamics III	(0,083)	Communication Skills I Thermodynamics II
TOTAL CREDITS FOR THE SEMESTER:		0,515	

SECOND SEMESTER

ASA301T	Applied Strength of Materials III	(0,083)	Mathematics II Strength of Materials III
EMA341T	Electrical Machines III	(0,100)	Electrical Machines II
HYM301T	Hydraulic Machines III	(0,083)	Fluid Mechanics III Mathematics II
SMP301T	Steam Plant III	(0,083)	Mathematics II Thermodynamics III
TMH301T	Theory of Machines III	(0,083)	Mathematics II Mechanics of Machines III

TOTAL CREDITS FOR THE SEMESTER: 0,432

TOTAL CREDITS FOR THE THIRD YEAR: **0,947**

FOURTH YEAR

FIRST SEMESTER

EXP1EME	Experiential Learning I	(0,500)	

TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER

EXP2EME	Experiential Learning II	(0,500)	Experiential Learning I

TOTAL CREDITS FOR THE SEMESTER: 0,500

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

FIFTH YEAR

FIRST SEMESTER

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

TOTAL CREDITS FOR THE SEMESTER: 0,500

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

TOTAL CREDITS FOR THE QUALIFICATION: **4,500**

8.5 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL AND BACCALAUREUS TECHNOLOGIAE: ENGINEERING: ELECTRICAL

Qualification code: BTDM96

THE QUALIFICATIONS BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL AND BACCALAUREUS TECHNOLOGIAE: ENGINEERING: ELECTRICAL WILL BE AWARDED ON THE COMPLETION OF THE CURRICULUM SET OUT BELOW.

NO NEW REGISTRATIONS FOR THIS QUALIFICATION ARE ACCEPTED AS FROM 2009. STUDENTS WHO ARE CURRENTLY REGISTERED FOR THIS QUALIFICATION HAVE UNTIL 2013 TO OBTAIN IT, SUBJECT TO THE STIPULATIONS OF REGULATION 3.1.1 ON THE MAXIMUM DURATION OF STUDY.

Phase-out date: 30 June 2013

Presentation and campus: eMalahleni and Pretoria campuses (block-based classes).

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

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)	
EMA411T	Electrical Machines IV	(0,100)	Electrical Machines III
EMT451T	Engineering Mathematics IV	(0,100)	Mathematics III
FMS411T	Fluid Mechanics IV	(0,125)	Hydraulic Machines III
MMH411T	Mechanics of Machines IV	(0,125)	Mathematics III Theory of Machines III Theory of Machines III
PWE411T	Power Electronics IV	(0,100)	Power Electronics III
SMT411T	Strength of Materials IV	(0,125)	Applied Strength of Materials III Mathematics III Mathematics III
TDN401T	Thermodynamics IV	(0,125)	Mathematics III Steam Plant III
	plus one of the following subjects:		
EDP400T	Engineering Design Project IV (year subject)	(0,250)	
	or		
IPR410T	Industrial Project IV (year subject)	(0,250)*	
IPR412R	Industrial Project IV (re-registration)	(0,000)	

plus two of the following subjects:

ATC411T	Automatic Control IV	(0,125)	Mathematics III Theory of Machines 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

plus one of the following subjects:

CSY401T	Control Systems IV	(0,100)	
EPC401T	Electrical Protection IV	(0,100)	
PWS401T	Power Systems IV	(0,100)	Electrical Engineering III

TOTAL CREDITS FOR THE QUALIFICATION: **1,500**

8.6 NATIONAL DIPLOMA: ENGINEERING: MECHATRONICS
Qualification code: NDMR06

Purpose of the qualification:
The purposes of the qualification are 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 learners in terms of enrichment of the person, status and recognition.

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics and at least (60-69%) for Physical Sciences.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	4
Additional subjects (excluding Life Orientation):	
Any three other vocational subjects with a competent (60-69%), totalling a final score of 11	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
For 2011: Any three other subjects with a final score of 13 **As from 2012:** Any three other subjects with a final score of 12	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

b.	Minimum duration:	Three years.
c.	Presentation and campus:	Pretoria Campus (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 Chapter 5 of Students' Rules and Regulations.
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

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
MSS101T	Materials and Processing	(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)	Electronic Technology Mathematics I
MAT351T	Mathematics III	(0,100)	Mathematics II
MHC201T	Mechanics II	(0,100)	Mathematics I Mechanics I
SMT101T	Strength of Materials I	(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
MED101T	Mechanical Engineering Design	(0,100)	Computer-Aided Design Engineering Communication Manufacturing Engineering Mechanical Engineering Drawing Mechanics I Strength of Materials I

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
MHC301T	Mechanics III	(0,100)	Engineering Communication Mechanics II
NUA301T	Networks and Communication	(0,100)	
SMT211B	Strength of Materials II	(0,100)	Engineering Communication Strength of Materials I
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)

TOTAL CREDITS FOR THE SEMESTER: 0,350

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

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

REMARKS

a. Admission requirement(s) and selection criteria:
See qualification NDMR06.

b. Minimum duration: Three and a half years.

c. Presentation and campus: Pretoria Campus (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 Chapter 5 of Students' Rules and Regulations.

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)
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
MSS101T	Materials and Processing (Extended)	(0,150)	Manufacturing Engineering
TOTAL CREDITS FOR THE SEMESTER:		0,550	

SECOND SEMESTER

DIT101T	Digital Technology I	(0,100)	Electronic Technology Mathematics (Extended) I
MAT351T	Mathematics III	(0,100)	Mathematics II
MHC201T	Mechanics II	(0,100)	Mathematics (Extended) I Mechanics (Extended) I
SMT101T	Strength of Materials I	(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
MED101T	Mechanical Engineering Design	(0,100)	Computer-Aided Design Engineering Communication (Extended) Manufacturing Engineering (Extended) Mechanical Engineering Drawing (Extended) Mechanics (Extended) I Strength of Materials I

TOTAL CREDITS FOR THE SEMESTER: 0,500

SECOND SEMESTER

MCD301T	Mechatronic Engineering Design	(0,100)	Control of Machines Mechanical Engineering Design
MHC301T	Mechanics III	(0,100)	Engineering Communication (Extended) Mechanics II
NUA301T	Networks and Communication	(0,100)	
SMT211B	Strength of Materials II	(0,100)	Engineering Communication (Extended) Strength of Materials I
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**

8.8 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL (Field of specialisation: Mechatronics)
Qualification code: BTMR09/BTMR05

REMARKS

a. Admission requirement(s): A National Diploma: Engineering: Mechanical with an average of 60% or higher for the exit-level diploma subjects or an NQF level 6 bachelor's degree in Mechanical Engineering obtained from a South African university. However, this does not apply to students who registered for the National Diploma for the first time before 2007, and who have not interrupted their studies.

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 will be based on the evaluation of a portfolio of evidence, as well as an interview with the Head of the Department and/or a selection panel. Acceptance will be subject to available capacity and the student enrolment plan (SEP). Due to the capacity constraints, students will be selected, based on academic performance and/or work experience. Selection will be done after the closing date for applications. Meeting the minimum requirements does not guarantee acceptance.

c. Minimum duration: One year.

d. Presentation and campus: Pretoria Campus (block-based classes).

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.

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.)

OPTION 2 (BTMR09): ONLY FOR STUDENTS WHO COMPLETED THE NATIONAL DIPLOMA: ENGINEERING: MECHATRONICS (NDMR06)

FIRST OR SECOND SEMESTER

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)*	
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 1 (BTMR05): ONLY FOR STUDENTS WHO COMPLETED THE NATIONAL DIPLOMA: ENGINEERING: MECHANICAL (FIELD OF SPECIALISATION: MECHATRONICS) (NDMR01)

FIRST OR SECOND SEMESTER

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
EDP400T	Engineering Design Project IV (year subject)	(0,300)*	

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

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**	

8.9 MAGISTER TECHNOLOGIAE: ENGINEERING: MECHANICAL
Qualification code: MTME95

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Engineering: Mechanical or an NQF level 7 bachelor's or honours degree in Mechanical Engineering 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.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (research).

e. 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)

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

8.10 DOCTOR TECHNOLOGIAE: ENGINEERING: MECHANICAL
Qualification code: DTME96

REMARKS

a. Admission requirement(s): A Magister Technologiae: Engineering: Industrial or an NQF level 8 master's degree in Mechanical Engineering 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.

c. Duration: A minimum of two years and a maximum of five years.

d. Presentation and campus: Pretoria Campus (research).

e. 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)

TOTAL CREDITS FOR THE QUALIFICATION: **2,000**

8.11 NATIONAL DIPLOMA: POLYMER TECHNOLOGY
Qualification code: NDPY03

Purpose for the qualification:
The purpose of the qualification is to give students a thorough knowledge of various polymer materials, processing and analytical techniques for polymers. The main aim is to prepare and train students for a career in any industrial and other sectors in which polymers play a role.

REMARKS

a. Admission requirement(s) and selection criteria:

- **FOR STUDENTS WHO OBTAINED A NATIONAL CERTIFICATE AT FET COLLEGES:**

Admission requirement(s): A National Certificate (Vocational) at level 4 with at least a competent (50-69%) achievement for English and Mathematics and at least (60-69%) for Physical Sciences.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	4
Additional subjects (excluding Life Orientation):	
Any three other vocational subjects with a competent (60-69%), totalling a final score of 11	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): 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 and an E symbol at the Higher Grade or a D symbol at the Standard Grade for Physical Science.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

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

Admission requirement(s): A National Senior Certificate or an equivalent qualification, with English (4), Mathematics (4) and Physical Sciences (3).

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE
Specifically required subjects:	
English – home language or first additional language	4
Mathematics	4
Physical Sciences	3
Additional subjects (excluding Life Orientation):	
For 2011: Any three other subjects with a final score of 13 **As from 2012:** Any three other subjects with a final score of 12	
TOTAL APS SCORE:	**23**

Assessment Procedure: Candidates with an APS of 23+ will be admitted to the National Diploma or the National Diploma (Extended Curriculum). A candidate's performance in an academic placement test written in January as part of the Faculty's orientation programme will determine whether he or she will be channelled to the National Diploma or National Diploma (Extended Curriculum).

d. Minimum duration: Three years.

e. Presentation and campus: Pretoria Campus (day classes).

f. Intake for the qualification: January only.

g. Readmission: See Chapter 3 of Students' Rules and Regulations.

h. Polymer Production Practice I, II and III (experiential learning): See Chapter 5 of Students' Rules and Regulations.

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. 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 Polymer Technology: Practical I
PTP211T	Polymer Technology: Practical II	(0,083)	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)	
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**	

8.12 BACCALAUREUS TECHNOLOGIAE: POLYMER TECHNOLOGY
Qualification code: BTPY03

Purpose for the qualification:
The purpose of the qualification is to train students to become polymer technologists who have the polymer-based technical background for a career in any industrial and other sectors in which polymer plays a role. At this level, some introduction on research methodology, project planning and technical writing are encouraged.

REMARKS

a. Admission requirement(s): A National Diploma: Polymer Technology or an equivalent qualification.

b. Selection criteria: Acceptance will be subject to available capacity and the student enrolment plan (SEP).
Due to the capacity constraints, students will be selected, based on academic performance and/or work experience.
Selection will be done after the closing date for applications.
Meeting the minimum requirements does not guarantee acceptance.

c. Minimum duration: One year.

d. Presentation and campus: Pretoria Campus (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**

8.13 MAGISTER TECHNOLOGIAE: POLYMER TECHNOLOGY
Qualification code: MTPY01

Purpose of the qualification:
The purpose of this degree (in Polymer Technology) is to train polymer technologists to be versatile enough to fit-in 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 make careers in the academic or research, development and innovation environments.

REMARKS

a. Admission requirement(s): A Baccalaureus Technologiae: Polymer Technology or an equivalent qualification.

Students should preferably have passed the subject, Research Methodology, before registering, but should definitely complete it before their dissertations will be accepted. Students who have not passed Research Methodology should make arrangements with Mrs B van Eeden, tel. 012 841 4926, to pay for and attend classes in this subject.

b. Selection criteria: All applications are subject to selection.

c. Duration: A minimum of one year and a maximum of three years.

d. Presentation and campus: Pretoria Campus (research).

e. Content: This programme comprises a research project with a dissertation, provided the student passes Research Methodology first. In the dissertation, the student must prove that he or she understands a particular problem in the industry in which he or she has done research and is 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.

f. 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)

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

8.14 DOCTOR TECHNOLOGIAE: POLYMER TECHNOLOGY
Qualification code: DTPY01

Purpose of the qualification:
The purpose of this degree (in Polymer Technology) is to train polymer technologists to be versatile enough to fit-in 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 make careers in the academic or research, development and innovation environments.

REMARKS

a. Admission requirement(s): A Magister Technologiae: Polymer Technology or an equivalent qualification.

b. Selection criteria: All applications are subject to selection.

c. Duration: A minimum of two years and a maximum of five years.

d. Presentation and campus: Pretoria Campus (research).

e. Content: This programme comprises an advanced research project with a thesis. In the thesis, the student must provide proof of original, creative thinking and problem-solving skills, and prove that he or she 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.

f. 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)

TOTAL CREDITS FOR THE QUALIFICATION: **2,000**

8.15 NATIONAL DIPLOMA: THREE-DIMENSIONAL DESIGN (Field of specialisation: Engineering and Related Design) Qualification code: NDDI08

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 which plays an important role in a country's economic growth. In the world 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 at the Higher Grade for English and an E symbol for Mathematics or a C symbol at the Standard Grade for English and a D symbol for Mathematics.

Recommended subject(s): Physical Sciences, Visual Arts, Technical Drawing, Woodwork and Metal work.

Selection criteria: Admission Point Score (APS):

PERCENTAGE OBTAINED	HIGHER GRADE	STANDARD GRADE	APS
(80 - 89%)	A		7
(70 - 79%)	B	A	6
(60 - 69%)	C	B	5
(50 - 59%)	D	C	4
(40 - 49%)	E	D	3
(30 - 39%)	F	E	2
(0 - 29%)	G	F	1
TOTAL APS SCORE (six subjects):			**23**

Assessment Procedure: Candidates with an APS of 21+ 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 60% and the APS of 40% of the total score.

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

Admission requirement(s): **For 2011:** A National Senior Certificate or an equivalent qualification, with English (4) and Mathematics or Mathematical Literacy (4).
As from 2012: A National Senior Certificate or an equivalent qualification, with English (4) and Mathematics (3).

Recommended subject(s): Computer Applications Technology, Consumer Studies, Design, Engineering Graphics and Design, Physical Sciences, Visual Arts.

Selection criteria: Admission Point Score (APS):

SUBJECT REQUIREMENTS	MINIMUM PERFORMANCE LEVEL/SCORE FOR 2011	MINIMUM PERFORMANCE LEVEL/SCORE FOR 2012
Specifically required subjects:		
English – home language or first additional language	4	4
Mathematics (for 2011 Mathematical Literacy will still be accepted)	4	3
Additional subjects (excluding Life Orientation):		
For 2011: Any four other subjects with a final score of 16 **For 2012:** Any four other subjects with a final score of 14		
TOTAL APS SCORE:	**24**	**21**

Assessment Procedure: Candidates with an APS of 21+ 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 60% and the APS of 40% of the total score.

b. Minimum duration: Three years.

c. Presentation and campus: Pretoria Campus (day classes).

d. Intake for the qualification: January only.

e. Readmission: See Chapter 3 of Students' Rules and Regulations.

f. 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

CDD101T	Computer-Aided Design	(0,067)	
MDR111T	Mechanical Engineering Drawing	(0,067)	
MUR101T	Manufacturing I	(0,067)	

SECOND SEMESTER

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

SECOND SEMESTER

EGG201T	Engineering Design II	(0,067)	Engineering Design I

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

THIRD YEAR

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

BMN33AD	Business Management IIIA	(0,067)	Business Management II
ERG301T	Ergonomics	(0,050)	
MUR301T	Manufacturing III	(0,067)	Manufacturing II

SECOND SEMESTER

BMN33BD	Business Management IIIB	(0,067)	Business Management II

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

8.16 SUBJECT INFORMATION

Syllabus content subject to change to accommodate industry changes.

SUBJECT NAME: APPLIED STRENGTH OF MATERIALS III
SUBJECT CODE: ASA301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Slope and deflection of beams. Struts, compound stresses and compound strains. Thick cylinders. Practical laboratory work.

SUBJECT NAME: AUTOMATIC CONTROL IV
SUBJECT CODE: ATC411B, ATC411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Gyroscopes. Elements of automatic control. Automatic control. Transducers. System design.

SUBJECT NAME: BUSINESS MANAGEMENT I
SUBJECT CODE: BMN120D
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 160 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: BUSINESS MANAGEMENT II
SUBJECT CODE: BMN230D
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 160 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: BUSINESS MANAGEMENT IIIA
SUBJECT CODE: BMN33AD
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Marketing management and general management.

SUBJECT NAME: BUSINESS MANAGEMENT IIIB
SUBJECT CODE: BMN33BD
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Purchasing management, personal management and integration of all business management functions.

SUBJECT NAME: CHEMISTRY IA
SUBJECT CODE: CHE141B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 160 hours
OVERVIEW OF SYLLABUS:
Matter and energy (atomic theory, the periodic table, chemical bonding, chemical compositions and nomenclature), reaction equations and stoichiometry, solutions, acids, bases and salts, chemical equilibrium, electrochemistry and redox theory, descriptive chemistry of selected elements, organic chemistry, chemistry practicals.

SUBJECT NAME: COMMUNICATION SKILLS I
SUBJECT CODE: COS101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 34 hours
OVERVIEW OF SYLLABUS:
Communication theory. Verbal communication. Technical writing skills. Group communication skills. Applied technical writing skills. Interpersonal skills.

SUBJECT NAME: COMPUTER-AIDED DESIGN
SUBJECT CODE: CDD101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: COMPUTER-AIDED DRAUGHTING (EXTENDED) I
SUBJECT CODE: FPCAI01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
Students will be introduced to: operating systems (Windows environment), basic word-processing skills (MS-Word), spreadsheets (MS-Excel), presentation tools (PowerPoint), communications, connectivity, the internet and the Web, computer-aided draughting (CAD), various software packages and compound drawings.

SUBJECT NAME: COMPUTER-AIDED DRAUGHTING I
SUBJECT CODE: CAI101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Introduction to computer-aided draughting (CAD), various software packages, compound drawings.

SUBJECT NAME: COMPUTER SKILLS I
SUBJECT CODE: CSK101C
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
Components of a microcomputer system and engineering applications of software. Managing personal computers. The subject covers hardware operating systems (Windows 2000 and MS-DOS), Microsoft Word, Microsoft PowerPoint, Excel, and an introduction to the Internet.

SUBJECT NAME: COMPUTER STUDIES
SUBJECT CODE: CSD201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
The basic principles of computer hardware (A+) and programming. The hardware component teaches how to assemble and commission a PC. The programming component teaches the C++ programming language. The following topics are covered: data types and conversions, program actions and loop control, functions and parameters, data structures, pointers. The subject is practice-orientated and assessment is based on a number of programming tasks completed during the semester.

SUBJECT NAME: CONTROL OF MACHINES
SUBJECT CODE: CNF301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Mechatronics for Engineering: Mechanical and Engineering: Mechanical: Manufacturing.)

SUBJECT NAME: CONTROL SYSTEMS IV
SUBJECT CODE: CSY401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DESIGN PROJECT III
SUBJECT CODE: DPJ301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Design, construction, testing and documentation of a complete project at the appropriate level in the particular discipline.

SUBJECT NAME: DESIGN THEORY
SUBJECT CODE: DTH310T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 160 hours
OVERVIEW OF SYLLABUS:
Expanded design observation, awareness, reflection, argument, reading and writing skills.

SUBJECT NAME: DIGITAL CONTROL SYSTEMS IV
SUBJECT CODE: DCS401T
EVALUATION METHOD: 1 X 3-HOUR PAPER (OPEN BOOK)
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Electrical.)

SUBJECT NAME: DIGITAL SYSTEMS I
SUBJECT CODE: DSY131T, DSY141T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Electrical.)

SUBJECT NAME: DIGITAL SYSTEMS II
SUBJECT CODE: DSY231T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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). (Subject taken from Engineering: Electrical.)

SUBJECT NAME: DIGITAL TECHNOLOGY I
SUBJECT CODE: DIT101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: DIGITAL TECHNOLOGY II
SUBJECT CODE: DIT201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: DRAWING: CHEMICAL ENGINEERING I
SUBJECT CODE: DCE111T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Students are taught basic drawing skills to enable them to express their ideas and to read working drawings of, for example, moulds or dyes (colouring). Students are also introduced to computer-aided drawing (CAD) techniques.

SUBJECT NAME: ELECTRIC MACHINES
SUBJECT CODE: EIE301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Mechatronics for Engineering: Mechanical.)

SUBJECT NAME: ELECTRICAL DISTRIBUTION III
SUBJECT CODE: ELD331T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
The principles and operation of different types of power stations and substations. High-voltage transmission lines, switchgear, cables, isolators, line supports, feeders and busbars.

SUBJECT NAME: ELECTRICAL ENGINEERING I
SUBJECT CODE: EEN111T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
The correct use of SI units and their applications, the construction and maintenance of batteries, a network analysis on direct current circuits and AC theory, a study of various measuring instruments. An investigation of the effects of magnetic lines of force, the application and use of magnetic fields, inductance and the factors affecting it, capacitors and their operation.

SUBJECT NAME: ELECTRICAL ENGINEERING II
SUBJECT CODE: EEN211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
The analysis of networks through different methods, the effect of harmonics, three-phase systems, power-factor correction, the operation of motors and transformers.

SUBJECT NAME: ELECTRICAL ENGINEERING III
SUBJECT CODE: EEN311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Three-phase balanced and unbalanced circuits. Symmetrical components and short-circuit and open-circuit problems. Power in three-phase systems. Power and energy measurements in three-phase circuits. Interconnected systems. Control of active and reactive power. Rectification and inversion. Illumination.

SUBJECT NAME: ELECTRICAL MACHINES II
SUBJECT CODE: EMA241T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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 insight into the principles on which such machines operate. Single-phase transformers, induction machines and direct current machines are covered. (Subject taken from Engineering: Electrical.)

SUBJECT NAME: ELECTRICAL MACHINES III
SUBJECT CODE: EMA341T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
The generation of electricity and the application of electrical machines in traction, the mining industry and other industries form the basis of this subject. Synchronous generators and motors, three-phase transformers and induction motors are covered. (Subject taken from Engineering: Electrical.)

SUBJECT NAME: ELECTRICAL MACHINES IV
SUBJECT CODE: EMA411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
A further study of design and maintenance of synchronous, induction and special machines, as well as the different control techniques and uses of those machines.

SUBJECT NAME: ELECTRICAL PROTECTION IV
SUBJECT CODE: EPC401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 70 hours
OVERVIEW OF SYLLABUS:
This subject contains a high component 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.

SUBJECT NAME: ELECTRONIC TECHNOLOGY
SUBJECT CODE: ENY101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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. (Subject taken from Engineering: Mechatronics for Engineering: Mechanical.)

SUBJECT NAME: ELECTRONICS I
SUBJECT CODE: ELC111T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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, students 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. (Subject taken from Engineering: Electrical.)

SUBJECT NAME: ELECTRONICS II
SUBJECT CODE: ELC211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
The basic concepts and operation of basic rectification, voltage regulation, single-stage transistor amplifiers, transistor configurations, field-effect transistors, characteristics, types, operational amplifiers, basic configurations, special semiconductors, multi-layer semiconductors, optoelectronics. On completion of this subject, students should be able to do basic 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 the laboratory, which are taken into account during evaluation. (Subject taken from Engineering: Electrical.)

SUBJECT NAME: ELECTROTECHNOLOGY (EXTENDED) I
SUBJECT CODE: FPETT01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
Atom theory, electricity, magnetism and electromagnetism, inductors, capacitors and RLC networks. The correct use of S1 units and their applications, the construction and maintenance of batteries, a network analysis on direct current circuits and AC theory, a study of various measuring instruments. The effects of magnetic lines of force, the application and use of magnetic fields, inductance and the factors affecting it, capacitors and their operation. The correct use of S1 units and their applications, the construction and maintenance of batteries, a network analysis on direct current circuits and AC theory, a study of various measuring instruments. The effects of magnetic lines of force, the application and use of magnetic fields, inductance and the factors affecting it, capacitors and their operation.

SUBJECT NAME: ELECTROTECHNOLOGY I
SUBJECT CODE: ETT101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
The correct use of S1 units and their applications, the construction and maintenance of batteries, a network analysis on direct current circuits and AC theory, a study of various measuring instruments. The effects of magnetic lines of force, the application and use of magnetic fields, inductance and the factors affecting it, capacitors and their operation.

SUBJECT NAME: ELECTROTECHNOLOGY II
SUBJECT CODE: ETT211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ENGINEERING COMMUNICATION (EXTENDED)
SUBJECT CODE: FPEGN02
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
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:

- Operating systems (Windows environment)
- Basic word-processing skills (MS-Word)
- Spreadsheets (MS-Excel)
- Presentations tools (PowerPoint)
- 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.

SUBJECT NAME: ENGINEERING COMMUNICATION
SUBJECT CODE: EGN101B
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Basics of technical English, verbal communication ethics, technical report writing, general business documents, presentation skills, meetings and interpersonal skills.

SUBJECT NAME: ENGINEERING COMMUNICATION (EXTENDED) I
SUBJECT CODE: FPEGN01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Speaking and communication skills, listening skills, reading for academic understanding, academic vocabulary, learning strategies and information gathering, writing, business and life skills. Communication theory. Verbal communication. Technical writing skills. Group communication skills. Applied technical writing skills. Interpersonal skills.

SUBJECT NAME: ENGINEERING COMMUNICATION I
SUBJECT CODE: EGN111T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
Specific discipline-related interpretation, presentation and communication skills, listening skills, reading for academic understanding, academic vocabulary, learning strategies and information gathering, writing, business and life skills. The students will be introduced to aspects of scaffolded reading as a tool to acquiring knowledge and interpretative abilities within their subject disciplines.

SUBJECT NAME: ENGINEERING COMMUNICATION I
SUBJECT CODE: EGN101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 34 hours
OVERVIEW OF SYLLABUS:
Communication theory. Verbal communication. Technical writing skills. Group communication skills. Applied technical writing skills. Interpersonal skills.

SUBJECT NAME: ENGINEERING DESIGN I
SUBJECT CODE: EGG101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ENGINEERING DESIGN II
SUBJECT CODE: EGG201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ENGINEERING DESIGN PROJECT IV
SUBJECT CODE: EDP400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Engineering management, project management, human resource management, law of contract, accounting and financial management, budgeting and the completion of an industrial project.

SUBJECT NAME: ENGINEERING MANAGEMENT IV
SUBJECT CODE: EGM411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Management practice and personnel, financial, production, project, marketing and research and development management. Negotiating techniques.

SUBJECT NAME: ENGINEERING MATHEMATICS IV
SUBJECT CODE: EMT451T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Advanced mathematical concepts are used in complex analysis and transforms. On completion of this subject, students should know and understand the following concepts and apply them to solve problems: complex variables, mappings, analytical functions, complex integration, Laplace transforms, Z-transforms, Fourier transforms, partial differential equations.

SUBJECT NAME: ERGONOMICS
SUBJECT CODE: ERG301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1EME
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Industry-related training, as determined by the industry and the University.

SUBJECT NAME: EXPERIENTIAL LEARNING I
SUBJECT CODE: EXP1ENM
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Industry-related training, as determined by the industry and the University.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2EME
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Industry-related training, as determined by the industry and the University.

SUBJECT NAME: EXPERIENTIAL LEARNING II
SUBJECT CODE: EXP2ENM
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
Industry-related training, as determined by the industry and the University.

SUBJECT NAME: FLUID MECHANICS II
SUBJECT CODE: FMS211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: FLUID MECHANICS III
SUBJECT CODE: FMS331T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: FLUID MECHANICS IV
SUBJECT CODE: FMS411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Dimensional analysis and similarity. Flow over immersed bodies, external flow. Compressible flow. Advanced flow in pipes.

SUBJECT NAME: FREEHAND DRAWING
SUBJECT CODE: FHE100T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 200 hours
OVERVIEW OF SYLLABUS:
Includes basic freehand perspective line drawing skills for designing products; how to use freehand drawing efficiently to develop, communicate and record design.

SUBJECT NAME: HISTORY OF ART AND DESIGN
SUBJECT CODE: HAD110T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 200 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: HISTORY OF INDUSTRIAL DESIGN
SUBJECT CODE: HOI200T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 160 hours
OVERVIEW OF SYLLABUS:
A general outline of the history of industrial design through the industrial revolution and modern art movements.

SUBJECT NAME: HYDRAULIC MACHINES III
SUBJECT CODE: HYM301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: INDUSTRIAL DESIGN I
SUBJECT CODE: ITD100T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 320 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: INDUSTRIAL DESIGN II
SUBJECT CODE: ITD200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 400 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: INDUSTRIAL DESIGN III
SUBJECT CODE: ITD300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 420 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: INDUSTRIAL PROJECT IV
SUBJECT CODE: IPR410T
EVALUATION METHOD: PROJECT
TOTAL TUITION TIME: 12 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MANUFACTURING I
SUBJECT CODE: MUR101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MANUFACTURING II
SUBJECT CODE: MUR201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Knowledge of various manufacturing processes, theory and applications. Material selection including surface treatments, measurement and conformity to specification.

SUBJECT NAME: MANUFACTURING III
SUBJECT CODE: MUR301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Apply suitable manufacturing methods to Industrial Design III projects.

SUBJECT NAME: MANUFACTURING ENGINEERING (EXTENDED)
SUBJECT CODE: FPMFE01
EVALUATION METHOD: 1 X 3-HOUR PAPER AND PRACTICAL
TOTAL TUITION TIME: ± 360 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MANUFACTURING ENGINEERING
SUBJECT CODE: MFE101C
EVALUATION METHOD: 1 X 3-HOUR PAPER AND PRACTICAL
TOTAL TUITION TIME: ± 180 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MATERIAL TECHNOLOGY I
SUBJECT CODE: MIY100T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
This subject deals specifically with the application of materials and processing methods as a component of Industrial Design II projects.

SUBJECT NAME: MATERIAL TECHNOLOGY II
SUBJECT CODE: MIY200T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MATERIALS AND PROCESSING
SUBJECT CODE: MSS101T
EVALUATION METHOD: 1 X 3-HOUR PAPER AND PRACTICAL
TOTAL TUITION TIME: ±120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MATHEMATICS (EXTENDED) I
SUBJECT CODE: FPMAT04
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
Basic algebra, functions, exponents and logarithm, differential calculus, trigonometry, geometry. Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS I
SUBJECT CODE: MAT171T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration.

SUBJECT NAME: MATHEMATICS II
SUBJECT CODE: MAT271T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Differentiation of functions of more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination).

SUBJECT NAME: MATHEMATICS III
SUBJECT CODE: MAT351T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
First-order ordinary differential equations. Higher-order differential equations. Laplace transforms. Infinite series. Fourier series. Matrix analysis. Probability and statistics. Elements of analytic geometry in 2D and 2D space.

SUBJECT NAME: MECHANICAL ENGINEERING DESIGN
SUBJECT CODE: MED101T
EVALUATION METHOD: 1 X 3-HOUR PAPER (PRESCRIBED OPEN BOOK)
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL ENGINEERING DESIGN II
SUBJECT CODE: MED201T
EVALUATION METHOD: 1 X 3-HOUR PAPER (PRESCRIBED OPEN BOOK)
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL ENGINEERING DESIGN III
SUBJECT CODE: MED321T
EVALUATION METHOD: 1 X 3-HOUR PAPER (PRESCRIBED OPEN BOOK)
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING (EXTENDED)
SUBJECT CODE: FPMDR02
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 240 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING
SUBJECT CODE: MDR111T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING (EXTENDED) I
SUBJECT CODE: FPMDR01
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL ENGINEERING DRAWING I
SUBJECT CODE: MDR101T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL MANUFACTURING ENGINEERING (EXTENDED) I
SUBJECT CODE: FPMME01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 136 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL MANUFACTURING ENGINEERING I
SUBJECT CODE: MME101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICAL MANUFACTURING ENGINEERING II
SUBJECT CODE: MME201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Measurement. Operative (practical) testing. Simple jigs and fixtures. Types of production. Quality and dimensional control. Ergonomics. Automation. Precision machining. Automatic control of size. Production. Production of plastic, forming and machining. Transfer machines (Detroit-type automation). Press-tool (basics).

SUBJECT NAME: MECHANICAL MANUFACTURING ENGINEERING III
SUBJECT CODE: MME301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS (EXTENDED) I
SUBJECT CODE: FPMHC01
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 240 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS I
SUBJECT CODE: MHC101C
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS I
SUBJECT CODE: MHC101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS II
SUBJECT CODE: MHC201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS III
SUBJECT CODE: MHC301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS OF MACHINES II
SUBJECT CODE: MMH211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS OF MACHINES III
SUBJECT CODE: MMH331T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHANICS OF MACHINES IV
SUBJECT CODE: MMH411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHATRONIC ENGINEERING DESIGN
SUBJECT CODE: MCD301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MECHATRONIC ENGINEERING PRACTICE (EXPERIENTIAL LEARNING)
SUBJECT CODE: EXP1MEC
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 420 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: MULTIMEDIA PRESENTATION
SUBJECT CODE: MUO300T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 200 hours
OVERVIEW OF SYLLABUS:
Project application of the spectrum of contemporary design media skills used for effective and unhindered design development and communication.

SUBJECT NAME: NETWORKS AND COMMUNICATION
SUBJECT CODE: NUA301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: ORGANIC CHEMISTRY II
SUBJECT CODE: OCH221T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Aliphatic hydrocarbons, benzene, alkyl and aryl halides, alkanols and alkoxyalkanes, phenols, alkanals and alkanones, carboxylic acids and derivatives, amines. Practical organic chemistry.

SUBJECT NAME: PHYSICS IA
SUBJECT CODE: PHU161B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 130 hours
OVERVIEW OF SYLLABUS:
Remedial mathematics, basic units, vectors and scalars, kinetics, mechanics, momentum, moments, work, energy and power, pressure, density, heat, optics, waves and sound, current electricity, magnetism, radio-activity. Practical physics.

SUBJECT NAME: PLASTICS MATERIAL SCIENCE II
SUBJECT CODE: PME201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 84 hours
OVERVIEW OF SYLLABUS:
The basic principles of polymer physics. Emphasis is placed on flow and other physical properties, as well as interactions with, for instance, additives.

SUBJECT NAME: PLASTICS MATERIAL SCIENCE III
SUBJECT CODE: PME301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 75 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PLASTICS MATERIAL SCIENCE: PRACTICAL II
SUBJECT CODE: PMP201T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
The theoretical principles. Correctly designed practicals that reflect the knowledge gained in the relevant theoretical subject (physical testing methods for polymer assessment).

SUBJECT NAME: PLASTICS MATERIAL SCIENCE: PRACTICAL III
SUBJECT CODE: PMP301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 60 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POLYMER CHEMISTRY III
SUBJECT CODE: PYC301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 75 hours
OVERVIEW OF SYLLABUS:
Advanced polymerisation techniques, characterisation, structure and properties, properties of commercial polymers.

SUBJECT NAME: POLYMER CHEMISTRY: PRACTICAL III
SUBJECT CODE: PCP301T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 64 hours
OVERVIEW OF SYLLABUS:
Polymerisation reactions are carried out, and the reactions are controlled by means of sophisticated analytical techniques.

SUBJECT NAME: POLYMER PRODUCTION PRACTICE I
SUBJECT CODE: PYR101T
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POLYMER PRODUCTION PRACTICE II
SUBJECT CODE: PYR201T
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POLYMER PRODUCTION PRACTICE III
SUBJECT CODE: PYR301T
EVALUATION METHOD: EXPERIENTIAL LEARNING
TOTAL TUITION TIME: 6 months
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POLYMER SCIENCE IV
SUBJECT CODE: PYW400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POLYMER SCIENCE: PRACTICAL IV
SUBJECT CODE: PWP410T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Practicals relating to Polymer Science IV.

SUBJECT NAME: POLYMER TECHNOLOGY I
SUBJECT CODE: PTL111T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 84 hours
OVERVIEW OF SYLLABUS:
Students acquire a thorough basic knowledge of materials. An overview is also given of the processes used in the plastics conversion industry.

SUBJECT NAME: POLYMER TECHNOLOGY II
SUBJECT CODE: PTL211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 84 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POLYMER TECHNOLOGY III
SUBJECT CODE: PTL311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 84 hours
OVERVIEW OF SYLLABUS:
The emphasis is placed on tool and die design. All the other conversion techniques not yet covered are also studied.

SUBJECT NAME: POLYMER TECHNOLOGY IV
SUBJECT CODE: PYT400T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POLYMER TECHNOLOGY: PRACTICAL I
SUBJECT CODE: PTP111T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Practicals relating to library and computer skills, compression moulding and general thermoset moulding techniques.

SUBJECT NAME: POLYMER TECHNOLOGY: PRACTICAL II
SUBJECT CODE: PTP211T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
Practical applications of plastics technology theory.

SUBJECT NAME: POLYMER TECHNOLOGY: PRACTICAL III
SUBJECT CODE: PTP311T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 90 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: POLYMER TECHNOLOGY: PRACTICAL IV
SUBJECT CODE: POP410T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 80 hours
OVERVIEW OF SYLLABUS:
Practicals relating to Polymer Technology IV.

SUBJECT NAME: POWER ELECTRONICS III
SUBJECT CODE: PWE311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Application of thyristors to deal with the following: controlled rectifiers, AC voltage controllers, DC choppers and controlled inverters. Principles of switching and component design.
(Subject taken from Engineering: Electrical.)

SUBJECT NAME: POWER ELECTRONICS IV
SUBJECT CODE: PWE411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Theory: in-depth study of semi-conductor devices, resonant converters, power supplies, AC and DC drive control principles, control and feedback model design.

SUBJECT NAME: POWER SYSTEMS IV
SUBJECT CODE: PWS401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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 Seidel 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.

SUBJECT NAME: PRESENTATION DRAWING
SUBJECT CODE: PDW210T
EVALUATION METHOD: CONTINUOUS ASSESSMENT
TOTAL TUITION TIME: ± 200 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PRODUCTION PLANNING AND CONTROL III
SUBJECT CODE: PLC311T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 74 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: PROGRAMMING I
SUBJECT CODE: PGG111T
EVALUATION METHOD: PRACTICAL
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Components of a microcomputer system, engineering applications of software. Managing personal computers.

SUBJECT NAME: REFRIGERATION AND AIR CONDITIONING IV
SUBJECT CODE: RAC401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Air-conditioning. Refrigeration. Cold storage. Solar power.

SUBJECT NAME: SENSORS AND PROCESS CONTROL
SUBJECT CODE: SOA301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: SOFTWARE DESIGN III
SUBJECT CODE: SFD301T
EVALUATION METHOD: PRACTICAL
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
The basic principles of object-orientated programming. This subject concerns inheritance and polymorphism. Windows applications will be developed, and computer graphics and principles will round off the subject. The subject is practice-orientated and students are evaluated on a number of programming tasks completed during the semester.
(Subject taken from Engineering: Electrical.)

SUBJECT NAME: STEAM PLANT III
SUBJECT CODE: SMP301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRENGTH OF MATERIALS I
SUBJECT CODE: SMT101T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRENGTH OF MATERIALS II
SUBJECT CODE: SMT211B
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRENGTH OF MATERIALS II
SUBJECT CODE: SMT211T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRENGTH OF MATERIALS III
SUBJECT CODE: SMT331T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: STRENGTH OF MATERIALS IV
SUBJECT CODE: SMT411T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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).

SUBJECT NAME: STRESS ANALYSIS IV
SUBJECT CODE: SAN401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THEORY OF MACHINES III
SUBJECT CODE: TMH301T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THERMODYNAMICS II
SUBJECT CODE: TDN201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THERMODYNAMICS III
SUBJECT CODE: TDN321T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: THERMODYNAMICS IV
SUBJECT CODE: TDN401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Power plant. Internal combustion engines. Gas turbines. Rotary compressors and blowers. Combustion.

SUBJECT NAME: THERMO-FLOW
SUBJECT CODE: THF201T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 120 hours
OVERVIEW OF SYLLABUS:
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.

SUBJECT NAME: TURBO MACHINES IV
SUBJECT CODE: TRM401T
EVALUATION METHOD: 1 X 3-HOUR PAPER
TOTAL TUITION TIME: ± 68 hours
OVERVIEW OF SYLLABUS:
Axial fans and pumps. Axial and centrifugal turbines and compressors.