

FACULTY BOOKLET

FACULTY OF ENGINEERING AND TECHNOLOGY

2021

Faculty Structure and Qualifications

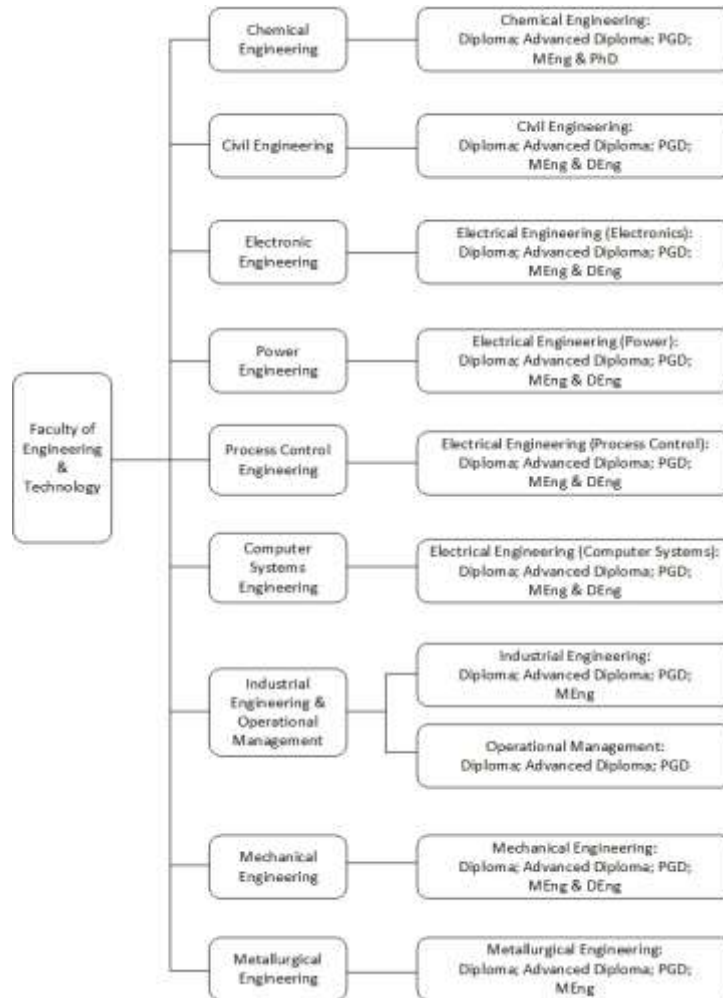


Table 1: Academic Points Calculation

(Please note Life Orientation is excluded from all points' calculations and bonus points)

NSC Percentages	NSC Achievement Score/Rating	SC HG	SC SG	VUT Score	Bonus Points	
					Maths	Physical/Natural Science and English
90% to 100%	7	A	A	8	3	2
80% - 89%				7		
70% - 79%				6		
60% - 69%	5	C	B	5	1	0
50% - 59%	4	D	C	4	0	
40% - 49%	3	E	D	3		
30% - 39%	2	F	E	2		
0% - 29%	1	G	F	0		

The academic point score (APS) for the Faculty of Engineering and Technology admission requirement is shown in the following tables for different type of qualifications.

Table 2: Diploma programmes in Engineering

Qualification	Compulsory Subjects	Minimum for the Diploma programmes
Diploma: Chemical Engineering Civil Engineering Electrical Engineering: ▪ Electronic ▪ Power ▪ Process Control & Computer Systems Industrial Engineering Mechanical Engineering Metallurgical Engineering	Mathematics	4
	Physical Sciences	4
	English Language	4
	Any other 3 subjects with a minimum level of 4, excluding Life Orientation	12
	Total	24*

- *Admission requirements for any of the **4-year extended Diploma programmes** in Engineering is a National Senior Certificate with a minimum of 24 APS points, plus a minimum of 4 for Mathematics, Physical Science and English. All candidates with APS scores from 24 – 29 will be required to register for the extended programme.
- *Admission requirements for any of the **3-year Diploma programmes** in Engineering is a National Senior Certificate with a minimum of 30 APS points, plus a minimum of 4 for Mathematics, Physical Science and English.

Table 3: Diploma programme in Operations Management

Qualification	Compulsory Subjects	Minimum
Diploma: Operations Management	Mathematics	4
	Physical Sciences	3
	English Language	4
	Any other 3 subjects with a minimum level of 4, excluding Life Orientation	12
	Total	23

For admission into Diploma in Engineering Programmes the following should be noted:

- The prospective student's results must meet the statutory admission requirement.
- Bonus points will only be used for selection purposes.
- Students that need more information regarding Extended programmes should liaise with their respective HOD's.
- All other grade 12 or equivalent certificates will be treated on ad hoc basis.
- International qualifications: All international qualifications will be evaluated by the International Office based on the Swedish scale.
- Transfers: Applications from students to transfer from other institutions will be dealt with in terms of the Recognition of Prior Learning and Continuation of Studies policies of VUT.

ENGINEERING COUNCIL OF SOUTH AFRICA

The Engineering Council of South Africa (ECSA) audit all the engineering programmes offered at the Vaal University of Technology every four years. ECSA awards an accreditation status to each programme that meets the standard for the award of the qualification. The standards are designed to meet the educational requirement towards registration as a Candidate or Professional Engineering Technician with ECSA and acceptance as a candidate to write the examinations for Certificated Engineers (for Diploma in Engineering Programmes) and the educational base required for registration as a Professional Engineering Technologist and/or Certificated Engineer with ECSA (for the Advanced Diploma in Engineering Programmes).

PHASING OUT OF NON-ALIGNED PROGRAMMES, CREDIT ACCUMULATION AND TRANSFER (CAT)

Phased out programmes

<i>Non-aligned programmes</i>	<i>Last year of registration of new intake</i>	<i>Comments</i>
National Diploma (ND)	2016	Replaced by Diploma in terms of the HEQSF*
Baccalaureus Technologiae (BTech)	2019 Students are allowed until 2022 to complete outstanding modules for the qualification.	Replaced by the Advanced Diploma in terms of the HEQSF*
Magister Technologiae (MTech)	2022	Replaced by the relevant new master's qualification in terms of the HEQSF*
<i>*A comprehensive system approved by the Minister of Higher Education and Training for the classification, registration, publication and articulation of quality -assured national qualifications</i>		

Credit accumulation and transfer (CAT) and articulation

<i>Description of programme</i>	<i>Comments</i>
Non-aligned National Diplomas (ND) Credit Accumulation and Transfer (CAT)	Students in possession of credits for an incomplete non-aligned diploma may be granted credits towards the relevant new diploma (<i>CHE Policy on CAT 5.2.6</i>). Students may be granted credits for modules (not more than 50%) (<i>CHE Policy on CAT 5.2.5</i>). Credits obtained from another institution can be transferred to a cognate VUT qualification (<i>VUT CAT Policy</i>). The granting of credits is undertaken by the relevant HoD, together with the module Co-ordinator and a subject specialist. Factors such as nature of qualification, the relationship between them, the nature, complexity, and extent of the curricula associated with the specific module to be recognised and the nature of the assessment used, will be taken into consideration in the granting of credits (<i>CHE Policy on CAT 5.2.5</i>).
BTech articulation	Students in possession of a BTech qualification or an appropriate NQF level 8 qualification may be allowed to articulate into the new relevant master's qualification. The articulation is permitted within the constraining parameters set by the requirements of a specific curricula (<i>CHE CAT Policy 5.15</i>). In addition, students must have a credit bearing research component in the BTech or relevant NQF level 8 qualification (<i>Senate approval 9 November 2018</i>). Students who possess a BTech or relevant NQF level 8 qualification BUT do not meet the entry requirements into a master's qualification may be allowed to enrol for the relevant post-graduate diploma.

Department: Chemical Engineering



HIERARCHY OF QUALIFICATIONS

Diploma in Chemical Engineering
Advanced Diploma in Chemical Engineering
Postgraduate Diploma in Chemical Engineering
Master of Engineering in Chemical Engineering
PhD in Chemical Engineering

1. QUALIFICATIONS

1.1 Diploma in Chemical Engineering

1.1.1 Duration of Programme: Three year full-time qualification: Two and a half years (Five semesters S1 to S5); One semester (6 months) Workplace Based Learning (WBL)

1.1.2 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
AAECH1A	Engineering Chemistry 1	10
EEESK1A	Engineering Skills 1	5
ASICT1A	ICT Skills 1	10
AMMAT1A	Mathematics 1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
SEMESTER 2		
HKCOY2A	Applied Communication Skills 1.2	8
AAECH2A	Engineering Chemistry 2	10
EMEDR1A	Engineering Drawing 1	10
EHITC1A	Introduction to Chemical Engineering 1	12
AMMAT2A	Mathematics 2	10
APHYT2A	Physics 2 (Theory)	5
APHYP2A	Physics 2 (Practical)	5
EHSPA1A	Safety Principles and Law 1	5
SEMESTER 3		
HKCOX2A	Applied Communication Skills 2.1	8
BHMAN1A	Management 1	10

EHCP1A	Chemical Process Industries 1	12
AAECH3A	Engineering Chemistry 3	10
EHMEB2A	Material and Energy Balance 2	12
AMMAT3A	Mathematics 3	10
EHMPO1A	Mechanical Operation 1	12
SEMESTER 4		
HKCOY2A	Applied Communication Skills 2.2	8
EHCOA2A	Computing Applications 2	7
EHCEL1A	Chemical Engineering Laboratory 1	12
EH CET2A	Chemical Eng. Thermodynamics 1	12
EHHMT2A	Heat and Mass Transfer 1	12
EHPCO2A	Process Control 1	12
EH PFD2A	Process Fluid Dynamics 1	12
SEMESTER 5		
EHATH3A	Applied Thermodynamics 2	12
EH CPR3A	Chemical Process Design	12
EHENE1A	Environmental Engineering 1	12
EHRTE3A	Reactor Technology 1	12
EHSEP3A	Separation Processes 1	12
EHCEL2A	Chemical Engineering Laboratory 2	12
SEMESTER 6		
EH EXL1A	Workplace Based Learning 1 / Experiential Learning 1	60

1.2 Advanced Diploma in Chemical Engineering

1.2.1 Admission Requirements: A Diploma in Chemical Engineering (NQF level 6, 360 credits) or equivalent qualification.

All other equivalent qualifications will be considered on a case-by-case basis.

1.2.2 Duration of Programme: The programme is offered full-time, minimum of 1 year.

1.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
Year Subjects		
EHAPD4A	Advanced Process Design	30
EHRMP4A	Research Methodology and Project	28
Semester 1		
EHAEM4A	Advanced Engineering Mathematics	12
EHARE4A	Advanced Reaction Engineering	12
EHFLM4A	Advanced Fluid Mechanics	12
EHHMX4A	Advanced Heat, Mass Transfer and Separation: Mod 1	10
Semester 2		
EHHMY4A	Advanced Heat, Mass Transfer and Separation: Mod 2	11
EHMAN4A	Engineering Management	7
EHCEL4A	Chemical Engineering Laboratory	8
EHAPC4A	Advanced Process Control	12

1.3 Postgraduate Diploma in Chemical Engineering

1.3.1 Admission Requirements: Advanced Diploma in Chemical Engineering and equivalent qualification such as BTech in Chemical Engineering. All other equivalent qualifications will be considered on a case-by-case basis.

1.3.2 Duration of Programme: One-year, full-time qualification.

1.3.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	Core/ Fundamental/ Elective	CREDITS
SEMESTER 1			
EHPRM5A	Research Project (Chemical Engineering) *Full Year	Core	40
EHPEX5A	Environmental Engineering I (Chemical Eng)	Core	15
EHPDX5A	Chemical Process Design I (Chemical Eng)	Core	15
	Elective Group YI**	Elective	10
SEMESTER 2			
EHPEY5A	Environmental Engineering II (Chemical Eng)	Core	15
EHPDY5A	Chemical Process Design II (Chemical Eng)	Core	15
	Elective Group YII***	Elective	10

*Research Project (Chemical Engineering) (Full year)

** Elective Group YI *(Elective group Y = A or B)

*** Elective Group YII *(Elective group Y = A or B)

Subject Elective Groups: The learners will first select a group among petroleum, mineral processing and bioprocessing. Elective YI and YII may not come from different groups. The elective group of subjects to be offered will depend on admission numbers per group (Minimum of 20 students).

SUBJECT CODE	NAME OF SUBJECT	Core/ Fundamental/ Elective	CREDITS
Elective Group A			
EHPBEX5A	Bioprocess Engineering I	Elective	10
EHPBEY5A	Bioprocess Engineering II	Elective	10
Elective Group B			
EHPPEX5A	Petrochemical Engineering I	Elective	10
EHPPEY5A	Petrochemical Engineering II	Elective	10

1.4 Master of Engineering in Chemical Engineering

1.4.1 Admission Requirements: BEng degree, BSc Degree in Chemical Engineering or Equivalent level 8 qualification including Postgraduate Diploma in Chemical Engineering.

1.4.2 Duration of Programme: At least 1 year full-time research, concluded with a Master Dissertation.

1.5 Doctor of Philosophy (PhD) in Chemical Engineering

1.5.1 Admission Requirements: MEng (Chemical Engineering) or equivalent. Ad hoc cases will be treated on merit.

1.5.2 Duration of Programme: At least two years full-time research, concluded with a Doctoral Thesis.

2. WHAT ARE THE FUNCTIONS OF A CHEMICAL ENGINEERING TECHNICIAN?

The qualified Chemical engineer/technician may find himself/herself as a member of an engineering team which may consist of engineers, scientists, artisans, process personnel, technologists and technicians from other disciplines. Functions

may include the commissioning and maintenance of chemical plants, process control, design and development, optimizing of chemical processes, quality control over the products of the manufacturing processes, feasibility studies and a variety of tasks related to the chemical process industry.

3. CAREER OPPORTUNITIES

A profession in the field of chemical engineering offers a challenging and exciting career in both the private and public sectors. There is a continuous demand for trained manpower in the field of chemical engineering. Job designations may vary from production foremen, area superintendents, plant engineer and various others within several branches of heavy, light and general types of industries where the services and expertise of such persons are required.

4. ENQUIRIES

Enquiries may be addressed to:

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Vaal University of Technology
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Vanderbijlpark 1900

Tel: (016) 950-9243

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Department: Civil Engineering



HIERARCHY OF QUALIFICATIONS

Diploma in Civil Engineering
 Advanced Diploma in Civil Engineering
 Postgraduate Diploma in Civil Engineering
 Master of Engineering in Civil Engineering
 Doctor of Engineering in Civil Engineering

1. QUALIFICATIONS

1.1 Diploma in Civil Engineering

1.1.1 Duration of Programme: This is a 3 year programme and consists of a five semester university attendance followed by one semester experiential training in industry.

1.1.2 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
ASICT1A	ICT Skills 1	10
AAECH1A	Engineering Chemistry 1	10
EEESK1A	Engineering Skills 1	5
AMMAT1A	Mathematics 1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
SEMESTER 2		
HKCOY1A	Applied Communication Skills 1.2	8
ECAME1A	Applied Mechanics 1	10
ECCOA2A	Computing Applications 2	7
AAECH2A	Engineering Chemistry 2	10
ECEDR1A	Engineering Drawing 1	10
AMMAT2A	Mathematics 2	10
APHYP2A	Physics 2 – Practical	5
APHYT2A	Physics 2 - Theory	5

ECSPA1A	Safety Principles and Law 1	5
SEMESTER 3		
HKCOX2A	Applied Communication Skills 2.1	8
ECCOS1A	Construction Methods 1	10
ECCOM1A	Construction Materials 1	5
ECEDR2A	Engineering Drawing 2	10
EYEGE1A	Engineering Geology 1	10
ECESU1A	Engineering Surveying 1	10
ECSME1A	Soil Mechanics 1	5
ECST2A	Theory of Structures 2	10
SEMESTER 4		
HKCOY2A	Applied Communication Skills 2.2	8
ECCEM1A	Civil Engineering Management 1	10
ECCOM2A	Construction Materials 2	5
ECEOS2A	Elements of Structural Steel and Timber Design 2	10
ECESU2A	Engineering Surveying 2	10
ECSAN3A	Structural Analysis 3	10
ECTEN1A	Transportation Engineering 1	10
ECWEN1A	Water Engineering 1	10
SEMESTER 5		
ECCEM2A	Civil Engineering Management 2	10
ECDOC1A	Documentation 1	10
ECEOR3A	Elements of Reinforced Concrete Masonry Design 3	10
ECFMC2A	Fluid Mechanics 2 (Civil)	10
ECSME2A	Soil Mechanics 2	10
ECSAN4A	Structural Analysis 4	10
ECTEN2A	Transportation Engineering 2	10
SEMESTER 6		
ECEXL1A	Workplace Based Learning / Experiential Learning 1	60

1.2 Advanced Diploma in Civil Engineering

1.2.1 Admission Requirements: A student with relevant qualification on NQF level 6 (min 360 credits) can enter this Advanced Diploma in Civil Engineering or a relevant qualification (e.g. Bachelors in Civil Engineering). *The relevant NQF level 6 qualification must be passed with an average of 65% of all the exit level subjects.* All other equivalent qualifications will be treated on an ad hoc basis.

1.2.2 Duration of Programme: A one-year full-time course and consists of two semesters' university attendance (13 modules) that includes two (2) modules on Civil Engineering Research Methods and Project.

1.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
ECMAT4A	Civil Engineering Materials	10
ECHTE4A	Highway and Traffic Engineering	10
ECSTR4A	Structural Analysis	10
ECWWE4A	Water and Wastewater Engineering	10
ECENS4A	Environmental Studies	10

ECREM4A	Civil Engineering Research Methodology	15
SEMESTER 2		
ECEDE4A	Earthworks Design	10
ECSR4A	Steel and Reinforced Concrete Design	10
ECRWE4A	Railway Engineering	10
ECRED4A	Reticulation Design	10
ECBDC4A	Business Development in the Civil Engineering Environment	10
ECMTT4A	Management Tools and Techniques	10
ECREP4A	Civil Engineering Research Project	15

NB: All subjects/modules are compulsory and must be completed in VUT

1.3 Postgraduate Diploma in Civil Engineering

1.3.1 Admission Requirements: A student with relevant qualification on NQF level 7, typically a Bachelor's Degree, Advanced Diploma or relevant NQF level 7 qualifications can enter this programme. *The relevant NQF level 7 qualification must be passed with an average of 65% of all the exit level subjects.*

1.3.2 Duration of Programme: This is a one-year full-time programme (or a minimum two years part-time programme). Consists of two semesters' university attendance (8 modules) that includes two (2) modules on Civil Engineering Research Project.

1.3.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
ECEEN5A	Environmental Engineering	10
ECGTE5A	Geotechnical Engineering	20
ECPCM5A	Project and Construction Management	10
ECRPX5A	Research Project in Civil Engineering (Module 1)	15
SEMESTER 2		
ECSTE5A	Structural Engineering	20
ECTEN5A	Transportation Engineering	20
ECWEN5A	Water Engineering	20
ECRPY5A	Research Project in Civil Engineering (Module 2)	25

1.4 Master of Engineering in Civil Engineering

1.4.1 Admission Requirements: A BEng Degree or Equivalent level 8 qualification including the Postgraduate Diploma in Civil Engineering with an average pass mark of 60% and above. Proof of successful completion of a Vaal University of Technology approved course in Research Methodology. Ad hoc cases will be treated on merit.

1.4.2 Duration of Programme: The equivalent of 1 year, full-time study.

1.4.3 Programme Structure: This programme comprises of a thesis only.

1.5 Doctor of Engineering in Civil Engineering

1.5.1 Admission requirements: Master of Engineering in Civil Engineering or Equivalent level 9 qualification. Ad hoc cases will be treated on merit.

1.5.2 Duration of Programme: At least two years full-time research, concluded with a Doctoral Thesis.

2 CIVIL ENGINEERING FIELDS

Transportation, Water, Structural, Geotechnical, Construction Management, Urban Engineering. Civil Engineering technicians could be involved with construction projects such as reinforced concrete, structural steel, timber and masonry structures, roads, bridges, dams, canals, pipelines, water purification, sewage treatment, airports, railways, harbours, housing and services.

3 CAREER OPPORTUNITIES

As a Civil Engineering Technician or Technologist, the following selection of careers are available: Design draughtsman, project official, site agent, municipal technician, engineering surveyor, quantity technician, designer, laboratory technician, contracts manager, project planner, estimator, quality controller, geotechnical technician. There is ample opportunity to attain job satisfaction and attractive financial rewards. Some past students from this department have senior positions at consulting engineering firms, construction companies, government bodies, local authorities and industry.

4 ENQUIRIES

Enquiries may be addressed to:

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Department: Electronic Engineering



HIERARCHY OF QUALIFICATIONS

Diploma in Electrical Engineering (Electronics)
 Advanced Diploma in Electrical Engineering (Electronics)
 Postgraduate Diploma in Electrical Engineering (Electronics)
 Master of Engineering in Electrical Engineering (Electronics) / Master of Engineering in Energy Efficiency (MEng Energy Efficiency)
 Doctor of Engineering in Electrical Engineering (Electronics)

1. QUALIFICATIONS

1.1 Diploma in Electrical Engineering (Electronics)

1.1.1 Duration of Programme: Three years full-time qualification, 360 credits. Sixty credits are allocated to Workplace Based Learning which will take place in industry.

1.1.2 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
EEESK1A	Engineering Skills 1	5
EPEEN1A	Electrical Engineering 1	10
ASICT1A	ICT Skills 1	10
AMMAT1A	Mathematics1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
	ADDITIONAL SUBJECT	
AAECH1A	Engineering Chemistry 1	10
SEMESTER 2		
HKCOY1A	Applied Communication Skills 1.2	8
EICOA2A	Computing Applications 2	7
EIDSY1A	Digital Systems 1	10
EPEEN2A	Electrical Engineering 2	10
AMMAT2A	Mathematics 2	10
EEELE1A	Electronics 1	10
EEWPR1A	Projects 1	7
EESPA1A	Safety Principles And Law 1	5
	Additional Subjects	

EIPRI1A	Process Instrumentation 1	10
APHYT2A	Physics 2 (Theory)	5
APHYP2A	Physics 2 (Practical)	5
AAECH2A	Engineering Chemistry 2	10
SEMESTER 3		
HKCOX2A	Applied Communication Skills 2.1	8
EIDSY2A	Digital Systems 2	10
EEELE2A	Electronics 2	10
EEWPR2A	Projects 2	7
EECAD1A	Electrical CAD 1	10
AMMAT3A	Mathematics 3	10
EEECO2A	Electronic Communication 2	10
	Additional Subjects	
EIENP1A	Engineering Programming 1	10
BHMAN1A	Management 1	10
EINET1A	Networks 1	10
SEMESTER 4		
HKCOY2A	Applied Communication Skills 2.2	8
EEELEC3A	Electronics 3	10
EEWPR3A	Projects 3	8
EEDCO2A	Digital Communication 2	10
EECAD2A	Electrical CAD 2	10
EEMET3A	Measurement Technology 3	10
	Choice Subjects	
EICSY2A	Control Systems 2	10
EIENP2A	Engineering Programming 2	10
EIPRI2A	Process Instrumentation 2	10
EINET2A	Networks 2	10
EIDCS1A	Digital Control Systems 1	10
SEMESTER 5		
EEOEL3A	Opto-Electronics 3	10
EEWPR4A	Projects 4	8
EEMIC3A	Microwave Communication 3	10
EERAD3A	Radio Engineering 3	10
EETXR3A	Transmission 3 (Radio Frequency)	10
	Additional Subjects	
EEPEL4A	Power Electronics 4	10
EIENP3A	Engineering Programming 3	10
SEMESTER 6		
WBL Placement		
EEEXL1A	Experiential Learning 1 / WBL 1	14
EEEXL2A	Experiential Learning 2 / WBL 2	16
EEPRJ4A	Engineering Project 4	30

1.2 Advanced Diploma in Electrical Engineering (Electronics)

1.2.1 Admission Requirements: All applicants must have a Diploma in Electrical Engineering (Electronics) (NQF level 6, 360 credits) with the provision of a 60% performance in those diploma subjects that will carry forward into the

Advanced Diploma in Electrical Engineering (Electronics). Apart from the prescribed qualification, a specified period of relevant post-qualification practical experience is a prerequisite for registration.

1.2.2 Duration of Programme: The Advanced Diploma is a one-year full-time course.

1.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
	COMPULSARY	
EEPRO4A	Electrical Engineering Project (AD)	25
EIREM4A	Engineering Research Methods (AD)	15
	Choice Subjects	
EEAEL4A	Electronics 4 (AD)	20
EERAD4A	Radio Engineering 4 (AD)	20
EIDSP4A	Digital Signal Processing 4 (AD)	20
EISPC4A	Signal Processing 4 (AD)	20
SEMESTER 2		
	COMPULSARY	
AMAEM4A	Advanced Engineering Mathematics	15
BHEMN4A	Engineering Management	10
	Choice Subjects	
EEAMI4A	Microwave Engineering 4	20
EAAOE4A	Opto-Electronics 4	20
EESAT4A	Satellite Communication 4	20
EICIA4A	Circuit Analysis 4	20
EIDCS4A	Digital Control Systems 4	20

1.3 Postgraduate Diploma in Electrical Engineering (Electronics)

1.3.1 Admission Requirements: Students who have completed the Advanced Diploma in Electrical Engineering automatically qualify for entry into this Postgraduate Diploma in Electrical Engineering. Students who have completed another relevant qualification are subjected to an RPL process.

1.3.2 Duration of Programme: This is a one-year full-time programme.

1.3.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
YEAR		
EEPRO5A	Engineering Research Project	30
SEMESTER 1		
EEMET5A	Advanced Measurement Technology	25
EEEMN5A	Energy Management	25
SEMESTER 2		
EEMIC5A	Microwave Design	25
EPEEM5A	Energy Efficiency Management	25

1.4 Master of Engineering in Electrical Engineering (Electronics)

1.4.1 Admission Requirements: A BEng degree or equivalent level 8 qualification including the Postgraduate Diploma.

1.4.2 **Programme Structure:** At least 1 year, full-time research, concluded with a Master's dissertation.

1.5 Master of Engineering in Energy Efficiency [MEng (Energy Efficiency)]

1.5.1 **Admission Requirements:** An appropriate BEng or Advanced Diploma.

1.5.2 **Duration of Programme:** One-year full-time or two years part time.

1.5.3 Curriculum:

Module	Module Content
Energy Accounting & Economics Credits: 20	<ul style="list-style-type: none"> • Building energy use and economic analysis and life cycle costing • Building envelopes and insulation • Energy auditing • Audit instruments • Codes standards and protocols • Energy purchasing • Energy accounting and benchmarking • Energy rates structures • Electrical systems and electricity management
Process Energy Management Credits: 25	<ul style="list-style-type: none"> • Fan systems • Pumps and pump systems • Air systems components management. • Heating, ventilating and air conditioning • Understanding and managing boilers: <ul style="list-style-type: none"> - Operation - Boiler components - Boiler controls and gauges - Boiler fuels - Heat balance for boilers - Boiler efficiency and improvements • Steam distribution systems: <ul style="list-style-type: none"> - Introduction - Steam distribution components - Tracer lines - Waste heat recovery - Improving the hot water distribution system - Cogeneration
Electrical Systems Credits: 20	<ul style="list-style-type: none"> • Rate structures • Electrical systems • Electric motors and drives • Tariffs and structures • Electrical protection systems • Energy systems maintenance • Control systems and computers <ul style="list-style-type: none"> - Need for controls - Types of controls <ul style="list-style-type: none"> Manual systems Basic automatic controls Web based building automation systems
Renewable Energy Credits: 25	<ul style="list-style-type: none"> • Renewable energy sources and water management: <ul style="list-style-type: none"> - Wind generation - Water energy systems - Geothermal energy - Solar energy - Thermal energy storage - Hydrogen and Fuel Cells • Distributed generation (DG) <ul style="list-style-type: none"> - Economics of DG - Technologies - Analysing your own facility for DG application - A case study
Research Project Credits: 90	<ul style="list-style-type: none"> • Research Project relating to energy sources and/or water management systems pertaining to: <ul style="list-style-type: none"> - Wind generation systems and optimization - Water energy systems and optimization - Geothermal energy systems and optimization

	<ul style="list-style-type: none"> - Solar energy systems and optimization - Thermal energy storage systems and optimization - Hydrogen and Fuel Cell systems and optimization
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1.5.4 Enquiries (MEng Energy Efficiency):

Prof WJ Bekker
 Tel: (016) 950-9410
 E-mail: bekkerj@vut.ac.za

1.6 Doctor of Engineering in Electrical Engineering (Electronics)

1.6.1 Admission Requirements: A MEng (Electrical Engineering) - Electronics. Ad hoc cases will be treated on merit.

1.6.2 Duration of Programme: At least two years full-time research, concluded with a Doctoral Thesis.

1.6.3 Programme Structure: This instructional programme comprises of a thesis only. This qualification is offered at the Vanderbijlpark campus only.

2. ENQUIRIES

Enquiries may be addressed to:

The Head of Department: Electronic Engineering
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Website: www.vut.ac.za

Department: Power Engineering



HIERARCHY OF QUALIFICATIONS

Diploma in Electrical Engineering (Power)
 Advanced Diploma in Electrical Engineering (Power)
 Postgraduate Diploma in Electrical Engineering (Power)
 Master of Engineering in Electrical Engineering (Power)
 Doctor of Engineering in Electrical Engineering (Power)

1. QUALIFICATIONS

1.1 Diploma in Electrical Engineering (Power)

1.1.1 Duration of Programme: Three years full-time qualification, 360 credits. Sixty credits are allocated to Workplace Based Learning which will take place in industry.

1.1.2 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
EEESK1A	Engineering Skills 1	5
EPEEN1A	Electrical Engineering 1	10
ASICT1A	ICT Skills 1	10
AMMAT1A	Mathematics 1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
SEMESTER 2		
HKCOY1A	Applied Communication Skills 1.2	8
EICOA2A	Computing Applications 2	8
EIDSY1A	Digital Systems 1	10
EPEEN2A	Electrical Engineering 2	10
EEELE1A	Electronics 1	10
AMMAT2A	Mathematics 2	10
EESPA1A	Safety Principles And Law 1	5
	Choice Subjects	
EMEDR1A	Engineering Drawing 1	10
APHYT2A	Physics 2 Theory	5

APHYP2A	Physics 2 Practical	5
SEMESTER 3		
HKCOX2A	Applied Communication Skills 2.1	8
EPEEN3A	Electrical Engineering 3	10
EPEMA2A	Electrical Machines 2	10
EPSYS2A	Power Systems 2	10
AMMAT3A	Mathematics 3	10
EEEE2A	Electronics 2	10
	Choice Subject (Choose 1)	
EIDSY2A	Digital Systems 2	10
BHMAN1A	Management 1	10
EIPRI1A	Process Instruments 1	10
EMMEC1A	Mechanics 1	10
SEMESTER 4		
HKCOY2A	Applied Communication Skills 2.2	8
EPSYS3A	Power Systems 3	10
EEPEL3A	Power Electronics 3	10
EPAEN2A	Alternative Energy 2	10
EPEMA3A	Electrical Machines 3	10
EPEEN4A	Electrical Engineering 4	10
	Choice Subject	
EICSY2A	Control Systems 2	10
SEMESTER 5		
EPEPR3A	Electrical Protection 3	10
EPAEN3A	Alternative Energy 3	10
EPEMA4A	Electrical Machines 4	10
EPTXP3A	Transmission 3	10
EEPEL4A	Power Electronics 4	10
EPEMN2A	Energy Management 2	10
	Choice Subject	
EEEE3A	Electronics 3	10
SEMESTER 6		
WBL Placement		
EPEXL1A	Experiential Learning 1 / WBL 1	14
EPEXL2A	Experiential Learning 2 / WBL 2	16
EPPRJ4A	Engineering Project 4	30

1.1.3 Government Certificate of Competency (GCC)

The Certificate of Competency as a Mechanical and / or Electrical Engineering Technician is issued by the Department of Labour (Factories) or the Department of Minerals and Energy Affairs (Mines) to a person with the necessary academic diploma / degree and practical experience and who has passed a qualifying examination. A person with such a certificate must take responsibility for the operation of a factory or mine where the consumption of electricity exceeds a certain limit.

This University is one of a few tertiary institutions accredited to offer Diplomas complying with the requirements for admission to the GCC examination. This is not a GCC qualification, only a subject package complying with the entry requirements to the GCC examination.

This is for the combination of subjects of the National Diploma and **NOT** for the Diploma in Engineering.

Government Certificate of Competency (GCC)	
• Computer & Programming Skills I	• Electrical Engineering, I

<ul style="list-style-type: none"> • Mathematics I • Mathematics II • Industrial Electronics II • Power Electronics III • Electronics I • Electronics II • Mechanics I • Mechanical Engineering Drawing I • Mechanical Technology I • Mechanical Technology II • Mechanical Technology III • Design Project III • Electrical Distribution 3 	<ul style="list-style-type: none"> • Electrical Engineering II • Electrical Engineering III • Electrical Machines II • Electrical Machines III • Electrical Protection III • Digital Systems I • Applied Communication Skills 1.1 • Applied Communication Skills 1.2 • Applied Communication Skills 2.1 • Applied Communication Skills 2.2 • EDL • Strength of Materials II • Strength of Materials III
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Government Certificate of Competency Contact Information: Written application for admission to the examination for the Certificate of Competency can be addressed to:

Mines & Industries : Department of Minerals & Energy Affairs
Private Bag X59
Pretoria, 0001

The written application must also include a letter stating that all the prescribed theoretical requirements have been met. This letter is obtainable from the Department of Power Engineering.

1.2 Advanced Diploma in Electrical Engineering (Power)

1.2.1 Admission Requirements: All applicants must have a Diploma in Electrical Engineering (Power) (NQF level 6, 360 credits) with the provision of a 60% performance in those diploma subjects that will carry forward into the Advanced Diploma in Electrical Engineering (Power). Apart from the prescribed qualification, a specified period of relevant post-qualification practical experience is a prerequisite for registration.

1.2.2 Duration of Programme: The Advanced Diploma is a one-year full-time course.

1.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
	COMPULSARY	
EPRO4A	Electrical Engineering Project 4	25
EPREM4A	Engineering Research Methods 4	15
EPHVE4A	High Voltage Engineering 4	20
EPELP4A	Electrical Protection 4	20
EPELM4A	Electrical Machines 4	20
SEMESTER 2		
	COMPULSARY	
AMAEM4A	Advanced Engineering Mathematics 4	15
BHEMN4A	Engineering Management 4	10
EPEPS4A	Electrical Power Systems 4	20
EEPOW4A	Power Electronics 4	20

1.3 Postgraduate Diploma in Electrical Engineering (Power)

1.3.1 Admission Requirements: Students who have completed the Advanced Diploma in Electrical Engineering automatically qualify for entry into this Postgraduate Diploma in Electrical Engineering. Students who have completed another relevant qualification are subjected to an RPL process.

1.3.2 Duration of Programme: This is a one-year full-time programme.

1.3.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
EPELP5A	Electrical Protection	25
EPHVE5A	High Voltage Engineering	25
EPEPS5A	Power Systems	25
SEMESTER 2		
EPAEN5A	Alternative Energy Feasibility	25
EPEEM5A	Energy Efficiency Management	25
EXPRO5A	Engineering Research Project	30

1.4 Master of Engineering in Electrical Engineering (Power)

1.4.1 Admission Requirements: A BEng degree or equivalent level 8 qualification including the Postgraduate Diploma.

1.4.2 Programme Structure: At least 1 year full-time research, concluded with a Master's dissertation.

1.5 Doctor of Engineering in Electrical Engineering (Power)

1.5.1 Admission Requirements: Master of Engineering in Electrical Engineering (Power). Ad hoc cases will be treated on merit.

1.5.2 Duration of Programme: At least two years full-time research, concluded with a Doctoral Thesis.

1.5.3 Programme Structure: This instructional programme comprises of a doctoral thesis only, offered at the Vanderbijlpark campus.

2. WHAT ARE THE FUNCTIONS OF A POWER ENGINEERING TECHNICIAN?

Power Engineering consists of the following:

- Fundamentals of electrical Engineering
- Generation of power by means of conventional and alternative energy sources
- Transmission and distribution of electrical power
- Electrical Machines and Power Transformers
- Electrical Protection and Power Electronics
- Energy Management

It can be seen from the above that Power Engineering forms an integral part of almost every industrial or household activity. There is a continuous demand for technicians in this field either from the electricity suppliers, mines, large industries, municipalities or small businesses. Our diplomats are equipped with the knowledge, drive and initiative to play a leading role in securing a healthy future in this country through the field of Power Engineering. Power Engineering reflects a dynamic and changing environment. It is practiced by people who are critical, inquisitive and creative. If you are such a person – then this programme is for you!

3. ENQUIRIES

Enquiries may be addressed to:

The Head of Department:
Power Engineering
Faculty of Engineering and Technology
Vaal University of Technology
Private Bag X021
Vanderbijlpark 1900

Tel: (016) 950-9929
Fax: (016) 950-9795
e-mail: hendrickl@vut.ac.za
Website: www.vut.ac.za



HIERARCHY OF QUALIFICATIONS

- Diploma in Electrical Engineering (Process Control and Computer Systems)
- Advanced Diploma in Electrical Engineering (Process Control and Computer Systems)
- Postgraduate Diploma in Electrical Engineering (Process Control and Computer Systems)
- Master of Engineering in Electrical Engineering (Process Control and Computer Systems)
- Doctor of Engineering in Electrical Engineering (Process Control and Computer Systems)

1. QUALIFICATIONS: PROCESS CONTROL

1.1 Diploma in Electrical Engineering (Process Control)

1.1.1 Duration of Programme: Offered as full-time, contact class for four semesters (two years) followed by one year Workplace Based Learning (carried out through attachment to industry). The student is encouraged to look for suitable industry opportunities (company).

1.1.2 Curriculum (Process Control)

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
EEESK1A	Engineering Skills 1	5
EPEEN1A	Electrical Engineering 1	10
ASICT1A	ICT Skills 1	10
AMMAT1A	Mathematics1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
SEMESTER 2		
HKCOY1A	Applied Communication Skills 1.2	8
EICOA2A	Computing Applications 2	7
EIDSY1A	Digital Systems 1	10
AMMAT2A	Mathematics 2	10
EIPRI1A	Process Instrumentation 1	10
APHYP2A	Physics 2 Practical	10
APHYT2A	Physics 2 Theory	10
EESPA1A	Safety Principles and Law 1	5
SEMESTER 3		
HKCOX2A	Applied Communication Skills 2.1	8
EPEEN2A	Electrical Engineering 2	10

EEEE1A	Electronics 1	10
EIENP1A	Engineering Programming 1	10
EINET1A	Networks 1	10
EIPRI2A	Process Instrumentation 2	10
AMMAT3A	Mathematics 3	10
SEMESTER 4		
EIDCS1A	Digital Control Systems 1	10
HKCOY2A	Applied Communication Skills 2.2	8
EIDSY2A	Digital Systems 2	10
EEELEC2A	Electronics 2	10
EIENP2A	Engineering Programming 2	10
EINET2A	Networks 2	10
EIPRI3A	Process Instrumentation 3	10
SEMESTER 5		
EEPEL3A	Power Electronics 3	10
EIDSY3A	Digital Systems 3	10
EINET3A	Networks 3	10
EICSY2A	Control Systems 2	10
EIDCS2A	Digital Control Systems 1	10
EIENP3A	Engineering Programming 3	10
SEMESTER 6		
	Optional additional	
EIDSY 4A	Digital Systems 4	10
EICSY3A	Control Systems 3	10
EINET4A	Networks 4	10
WBL PLACEMENT		
EIEXL1A	Experiential Learning 1 / WBL 1	14
EIEXL2A	Experiential Learning 2 / WBL 2	16
EIPRJ4A	Engineering Project 4A	30

1.2 Advanced Diploma in Electrical Engineering (Process Control)

1.2.1 Admission Requirements: All applicants must have a Diploma in Electrical Engineering (Process Control) (NQF level 6, 360 credits) with the provision of a 60% performance average in the third year subjects. Certain pre-required subjects in the Diploma in Electrical Engineering (Process Control) must also be passed with a 60% average.

1.2.2 Duration of Programme: The Advanced Diploma is a one-year full-time course.

1.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
EIPRO4A	Electrical Engineering Project 4	25
EIREM4A	Engineering Research Methods 4	15
EIPRI4A	Process Instrumentation 4	20
EIDSP4A	Digital Signal Processing 4	20
SEMESTER 2		
AMAEM4A	Advanced Engineering Mathematics 4	15
BHEMN4A	Engineering Management 4	10
EIDCS4A	Digital Control Systems 4	20

1.3 Postgraduate Diploma in Electrical Engineering (Process Control)

1.3.1 Admission Requirements: All applicants must have an Advanced Diploma in Electrical Engineering (Process Control) with the provision of a 60% performance in the Advanced Diploma subjects.

1.3.2 Duration of Programme: This is a one-year full-time programme.

1.3.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
	GROUP A (Compulsory)	
EIPRP5A	Process Control Engineering Research Project 5	30
	GROUP B (Compulsory)	
EIASI5A	Advanced Smart Instrumentation Engineering 5	25
EIANX5A	Advanced Networking Concepts (A) 5	25
EIANY5A	Advanced Networking Concepts (B) 5	25
SEMESTER 2		
EIAPI5A	Advanced Process Instrumentation Systems 5	25
EIADS5A	Advanced DCS and Safety Systems Engineering 5	25
EIPCS5A	Process Control System Design and Development 5	25
EISIN5A	Smart Industrial Network Control 5	25

1.4 Master of Engineering in Electrical Engineering (Process Control)

1.4.1 Admission Requirements: A BEng degree or equivalent level 8 qualification including the Postgraduate Diploma.

1.4.2 Programme Structure: At least 1 year, full-time research, concluded with a Master's dissertation.

1.5 Doctor of Engineering in Electrical Engineering (Process Control)

1.5.1 Admission Requirements: Master of Engineering in Electrical Engineering (Process). Ad hoc cases will be treated on merit.

1.5.2 Duration of Programme: At least two years full-time research, concluded with a Doctoral Thesis.

1.5.3 Programme Structure: This instructional programme comprises of a doctoral thesis only, offered at the Vanderbijlpark campus.

1.6 TYPICAL WORK ENVIRONMENT FOR THE INSTRUMENTATION TECHNICIAN

Measurement and control of pressure, level, flow and temperature parameters. Design, installation and maintenance of process control systems and instrumentation. Installation, commissioning and optimisation of various control systems, industrial networks, Safety Systems and Distributed Control Systems (DCS).

2. QUALIFICATIONS: COMPUTER SYSTEMS

2.1 Diploma in Electrical Engineering (Computer Systems)

2.1.1 Duration of Programme: Offered full-time, contact classes are for a period of six semesters (three years) followed by a one-year Workplace Based Learning (carried out through attachment to industry) component.

2.1.2 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
EEESK1A	Engineering Skills 1	5
EPEEN1A	Electrical Engineering 1	10
ASICT1A	ICT Skills 1	10
AMMAT1A	Mathematics1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
SEMESTER 2		
HKCOY1A	Applied Communication Skills 1.2	8
EICOA2A	Computing Applications 2	7
EIDSY1A	Digital Systems 1	10
EPEEN2A	Electrical Engineering 2	10
AMMAT2A	Mathematics 2	10
APHYP2A	Physics 2 Practical	10
APHYT2A	Physics 2 Theory	10
EESPA1A	Safety Principles and Law 1	5
SEMESTER 3		
HKCOX2A	Applied Communication Skills 2.1	8
EIDSY2A	Digital Systems 2	10
EEEE1A	Electronics 1	10
EIENP1A	Engineering Programming 1	10
EINET1A	Networks 1	10
EISEN1A	Software Engineering 1	10
EIOSY1A	Operating systems 1	10
SEMESTER 4		
HKCOY2A	Applied Communication Skills 2.2	8
EIDSY3A	Digital Systems 3	10
EEELEC2A	Electronics 2	10
EIENP2A	Engineering Programming 2	10
EINET2A	Networks 2	10
EIOSY2A	Operating Systems 2	10
EISEN2A	Software Engineering 2	10
SEMESTER 5		
EIDSY 4A	Digital Systems 4	10
EIENP3A	Engineering Programming 3	10
AMMAT3A	Mathematics 3	10
EINET3A	Networks 3	10
EIOSY3A	Operating Systems 3	10
EISEN3A	Software Engineering 3	10
SEMESTER 6		
	CHOICE (At least 1)	
EIENP4A	Engineering Programming 4	10
EINET4A	Networks 4	10
WBL Placement		
EIEXC1A	Experiential Learning 1 / WBL 1 (Computer)	14

EIEXC2A	Experiential Learning 2 / WBL 2 (Computer)	16
EIPRC4A	Engineering Project 4A	30

2.2 Advanced Diploma in Electrical Engineering (Computer Systems)

2.2.1 Admission Requirements: All applicants must have a Diploma in Electrical Engineering (Computer Systems), (NQF level 6, 360 credits) with the provision of a 60% performance average in the third year subjects. Certain pre-required subjects in the Diploma in Electrical Engineering (Computer Systems) must also be passed with a 60% average.

2.2.2 Duration of Programme: The Advanced Diploma is a one-year full-time course.

2.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
COMPULSARY		
EIPRE4A	Electrical Engineering Project 4	25
EIREM4A	Engineering Research Methods 4	15
GROUP A		
EIMSD4A	Micro System Design 4	20
EEAEL4A	Electronics 4	20
GROUP B		
EINTP4A	New Technology Programming 4	20
EIDBP4A	Database Programming 4A	20
SEMESTER 2		
COMPULSARY		
AMAEM4A	Advanced Engineering Mathematics 4	15
BHEMN4A	Engineering Management 4	10
GROUP A		
EISEN4A	Software Engineering 4	20
EIWDC4A	Wireless Data Communications 4	20
GROUP B		
EICNS4A	Computer Network Security 4	20
EIDBS4A	Database Administration 4	20
EIARI4A	Artificial Intelligence 4	20
Students must do at least 2 subjects from Group A		

2.3 Postgraduate Diploma in Electrical Engineering (Computer Systems)

2.3.1 Admission Requirements: All applicants must have an Advanced Diploma in Electrical Engineering (Computer Systems) with the provision of a 60% performance in the Advanced Diploma subjects.

2.3.2 Duration of Programme: This is a one-year full-time programme.

2.3.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
GROUP A (Compulsory)		

EICRP5A	Computer Engineering Research Project 5	50
	GROUP B	
	Co-requisite Modules:	
EIASX5A	Advanced Software Engineering Module 1 5	25
EIASY5A	Advanced Software Engineering Module 2 5	25
EISNX5A	Systems Engineering Module 1 5	25
EISNY5A	Systems Engineering Module 2 5	25
SEMESTER 2		
EIANX5A	Advanced Networking Module 1 5	25
EIANY5A	Advanced Networking Module 2 5	25
	Independent Modules:	
EICSS5A	Computer Systems Security 5	25
EIAHS5A	Advanced Hardware Systems 5	25
EIESS5A	Emerging Systems 5	25
	GROUP C	
EIOSD5A	Operating System Design 5	25
EIISS5A	Intelligent Systems 5	25

2.4 Master of Engineering in Electrical Engineering (Computer Systems)

2.4.1 Admission Requirements: A BEng degree or equivalent level 8 qualification including the Postgraduate Diploma.

2.4.2 Programme Structure: At least one-year, full-time research, concluded with a Master's dissertation.

2.5 Doctor of Engineering in Electrical Engineering (Computer Systems)

2.5.1 Admission Requirements: Master of Engineering in Electrical Engineering (Computer Systems). Ad hoc cases will be treated on merit.

2.5.2 Duration of Programme: At least two years full-time research, concluded with a Doctoral Thesis.

2.5.3 Programme Structure: This instructional programme comprises of a doctoral thesis only, offered at the Vanderbijlpark campus.

2.6 TYPICAL WORK ENVIRONMENT FOR THE COMPUTER SYSTEMS TECHNICIAN

Hardware design and development using microcontroller systems. Data communications, design, installation and maintenance of network systems. Programming and data processing. Database applications. Design and development of fully engineered systems.

ENQUIRIES

Enquiries may be addressed to:

The Head of Department:
Process Control and Computer Systems
Faculty of Engineering and Technology
Vaal University of Technology
Private Bag X021
Vanderbijlpark 1900

Tel: (016) 950-9254
Fax: (016) 950-9727

e-mail: refilwem1@vut.ac.za or andrej1@vut.ac.za
Website: www.vut.ac.za

INDUSTRIAL ENGINEERING



HIERARCHY OF QUALIFICATIONS

Diploma in Industrial Engineering
 Advanced Diploma in Industrial Engineering
 Postgraduate Diploma in Industrial Engineering
 Master of Engineering in Industrial Engineering

1. QUALIFICATIONS: INDUSTRIAL ENGINEERING

1.1 Diploma in Industrial Engineering

1.1.1 **Duration of Programme:** Three-year full-time qualification: Five semesters (S1 to S5) of theoretical learning at the Vaal University of Technology and one semester (at least) of Workplace Based Learning (Industry).

1.1.2 Curriculum: Diploma in Industrial Engineering

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
AAECH1A	Engineering Chemistry 1	10
EEESK1A	Engineering Skills 1	5
ASICT1A	ICT Skills 1	10
AMMAT1A	Mathematics 1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
SEMESTER 2		
HKCOY1A	Applied Communication Skills 1.2	8
EBCOA2A	Computing Applications 2	7
AAECH2A	Engineering Chemistry 2	10
EMEDR1A	Engineering Drawing 1	10
EBMRE2A	Manufacturing Relations 2	10
AMMAT2A	Mathematics 2	10
APHYT2A	Physics 2 (Theory)	5
APHYP2A	Physics 2 (Practical)	5

EBSPA1A	Safety Principles and Law 1	5
SEMESTER 3		
HKCOX2A	Applied Communication Skills 2.1	8
EPEEN1A	Electrical Engineering 1	10
EBEWS1A	Engineering Work Study 1	10
EMMEN1A	Manufacturing Engineering 1	10
EBPEN1A	Production Engineering 1	10
EBQTE1A	Qualitative Techniques 1	10
EMMEC1A	Mechanics 1	10
AMMAT3A	Mathematics 3	10
SEMESTER 4 (All Compulsory and 1 Elective)		
	<u>Compulsory (All):</u>	
HKCOY2A	Applied Communication Skills 2.2	8
BACOS2A	Costing 2	10
EBEWS2A	Engineering Work Study 2	10
EBFLA2A	Facility Layout and Material Handling 2	10
EMMEN2A	Mechanical Manufacturing Engineering 2	10
EBPEN2A	Production Engineering 2	10
EBQAS2A	Quality Assurance 2	10
	<u>Electives* (Only 1):</u>	
EBCAD1A	Computer Aided Draughting 1*	10
EPEEN2A	Electrical Engineering 2*	10
EMMAE1A	Maintenance 1*	10
EMMOM2A	Mechanics of Machines 2*	10
EMSOM2A	Strength of Materials 2*	10
SEMESTER 5		
EBAUT3A	Automation 3	10
EBEWS3A	Engineering Work Study 3	10
EBIAC3A	Industrial Accounting 3	10
EBILE3A	Industrial Leadership 3	10
EBORE3A	Operations Research 3	10
SEMESTER 6		
EBWIL1A	Work Based Learning (Industrial)/Work Integrated Learning 1	60

1.2 Advanced Diploma in Industrial Engineering

1.2.1 Admission Requirements: A Diploma in Industrial Engineering (NQF level 6, 360 credits) or equivalent with an overall minimum average of 60% and with a pass in Mathematics 3. All other equivalent qualifications will be treated on an ad hoc basis.

1.2.2 Duration of Programme: The Advanced Diploma in Industrial Engineering is a minimum one-year full-time course.

1.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1 (All 3 modules are compulsory)		
EBMPS4A	Manufacturing and Production Science 4	20
EBQIC4A	Quality Control and Improvement 4	20

EBRMI4A	Research Methods and Industrial Engineering Project 4	20
SEMESTER 2 (3 compulsory modules and 1 elective)		
	<u>Compulsory modules:</u>	
EBFPD4A	Facility Planning and Design 4	20
EBHFE4A	Human Factors and Ergonomics 4	20
EBIEM4A	Industrial Engineering Management 4	20
	<u>Elective modules (choose one):</u>	
EBFEE4A	Financial Engineering and Economics 4*	20
EBIKM4A	Information and Knowledge Management 4*	20
EBMOS4A	Modelling and Simulation 4*	20

Please note: All modules must be done at VUT. This is a NQF Level 7 qualification that requires a minimum of 120 credits but it has 140 credits to meet ECSA requirements.

1.3 Postgraduate Diploma in Industrial Engineering

1.3.1 Admission Requirements: A Bachelor's degree or Advanced Diploma or relevant NQF level 7 qualification with an overall minimum average of 60%. All other equivalent qualifications will be treated on an ad hoc basis.

1.3.2 Programme Duration: The Postgraduate Diploma in Industrial Engineering is a minimum one-year, full-time course.

1.3.1 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
YEAR MODULES (All compulsory)		
EBIPD5A	Industrial Engineering Project Planning and Design 5	30
EBIDI5A	Industrial Engineering Project Design and Implementation 5	30
SEMESTER 1 (All modules are Compulsory)		
EBADA5A	Advanced Decision Analysis 5	20
EBAMS5A	Advanced Modelling and Simulation 5	20
SEMESTER 2 (1 Compulsory module and 1 Elective)		
	<u>Compulsory module:</u>	
EBMPE5A	Manufacturing and Production Engineering 5	20
	<u>Elective modules (choose one):</u>	
EBAFD5A	Advanced Facility Design 5*	20
EBFEN5A	Financial Engineering 5*	20
EBPRE5A	Project Engineering 5*	20

Please note: All modules must be done at VUT. This is an NQF level 8 qualification with 140 credits.

1.4 Master of Engineering in Industrial Engineering

1.4.1.1 Admission Requirements: A BEng Degree or Equivalent NQF level 8 qualification including the Postgraduate Diploma.

1.4.2 Duration of Programme: The equivalent of a minimum one-year full-time study.

1.4.3 Programme Structure: This programme comprises of a thesis only.

1.5 JOB OPPORTUNITIES

There is a great need for persons who are well trained in Industrial Engineering. Job opportunities as business advisors, industrial analysts, production personnel, planning personnel and line managers are available in all types of manufacturing companies as well as in service organisations. Experience has shown that people with a dynamic personality and a qualification in Industrial Engineering quickly progress to management level or start their own businesses.

1.6 ENQUIRIES

Enquiries may be addressed to:

The Head of Department
Industrial Engineering and Operations Management
Vaal University of Technology
Private Bag X021
Vanderbijlpark, 1900

Tel: (016) 950 9287

Fax: (016) 950 9797

e-mail: madeleine@vut.ac.za or thomas@vut.ac.za

Website: www.vut.ac.za

OPERATIONS MANAGEMENT



HIERARCHY OF QUALIFICATIONS

Diploma in Operations Management
Advanced Diploma in Operations Management
Postgraduate Diploma in Operations Management

2. QUALIFICATIONS: OPERATIONS MANAGEMENT

2.1 Diploma in Operations Management

2.1.1 Duration of Programme: Five semesters of theoretical learning and one semester Operations Management Practice (Project based).

2.1.2 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
ASICT1A	ICT Skills 1	10
EBMFX1A	Manufacturing Technology 1.1	10
AMMAT1A	Mathematics 1	10
EBOPX1A	Operations Management 1.1	10
EBOGX1A	Organisational Effectiveness 1.1	10
EBWPX1A	Workplace Dynamics 1.1	10
SEMESTER 2		

HKCOY1A	Applied Communication Skills 1.2	8
EBMFY1A	Manufacturing Technology 1.2	10
EBOPY1A	Operations Management 1.2	10
EBOGY1A	Organisational Effectiveness 1.2	10
EBQMA1A	Quality Management 1	10
EBWPY1A	Workplace Dynamics 1.2	10
SEMESTER 3		
HKCOX2A	Applied Communication Skills 2.1	8
BACEX1A	Costing and Estimating 1.1	10
EBMAX2A	Operations Management 2.1	10
EBOGX2A	Organisational Effectiveness 2.1	10
EBQAS2A	Quality Assurance 2	10
EBSTX1A	Statistics 1.1	10
	(Subjects with * are electives) – choose one:	
AAECH1A	*Engineering Chemistry 1	10
HLAWX1A	*Labour Law 1.1	15
APHYS1A	*Physics 1	10
ASPRG1A	*Programming 1	10
SEMESTER 4		
HKCOY2A	Applied Communication Skills 2.2	8
BACEY1A	Costing and Estimating 1.2	10
EBMAY2A	Operations Management 2.2	10
EBMAT2A	Operations Management Techniques 2	10
EBOGY2A	Organisational Effectiveness 2.2	10
	(Subjects with * are electives) – choose one:	
AAECH2A	*Engineering Chemistry 2	10
EMMAE2A	*Maintenance Engineering 2	10
EMMEN2A	*Manufacturing Engineering 2	10
APHYS2A	*Physics 2	10
ASPRG2A	*Programming 2	10
SEMESTER 5		
EBILE3A	Industrial Leadership 3	10
EBMAX3A	Operations Management 3.1	10
EBMAT3A	Operations Management Techniques 3	10
EBOMG3A	Operations Management Technology 3	10
EBOEG3A	Organisational Effectiveness 3	10
SEMESTER 6		
EBMAP1A	Operations Management Practice 1	60

2.2 Advanced Diploma in Operations Management

2.2.1 Admission Requirements: A Diploma in Operations Management (NQF level 6, 360 credits) or other engineering disciplines or equivalent (including National Diploma in Operations Management) with an overall minimum average of 60% and a pass in Mathematics 1. All other equivalent qualifications will be treated on an ad hoc basis.

2.2.2 Duration of Programme: A minimum one-year, full-time course.

2.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1 (All 3 modules are Compulsory)		
EBQMA4A	Quality Management 4	20
EBRMO4A	Research Methodology for Operations Management 4	20
EBSCM4A	Supply Chain Management 4	20
SEMESTER 2 (2 compulsory modules and 1 elective)		
	Compulsory modules:	
EBFIM4A	Financial Management 4	20
EBWDE4A	Workplace Design 4	20
	Elective modules (choose one):	
EBMAS4A	Manufacturing Systems 4*	20
EBMOM4A	Modelling in Operations Management 4*	20

Please note: All modules must be done at VUT. This is an NQF Level 7 qualification with 120 credits.

2.3 Postgraduate Diploma in Operations Management

2.3.1 Admission Requirements: A Bachelor's degree or Advanced Diploma or relevant NQF level 7 qualification with an overall minimum average of 60%. All other equivalent qualifications will be treated on an ad hoc basis.

2.3.2 Duration of Programme: A minimum one-year, full-time course.

2.3.3 Curriculum:

SUBJECT CODE	NAME OF SUBJECT	CREDITS
YEAR MODULES (All compulsory)		
EBOPD5A	Operations Management Project Planning and Design 5	30
EBODI5A	Operations Management Project Design and Implementation 5	30
SEMESTER 1 (All 2 modules are Compulsory)		
EBAMA4A	Advanced Modelling in Operations Management 5	20
EBQRM5A	Quality and Reliability Management 5	20
SEMESTER 2 (1 Compulsory module and 1 Elective)		
	Compulsory module:	
EBOMS5A	Advanced Manufacturing Systems 5	20
	Elective modules (choose one):	
EBAIM5A	Advanced Industrial Management 5*	20
EBAFD5A	Business Finance 5*	20

Please note: All modules must be done at VUT. This is an NQF level 8 qualification with 140 credits.

2.4 JOB OPPORTUNITIES

Operations Management offers a challenging and exciting career in the private sector. The expertise and skills that you will achieve find their optimum applications and growth in the manufacturing industry as Production Assistant / Production Planner, Production Scheduler / Head Planner, Production Superintendent, Production Manager and Operations Manager. People with Operations Management qualifications and experience are also well equipped to be in many other industries or to start their own business.

2.5 ENQUIRIES

Enquiries may be addressed to:

The Head of Department
Industrial Engineering and Operations Management

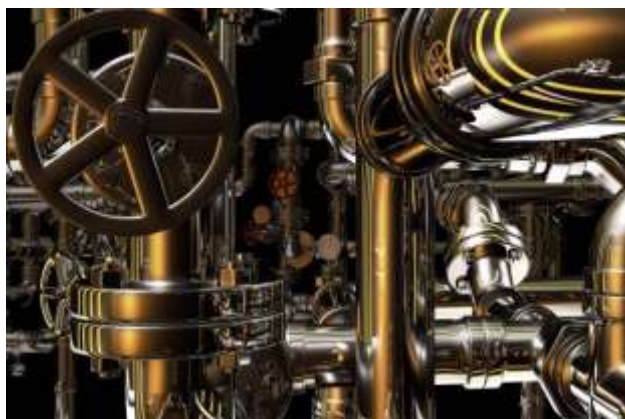
Vaal University of Technology
Private Bag X021
Vanderbijlpark, 1900

Tel: (016) 950 9287

Fax: (016) 950 9797

e-mail: madeleine@vut.ac.za or thomas@vut.ac.za

Website: www.vut.ac.za



HIERARCHY OF QUALIFICATIONS

Diploma in Mechanical Engineering
 Advanced Diploma in Mechanical Engineering
 Postgraduate Diploma in Mechanical Engineering
 Master of Engineering in Mechanical Engineering
 Doctor of Engineering in Mechanical Engineering

1. QUALIFICATIONS

1.1 Diploma in Mechanical Engineering

1.1.1 Duration of Programme: Three-year full-time (six semesters S1 to S6) qualification at the Vaal University of Technology.

1.1.2 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
HKCOX1A	Applied Communication Skills 1.1	8
AAECH1A	Engineering Chemistry 1	10
EEESK1A	Engineering Skills 1	5
ASICT1A	ICT Skills 1	10
AMMAT1A	Mathematics 1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
SEMESTER 2		
HKCOY1A	Applied Communication Skills 1.2	8
EMCOA2A	Computing Applications 2	7
AAECH2A	Engineering Chemistry 2	10
EMEDR1A	Engineering Drawing 1	10
AMMAT2A	Mathematics 2	10
APHYT2A	Physics 2 (Theory)	5
APHYP2A	Physics 2 (Practical)	5
EMSPA1A	Safety Principles and Law 1	5
SEMESTER 3		

EMMEC1A	Mechanics 1	10
EMPRJ1A	Project 1 (WIL Mechanical)	7
EPEEN1A	Electrical Engineering 1	10
AMMAT3A	Mathematics 3	10
HKCOX2A	Applied Communication Skills 2.1	8
EMMEN1A	Mechanical Manufacturing Engineering 1	10
EMEDR2A	Engineering Drawing 2	10
SEMESTER 4		
EMMED2A	Mechanical Engineering Design 2	10
EMMOM2A	Mechanics of Machines 2	10
EMSOM2A	Strength of Materials 2	10
EMFMM2A	Fluid Mechanics 2 (Mechanics)	10
EMTHE2A	Thermodynamics 2	10
EMPRJ2A	Project 2 (WIL Mechanical)	8
HKCOY2A	Applied Communication Skills 2.2	8
EMCAI1A	Computer Aided Draughting 1	10
SEMESTER 5		
EMMOM3A	Mechanics of Machines 3	10
EMSOM3A	Strength of Materials 3	10
EMFME3A	Fluid Mechanics 3	10
EMTHE3A	Thermodynamics 3	10
EMMED3A	Mechanical Engineering Design 3	10
EMMEN2A	Manufacturing Engineering 2	10
EMMAE1A	Maintenance Engineering 1	10
EMPRJ3A	Project 3 (WIL Mechanical)	15
SEMESTER 6		
EMTOM3A	Theory of Machines 3	10
EMAOM3A	Applied Strength of Materials 3	10
EMHYM3A	Hydraulic Machines 3	10
EMSPL3A	Steam Plant 3	10
EMMDE3A	Machine Design 3	10
EMMAE2A	Maintenance Engineering 2	10
EMMEC2A	Modelling and Engineering Computation 2	10
EMEXM1A	Workplace Based Learning 1/Experiential Learning (Mechanical)	30

1.2 Advanced Diploma in Mechanical Engineering

1.2.1 Admission Requirements: A Diploma in Mechanical Engineering (NQF level 6, 360 credits) or National Diploma in Mechanical Engineering with an average of at least 60% in the following subjects: Hydraulic Machines 3, Steam Plant 3, Theory of Machines 3, Applied Strength of Materials 3 and Mathematics 3. All other equivalent qualifications will be treated on an ad hoc basis.

1.2.2 Programme Duration: One-year full-time qualification.

1.2.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
EMEPR4A	Engineering Professionalism	10

EMECN4A	Engineering Economics	10
EMAEM4A	Applied Engineering Mathematics	15
EMMTS4A	Material Science	15
SEMESTER 2		
EMTFM4A	Thermo-Fluids and Turbo Machinery	15
EMHMT4A	Heat and Mass Transfer	15
EMSMS4A	Solid Mechanics and Stress Analysis	15
EMVCE4A	Vibration and Control Engineering	15
YEAR MODULE		
EMRMD4A	Research Methods and Engineering Design Project	30

1.3 Postgraduate Diploma in Mechanical Engineering

1.3.1 Admission Requirements: Advanced Diploma in Mechanical Engineering and equivalent qualification.

1.3.2 Duration of Programme: One-year, full-time qualification.

1.3.3 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
EMEAM5A	Advanced Engineering Mathematics	15
EMEMS5A	Engineering Modelling and Simulations Module 1	15
EMEIC5A	Internal Combustion Engine Analysis	8*
EMEMM5A	Maintenance Management	7*
SEMESTER 2		
EMECCM5A	Continuum Mechanics	15
EMEES5A	Energy Systems	15
EMEMS5B	Engineering Modelling and Simulations Module 2	15
EMEPM5A	Production and Manufacturing	8*
EMERE5A	Refrigeration and Air-conditioning	7*
YEAR MODULE		
EMEAR5A	Applied Research Methodology in Mechanical Engineering	30

* Elective: total credit 15 required

1.4 Master of Engineering in Mechanical Engineering

1.4.1 Admission Requirements: A BEng degree or equivalent level 8 qualification including the Postgraduate Diploma.

1.4.2 Duration of Programme: The equivalent of one-year, full-time study.

1.4.3 Programme Structure: This programme comprises of a Master's dissertation only.

1.5 Doctor of Engineering in Mechanical Engineering

1.5.1 Admission Requirements: Master of Engineering in Mechanical Engineering or equivalent. Ad hoc cases will be treated on merit.

1.5.2 Duration of the Programme: At least two years full-time research, concluded with a Doctoral Thesis.

2. CAREER OPPORTUNITIES

In any heavy or light manufacturing industry, e.g. the chemical industry, iron and steel manufacturing industry, mining industry, power stations, transport services, provincial and government services, etc. Technicians are much sought after and a career in this field is lucrative and rewarding.

3. ENQUIRIES

Enquiries may be addressed to:

The Head of Department:
Mechanical Engineering
Vaal University of Technology
Private Bag X021
VANDERBIJLPARK 1900

Tel: (016) 950-9287/9302

Fax: (016) 950-9797

e-mail: madeleine@vut.ac.za or alfayoa@vut.ac.za

Website: www.vut.ac.za



HIERARCHY OF QUALIFICATIONS

Diploma in Metallurgical Engineering
 Advanced Diploma in Metallurgical Engineering
 Postgraduate Diploma in Metallurgical Engineering
 Master of Engineering in Metallurgical Engineering

1. QUALIFICATIONS

1.1 Diploma in Metallurgical Engineering

1.1.1 Duration of Programme: Three-year full-time qualification. Five semesters, S1 to S5 at the Vaal University of Technology. One semester Workplace Based Learning (WBL).

1.1.2 Curriculum

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
AMMAT1A	Mathematics 1	10
AAECH1A	Engineering Chemistry 1	10
APHYS1A	Physics 1	10
EESIN1A	Social Intelligence 1	3
EEESK1A	Engineering Skills 1	5
ASICT1A	ICT Skills 1	10
HKCOX1A	Applied Communication Skills 1.1	8
SEMESTER 2		
AMMAT2A	Mathematics 2	10
EMEDR1A	Engineering Drawing 1	10
APHYS2A	Physics 2	10
AAECH2A	Engineering Chemistry 2	10
EYSPA1A	Safety Principles and Law 1	5
EYCOA2A	Computing Applications 2	7
HKCOY1A	Applied Communication Skills 1.2	8
SEMESTER 3		
EYPH1A	Process Thermodynamics 1	10
EYEME1A	Extractive Metallurgy 1	10
EYPME1A	Physical Metallurgy 1	10

EYMPR1A	Mineral Processing 1	10
EYMAM1A	Manufacturing Metallurgy 1	10
EYEGE1A	Engineering Geology 1	10
HKCOX2A	Applied Communication Skills 2.1	8
SEMESTER 4		
EYHYD2A	Hydrometallurgy 2	10
EYPYR2A	Pyrometallurgy 2	10
EYPME2A	Physical Metallurgy 2	10
EYMPR2A	Mineral Processing 2	10
EYMAM2A	Manufacturing Metallurgy 2	10
EBQCO2A	Quality Control 2	10
HKCOY2A	Applied Communication Skills 2.2	8
SEMESTER 5		
EYHYD3A	Hydrometallurgy 3	10
EYPYR3A	Pyrometallurgy 3	10
EYPME3A	Physical Metallurgy 3	10
EYMPR3A	Mineral Processing 3	10
EYMAM3A	Manufacturing Metallurgy 3	10
BHMAN1A	Management 1	10
EYENC1A	Environmental Geochemistry 1	8
SEMESTER 6		
EYWBL1A	Workplace Based Learning 1/Work Integrated Learning 1	60

1.2 Advanced Diploma in Metallurgical Engineering

1.2.1 Admission Requirements: A Diploma in Metallurgical Engineering (NQF level 6, 360 credits) or the old National Diploma: Engineering Metallurgy.

1.2.2 Duration of Programme: It is a one year programme.

1.2.3 Curriculum:

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
AMMAT3A	Mathematics 3	10
SEMESTER 2		
EBQCO3A	Quality Control 3	10
SEMESTER 1 & 2 (Year Subjects)		
EYHYD4A	Hydrometallurgy 4	20
EYPYR4A	Pyrometallurgy 4	20
EYPME4A	Physical Metallurgy 4	20
EYMIP4A	Mineral Processing 4	20
EYMAM4A	Manufacturing Metallurgy 4	20
EYPRO2A	Metallurgical Research Methods and Project 2	20

1.3 Postgraduate Diploma in Metallurgical Engineering

1.3.1 Admission Requirements: Admission requires a 120 credit Advanced Diploma (NQF level 7) in Metallurgical Engineering.

1.3.2 Duration of Programme: This is a one-year programme.

1.3.3 Curriculum

PHYSICAL METALLURGY OPTION

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
EYPH2A	Process Thermodynamics	10
EYMKR5A	Corrosion	10
SEMESTER 2		
EYHMT5A	Heat and Mass Transfer	10
SEMESTER 1 & 2 (Year Subjects)		
EYMAS5A	Modelling and Simulation	20
EYPRO5A	Physical Metallurgy Research Project	30
EYPME5A	Physical Metallurgy	20
EYMAM5A	Manufacturing Metallurgy	20
EYMAE5A	Materials Engineering	20

EXTRACTIVE METALLURGY OPTION

SUBJECT CODE	NAME OF SUBJECT	CREDITS
SEMESTER 1		
EYPH2A	Process Thermodynamics	10
EYMKR5A	Corrosion	10
SEMESTER 2		
EYHMT5A	Heat and Mass Transfer	10
SEMESTER 1 & 2 (Year Subjects)		
EYMAS5A	Modelling and Simulation	20
EYPRO5A	Extractive Metallurgy Research Project	30
EYMIP5A	Mineral Processing	20
EYHYD5A	Hydrometallurgy	20
EYPYR5A	Pyrometallurgy	20

1.4 Master of Engineering in Metallurgical Engineering (MEng (Metallurgical Engineering))

1.4.1 Admission Requirements: A BEng Degree or equivalent level 8 qualification including the Postgraduate Diploma.

1.4.2 Duration of Programme: The equivalent of one-year, full-time study.

1.4.3 Programme Structure: This instructional programme comprises of a dissertation only.

2. CAREER OPPORTUNITIES

Many opportunities exist at primary producers of both ferrous and non-ferrous metals as well as in the manufacturing industry.

3. ENQUIRIES

Enquiries may be addressed to:

Head of Department:
Metallurgical Engineering
Vaal University of Technology
Private Bag X021
VANDERBIJLPARK 1900

Tel: (016) 950 9243

Fax: (016) 950 9796

E-mail: rethav@vut.ac.za or peter@vut.ac.za
Website: www.vut.ac.za