Your world to a better future

Faculty of Engineering & Technology

2015 for 2016

Vanderbijlpark

Engineering: Computer Systems
Electrical Engineering:
- Process Instrumentation
- Electronic Engineering
- Power Engineering
Chemical Engineering
Civil Engineering
Industrial Engineering
Mechanical Engineering

Additional Information:
Bursaries & Loans
Sport Academy
1. Admission Requirements

Minimum Admission Requirements for All Engineering Courses

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Nat. Diploma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory Subjects</td>
<td>Eligibility for Dip or BTech Degree</td>
</tr>
<tr>
<td>Mathematics</td>
<td>5</td>
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<tr>
<td>Physical Science</td>
<td>5</td>
</tr>
<tr>
<td>English</td>
<td>5</td>
</tr>
<tr>
<td>Any other 4 subjects</td>
<td>4x4=16</td>
</tr>
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<td>Total</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>8 = 90-99%</td>
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</tbody>
</table>

Note: Scholars who do not qualify for the National Diploma Programmes may apply for the pre diploma programmes. Tel: (016) 950-9589. For details on the pre diploma programmes see VUT website www.vut.ac.za.

Please note that this program is currently under review to bring it into line with the requirements of the newly published National Qualifications Framework.

2. Diploma Course Structure

Electives: * Electives above can be replaced by any of Electronics III, Projects I, or another relevant engineering elective offering.
Semester 6/7: Experiential training.

3. Baccalaureus Technologiae Structure: (Only part time class)

Compulsory Offering: Industrial Project IV, Hardware Design IV, Functional Management, Database Programming IV, New Technology Programming IV.
Electives: (Choose any four from:) Software Systems IV, Database Administration IV, Digital Process Control IV, Mathematics IV, Network Systems IV, or two from another relevant discipline.

4. Syllabi


Database Principles III: System theory, data modelling, normalisation and relational models.

Design Project III: Development cycle of project, project study, design base line and practical implementation of the project.

Digital Systems I: Number systems, Binary codes, Logic gates, Boolean algebra, Simplification Techniques and Combinational logic.

Digital Systems II: Logic Families, Multivibrators, Sequential Logic, Analogue vs. Digital, Displays and Memory concepts.

Digital Systems III: Memories, Basic microcomputer systems, Microcontrollers, Assembler and C programming.

Electrical Engineering I: SI-units, and energy, Electrical Circuits, Magnetism, Inductance, Capacitance, AC theory, Measurements.

Electronics I: Basic semi-conductors, Rectification, Biasing, RC transitions, Basic operational amplifiers.

Electronics II: Operational amplifiers, Biasing, Amplifiers, RLC transition, Oscillators.


ICT Skills I: Integrated software packages such as word processors and spreadsheets, Windows environment.

IT Essentials: System Software 1.1 - A plus software and hardware.

Logic Design III: Logic design using the C high level language.

Mathematics I: Basic mathematics, Differentiation, Integration, Hyperbolic functions.

Mathematics II: Advanced Differentiation and Integration, Matrix Algebra, 1st order differential equations.

Mathematics III: Applications of integration, First order differential equations and O-operators.

Network Systems II: CISCO Exploration CCNA1 and CCNA2

Network Systems III: CISCO Exploration CCNA3 and CCNA4

Operating Systems III: Resource sharing, memory management, multiprocessing and multiprogramming. Server installation and configuration

Programming I: Programming and languages, Variables, Data types and Program control.

Programming II: Files, Links, Subroutines, External functions, Recursion, State machines and Numerical analysis.

Programming III: Hardware linking, Assembly Linking, Interrupts, Concurrency and resident programs.

Projects I: Applicable CAD, ergonomic/aesthetic design, operational Procedures, maintenance, construction techniques and documentation.

Software Engineering III: Model driven Engineering approach, based on OOA&D.UML to define/analyse requirements for design & develop comprehensive engineered systems.


5. Typical work environment for the Computer 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.

6. Career opportunities

The computerisation of most facets of modern business and industry, together with the great demand for technical manpower creates a multitude of possibilities.

7. Career Status

The Technician can register for professional status with ECSA, the Control Board for Engineering Technicians.

8. Enquiries

Enquiries may be addressed to:

Head of Department: Process Control and Computer Systems
Faculty of Engineering and Technology
Vaal University of Technology, Private Bag X021 Vanderbijlpark 1900
Tel: (016)950-9323, Fax (016)950-9727. E-mail: badenl@vut.ac.za
website: www.vut.ac.za

Whilst every effort has been made to present the relevant information in this brochure, program offerings may be subject to change in order to keep abreast with new developments in the higher education landscape. The institution therefore reserves the right to unilaterally change or amend any of the content/structures contained herein.
**Electrical Engineering: Process Instrumentation**

Department: Process Control and Computer Systems
National Diploma: Engineering: Electrical
B Tech: Engineering: Electrical
M Tech: Engineering: Electrical
D Tech: Engineering: Electrical

1. Admission Requirements

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<td></td>
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Please note that this program is currently under review to bring it into line with the requirements of the newly published National Qualifications Framework.

2. Diploma Course Structure


**Electives:** * Electives above can be replaced by Network Systems 2.2, Programming I, Programming II, Digital Process Control II, Digital Process Control III or another relevant engineering elective offering.

**Semester 5/6:** Experiential training.

3. Baccalaureus Technologiae Structure: (Only Part time class)

**Semester 1:** Industrial Project IV, Process Instrumentation IV, Signal Processing IV, Digital Signal Processing IV, Electronics IV, Engineering Management IV, Database Programming IV.

**Semester 2:** Digital Control Systems IV, Circuit Analysis IV, Micro Systems Design IV, Network Systems IV, Software System IV.

4. Admission requirements for M Tech: B Tech degree.

Admission requirements for D Tech: M Tech degree.

5. Syllabi

**Control Systems II:** Introduction to typical control systems, Laplace transform, Differential equations, Complex variables, Block diagrams, Modelling of physical systems like RLC circuits, Routh Hurwitz stability criteria, Time domain analysis of control systems, Frequency-domain analysis, Nyquist, Bode and Nichols chart, Laboratory assignments.

**Design Project III:** Design, Construction, Testing and Documentation of a complete project in an applicable field of specialisation.

**Digital Control Systems IV:** Sampled data systems, Pulse transfer functions, Stability analyses and root locus techniques, Digital controller design.

**Digital Process Control II:** Industrial networks for modern Instrumentation control environments.

**Digital Process Control III:** Distributed Control Systems.

**Digital Signal Processing IV:** Discrete systems and signals, Convolution, Z transform and discrete Fourier transform, Digital filter design.

**Electrical Engineering II:** AC Networks, Resonance, Series and parallel circuits, Power factor correction (single phase circuits), AC and DC network theorems, Harmonics, Three phase circuits.

**Electronic Measurements III:** Electronic measuring methods, Principles of electronic instruments, Digital meters, Tests and measurements.

**Electronics IV:** Advanced Biasing, Universal preamplifier, Three stage semi-power amplifier signal sources and signal processing, Power amplifier, Power supply, R.F coil, Differential amplifier, Dual gate mosfet, Power mosfet.

**Engineering Management IV:** The business environment, Functions of management, Decision making and problem solving, Strategic and Small business management and International management.

**Industrial Project IV:** A course in research methodology.

**Identification of an industrial project, and writing of the proposal. The research for the design and construction of the project. The writing of a thesis for the project.**

**Network Systems 2.1:** CISCO Discovery CCNA1.

**Network Systems 2.2:** CISCO Discovery CCNA2.

**Physics I:** Hydrostatics, Heat, Optics, Wave theory, Radiation physics.

**Process Instrumentation I:** Process-measurement applications, Process control principles.

**Process Instrumentation II:** Calculation of applicable and specific process parameters, Process controllers and other measurement applications.

**Process Instrumentation III:** Instrumentation for unsafe environments, Plant unit operation and control, Telemetering applications, Radio-active instrumentation applications, Process analysers.

**Process Instrumentation IV:** Process analysers, Measurement and control of water and air pollution, Instrumentation engineering, Commissioning of newly constructed plants, PLC’s and DCS systems.

**Signal Processing IV:** Linear systems and Fourier spectrum analysis, Laplace network analysis and active Butterworth and chebychev filter design.

6. Typical work environment for the Instrumentation Technician


7. Career opportunities

The computerisation of modern instrumentation platforms in industry, and a vacuum period in training of mechanicians and technicians in this modern environment led to a huge demand for technical manual power in this field.

8. Career Status

The Technician can register for professional status with ECSA, the Control Board for Engineering Technicians. The South African Institute for Measurement and Control is another professional body.

9. Enquiries

Enquiries may be addressed to:
The Head of Department: Process Control and Computer Systems
Faculty of Engineering
Vaal University of Technology, Private Bag X021 VANDERBULTPARK 1900
Tel: (016) 950-9323, Fax: (016) 950-9727
email: badenl@vut.ac.za, website: www.vut.ac.za

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2. Course Structure

(*Compulsory Subjects, plus twelve selected subjects)


2.1 Experiential Training

A candidate must do 12 months in-service training at a university-approved employer. This is necessary to give the student practical experience in the work situation.

2.2 Future Studies

The National Diploma can be followed by a further year of full-time study to obtain the B Tech degree. The candidate can then register as a Professional Technician/Technologist with ECSA. A Masters (MTech) and Doctoral (DTech) degree can also be obtained by means of research.

2.3 Baccalaureus Technologiae (BTech)

The admission requirements are: An appropriate National Diploma or National Higher Diploma or equivalent qualification.

2.4 Course Structure


Semester 2: Microwave Engineering IV, Industrial Project IV, Satellite Communication IV, Opto Electronics IV.

2.5 Additional Subjects

Semester 1: Engineering Management IV, Digital Signal Processing IV, Signal Processing IV.


3. What are the functions of an Electronic Communications Technician?

The technician will be involved with the practical design, installation and maintenance of electronic equipment. The calibration of measuring instruments may also form part of the technician’s task. In the engineering team the technician forms part of the management team.
Power Engineering
Department: Power Engineering
National Diploma: Engineering: Electrical
B Tech: Engineering: Electrical
M Tech: Engineering: Electrical
D Tech: Engineering: Electrical

1. Admission Requirements:

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<td>3 = 40-49%</td>
</tr>
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<td>4 = 50-59%</td>
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<tr>
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<td>5 = 60-69%</td>
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Total: 31

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2. Compulsory Subjects

Semester 1: Electrical Engineering I; Mathematics I; Physics I; Computer Skills I; Applied Communication Skills 1.1; English Language and Cognitive Development (EDL).

Semester 2: Electronics I; Electrical Engineering II; Mathematics II; Digital Systems I; Mechanics I; Applied Communication Skills 1.2.

Semester 3: Electronics II; Industrial Electronics II; Electrical Engineering III; Mathematics III; Electrical Machines II; Applied Communication Skills 2.1.

Semester 4: Power Electronics III; Design Project III; Electrical Distribution III; Electrical Protection III; Electrical Machines III; Applied Communication Skills 2.2.

2.1 Recommended Subjects

Projects I; Digital Systems II; Management II; Entrepreneurship II; Control Systems II; Electronics III; Mechanical Technology; Strength of Materials; Process Instrumentation I.

2.2 Work Integrated Learning (WIL)

A candidate must undergo 12 months experiential training at an approved employer. This is necessary to offer the student practical experience in the work situation. The Vaal University of Technology will provide assistance to students in securing placements for WIL, but does not guarantee such placements. The Department of Co-operative Education - assisting in WIL administration and placements. Contact details: Tel: 016-950-9496, Fax: 016-950-9759, E-mail: education@vut.ac.za.

2.3 Curriculum

Mechanics I: Statics; Centre of gravity; Friction; Dynamics; Momentum and impulse; Work energy and power; Radial acceleration.

Physics I: Hydrostatics; Heat; Optics; Wave theory; Radiation physics; electricity.

Digital Systems I: Introduction to digital logic; Stored computer programs; Number systems and codes; Logic gates; Boolean algebra; Combined logic; Functions of combined logic; Fault detection and correction.

Electrical Engineering I: Introduction to electrical engineering, quantities and their application; DC theory and network analysis; Electromagnetism; Magnetic circuits; Inductance; Basic AC theory and measurements.

Electronics I: Basic measurements; Semiconductor theory; Diodes; Transistor theory; Capacitance; Applied technology.

Communication Skills I: Theory of communication; Oral presentations; Technical writing skills; Group communication skills.

Computer Skills I: Computer hardware; Software; Computer utilisation.

Mathematics I: Basic mathematics; Differentiation I; Integration I; Hyperbolic functions.

Industrial Electronics II: PLC’s; Logic circuits; Transducers.

Electrical Engineering II: AC network; Resonance; Series and parallel circuits; Power factor correction (single-phase circuits); AC and DC network theorems; Harmonics; Three-phase circuit.

Electrical Machines II: Direct current machines; Single-phase transformers; Three-phase induction machines.

Electronics II: Field-phase transformers; Other semi-conductor apparatus; Basic rectification; Single-stage transistor amplifiers; Applied technology.

Mathematics II: Differentiation 2; Integration 2; Matrix algebra; Differential equations of the first order.

Power Electronics III: Rectifiers; Converters; Semi-conductor switches; Applications; Harmonics; AC Drives; DC Drives; Switch mode power supplies.

Electrical Protection III: Introduction; Basic theory; Fault calculations; Fuses; Fuse protection.

Electrical Engineering III: Advanced three-phase circuits; Illumination; Interconnectors; Components.

Electrical Machines III: Three-phase transformers; Induction machines; Synchronous machines.

Electrical Distribution III: Principles of transmission and distribution; Conductors; Insulators; Cables-low and high voltages; Isolators; Overhead lines.

Project Design III: Design; Construction; Testing and documentation of complete project in an applicable field of specialisation.

Mathematics III: Fourier Analysis; Differential equations.

2.4 B Tech: Engineering: Electrical: (Power Engineering)

2.5 Admission Requirements

National Diploma (N Dip): New Structure (S4): Holders of the National Diploma: Engineering Electrical (new structure), may directly register for the fourth year of study, the B Tech qualification, if the student obtained an average of 65% for all subjects required for the National Diploma: Engineering Electrical.

National Diploma (N Dip) (T3): Students holding a National Diploma (T3) must apply for admission to B Tech and submit a comprehensive portfolio of work experience and related courses to the Head of Department. A committee constituted by the Head of Department will evaluate the portfolio and conduct a RPL evaluation and make a recommendation to the Faculty Board regarding the application.

National Higher Diploma (N H Dip) (T4): Holders of the National Higher Diploma may register for the M Tech degree program.

Master’s Diploma in Technology: Persons with a partially completed M Dip Tech may obtain several subject exemptions, but only up to a maximum of 0.5 subject credits.

An Equivalent Qualification: An equivalent qualification approved by the Faculty Board will allow a candidate to register for the qualification required on an Ad Hoc basis.

2.6 Curriculum and Codes

Please Note: B Tech subjects are only offered once a year. Year marks in B Tech subjects may only be used once.

The following subjects are compulsory:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Code</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Semester 1:</td>
<td></td>
<td></td>
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<tr>
<td>Electrical Machines IV</td>
<td>EPMAC4</td>
<td>0,1</td>
</tr>
<tr>
<td>Protection Technology IV</td>
<td>EPET4</td>
<td>0,1</td>
</tr>
<tr>
<td>High Voltage Engineering IV</td>
<td>EPHN4</td>
<td>0,1</td>
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<tr>
<td>Power Electronics IV</td>
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<tr>
<td>Industrial Projects IV</td>
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<tr>
<td>Semester 2:</td>
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<tr>
<td>Engineering Mathematics IV</td>
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<td>Electrical Protection IV</td>
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<tr>
<td>Power Systems IV</td>
<td>EPDS4</td>
<td>0,1</td>
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<tr>
<td>Any of the following for T-stream students:</td>
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<tr>
<td>Engineering Management IV</td>
<td>BIIH4</td>
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</tr>
<tr>
<td>Strength of Material IV</td>
<td>EMISSA4</td>
<td></td>
</tr>
</tbody>
</table>
3. What does a Power Engineering Technician/Technologist do?

Power Engineering consists out 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.
- Illumination, Networks, Systems, etc.

So you can see that Power Engineering forms an integral part of almost every industrial or household activity. There is a continuous demand for technicians and technologists in this field either from the electricity suppliers, mines, large industries, municipalities or small businesses.

Our diplomats and graduates 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.

In the engineering team, the technician will have to act as manager in order to give the instructions received from senior personnel, usually engineers and to his subordinates, usually artisans. Power Engineering reflects a dynamic and changing environment. It is practised by people who are critical, inquisitive and creative. If you are such a person - then this course is just for you!

4. Career Opportunities

4.1 Technician (N Dip - 3 years): Maintenance, development work, projects at places like Eskom, Mines, Municipalities, Sasol, etc. This person can register as Professional Technician with the Engineering Council of South Africa (ECSA).

4.2 Technologist (B Tech - 4 years): Higher level of proficiency with special emphasis on technology transfer and application, complex problem solving abilities, analytical thinking and greater technical and managerial skills. This person can register as Professional Technologist with ECSA. For any further information regarding B Tech, please contact the Department of Power Engineering directly.

Government Certificate of Competence: This field of study can be done in parallel to normal pre-diploma studies. It will allow the student entrance to the National Examination after proof of relevant experience.

5. Enquiries

Enquiries may be addressed to:

Head of Department Power Engineering: Faculty of Engineering
Vaal University of Technology
Private Bag X021 Vanderbijlpark 1900
Tel: (016) 950-9295 or 950-9908, Fax: (016) 950-9795;
e-mail: rosemaryk@vut.ac.za
website: www.vut.ac.za
1. Minimum Admission Requirements:
NSC Entry Requirements: Minimum Admission Requirements for Chemical Engineering Courses

<table>
<thead>
<tr>
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Note: Any candidate not meeting the standard minimum required but with total points of 28 can be placed on waiting list into Engineering Extended Programme including Foundation.

2. Curriculum
2.1. National Diploma: Engineering: Chemical
All subjects are compulsory.

Part 1

Part 2

Part 3

Part 4

Part 5 and 6
The work integrated learning component must be completed at an approved employer and can be done after completion of S2 or later. A candidate must do a minimum of 12 months work integrated learning.

2.2. Baccalaureus Technologiae: Engineering: Chemical
Admission requirements:
National Diploma: Engineering: Chemical
Duration of course: A degree will be awarded after the successful completion of 10 subjects. The course is offered full time, minimum of 1 year as well as part time over 2 years.

Course Structure: All subjects are compulsory

3. What are the functions of a Chemical Engineering Technician?
The qualified 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.

4. 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, line managers and various others within several branches of heavy, light and general types of industries where the services and expertise of such persons are required.

5. Enquiries
Enquiries may be addressed to:
Head: Department of Chemical Engineering
Faculty of Engineering and Technology
Vaal University of Technology
Private Bag X021 VANDERBIJLPARK 1900
Tel: (016) 950-9243; Fax: (016) 950-9796
e-mail: deborahn@vut.ac.za
website: www.vut.ac.za
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2. Course Structure

A diploma will be issued on the completion of 28 subjects (four semesters university education) and two semesters experiential training at an approved employer. The experiential training, in six monthly periods, is registered at the University and preferably phased in after completion of at least the fourth semester of university attendance.


Note: *two approved subjects from the Mechanical Engineering curriculum.

The Vaal University of Technology will provide assistance to students in securing placements for experiential training, but does not guarantee such placements.

BACCALAUREUS TECHNOLOGIAE (B Tech)

COURSE PREREQUISITES

(i) An average of 65% for the subjects completed during the National Diploma.

(ii) The inclusion of Mathematics III in the entrance qualification is required.

COURSE DURATION

A B Tech: Industrial Engineering degree will be awarded after successful completion of the following subjects which can be completed in one year:

COURSE STRUCTURE

The following subjects are offered for the B Tech program:

- Entrepreneurship IV
- Production Technology IV
- Quality Assurance IV
- Systems Dynamics IV
- Information Systems IV
- Project Research IV
- Project Engineering IV
- Logistics Engineering IV

MAGISTER TECHNOLOGIAE (M Tech)

COURSE PREREQUISITES

1) An average of 65% in the B Tech programme.

2) As this degree is mainly based on research, all candidates for the degree shall within 1 year after registration, submit the following:

a) Completion of the Project Research IV subject at the B Tech level or approved equivalent.

b) Submission of a research proposal approved by the EXCO of Senate within 6 months of registration. Guidelines for research projects are available from the Faculty of Engineering.

COURSE DURATION

Minimum formal time is one year.

3. What is Industrial Engineering?

The main objective of this discipline is to constantly improve methods, procedures and practices within an organisation in order to increase productivity and profits. More value is added if inputs like manpower, materials, machinery and money are converted more effectively with sound management into products and services.

Such a person is continually engaged in core aspects such as communication, cooperation, quality, planning, scheduling, cycle time, capacity, utilisation, economic analysis, problem solving, materials handling, facility layout, etc.

Industrial Engineering therefore requires persons who like working with people, who enjoy analysing and solving problems, developing solutions, gaining co-operation, motivating people, and always seek better, quicker and cheaper ways of doing things.

4. Job Opportunities

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

4.1 Registration with ECSA

Registration with the Engineering Council of South Africa (ECSA) is possible. The registration options are:

(i) Registered Engineering Technician after completion of the National Diploma and two years practical experience.

(ii) Registered Professional Technologist after completion of the B Tech Degree and three years practical experience.

5. Enquiries

Student Registration, Vaal University of Technology, Private Bag X021, VANDERBULJPARK 1900

Further enquiries may be addressed to Head of Department: Industrial Engineering and Production Management Vaal University of Technology, Private Bag X021, Vanderbijlpark 1900

Tel: (016) 950-9087, Fax: (016) 950-9797 e-mail: suzie@vut.ac.za

website: www.vut.ac.za
Mechanical Engineering
Faculty: Engineering and Technology
Department: Mechanical Engineering
National Diploma: Engineering: Mechanical
B Tech / M Tech / D Tech: Engineering: Mechanical

Hierarchy of Qualifications
Degrees: Doctor Technologiae (D Tech) 7 years. Magister Technologiae (M Tech) 5 years.
Baccalaureus Technologiae (B Tech) 4 years
Diploma: National Diploma: Engineering: Mechanical (N Dip) 3 years

1. Admission Requirements:

<table>
<thead>
<tr>
<th>Subjects</th>
<th>NSC Endorsements</th>
<th>Nat. Diploma</th>
<th>Eligibility for Dip or BTech Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>compulsory subjects</td>
<td></td>
<td></td>
<td>Note</td>
</tr>
<tr>
<td>Mathematics</td>
<td>5</td>
<td></td>
<td>3 = 40-49%</td>
</tr>
<tr>
<td>Physical Science</td>
<td>5</td>
<td></td>
<td>4 = 50-59%</td>
</tr>
<tr>
<td>English</td>
<td>5</td>
<td></td>
<td>5 = 60-69%</td>
</tr>
<tr>
<td>Any other 4 subjects</td>
<td></td>
<td></td>
<td>6 = 70-79%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4x4=16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 = 80-89%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8 = 90-99%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>

Note: Scholars who do not qualify for the National Diploma Programmes may apply for the pre diploma programmes. Tel: (016) 950-9589. For details on the pre diploma programmes see VUT website www.vut.ac.za

2. Course Structure: National Diploma
Four semesters University attendance.
Two semesters work integrated learning in industry. The Vaal University of Technology is not responsible for providing opportunities for work integrated learning but will assist students in obtaining such opportunities. Any sandwich course structure is acceptable.

This Department offers the following fields of study in this programme:

2.1 Curriculum
Semester 1: *Mechanics I, **Mechanical Engineering Drawing I, Computer Aided
Draughting I, Computer and Programming Skills I, Applied Communication Skills I, 1.1,
Mechanical Manufacturing Engineering I, Electrical Engineering I, Mathematics I, EDL.
*Prerequisite for Mechanics of Machines II, Strength of Materials II, Fluid Mechanics II
and Thermodynamics II.
**Prerequisite for Mechanical Engineering Design II
Semester 2: Mechanical Engineering Design II, Mechanics of Machines II, Strength of
Materials II, Fluid Mechanics II, Applied Communication Skills I, 1.2, Thermodynamics II,
Electrical Engineering II, Mechanical Manufacturing Engineering II, Mathematics II.
Semester 3: Mechanics of Machines III, Strength of Materials III, Computer and
Programming Skills I, Applied Communication Skills 2.1, Fluid Mechanics III,
Thermodynamics III, Mechanical Engineering Design III, Maintenance Engineering I,
Electrical Engineering III, Electrical Machines II, Professional Skills Mod I & Mod 2.
Communication Skills 2.2, Hydraulic Machines III, Steam Plant III, Machine Design III,
Maintenance Engineering II, Electrical Engineering III, Electrical Distribution III,
Mathematics III.

BACCALAUREUS TECHNOLOGIAE (B Tech)
ADMISSION REQUIREMENTS: National Diploma: Engineering: Mechanical (with
at least Mathematics III).
COURSE DURATION: Minimum formal time is one year full time or two years part
time.
SUBJECTS
Option 1: Technology
Engineering Design Project IV (Two semesters - enrollment in January), Strength of
Materials IV, Stress Analysis IV, Mechanics of Machines IV, Automatic Control IV, Fluid
Mechanics IV, Turbo Machines IV.

Option 2: Management
Engineering Design Project IV (Two semesters - enrollment in January) plus two of the
following combinations:
Strength of Materials IV / Stress Analysis IV
Mechanics of Machines IV / Automatic Control IV
Fluid Mechanics IV / Turbo Machines IV.
Plus two of the following subjects: Maintenance Management IV, Project Engineering IV,
Entrepreneurship IV, Information Systems IV.

MAGISTER TECHNOLOGIAE (M Tech)
ADMISSION REQUIREMENTS: Baccalaureus Technologiae, or equivalent
qualification plus course in research methodology
COURSE DURATION: Minimum formal time is one year
COURSE STRUCTURE: A dissertation.

DOCTOR TECHNOLOGIAE (D Tech)
ADMISSION REQUIREMENTS: Magister Technologiae, or equivalent qualification
COURSE DURATION: Minimum formal time is two years
COURSE STRUCTURE: An advanced research project with a thesis.

3. What does a Technician in Mechanical Engineering do?
A technician is a person in possession of at least the National Diploma in Engineering.
The task of the technician in the design field is to assist the engineer/technologist with
the design of new products or equipment for use in industry or society.
A technician in the maintenance field must see to it that preventive or scheduled
maintenance is done on all machines in order to prevent interruptions in production.
The activities in Mechanical Engineering can therefore be grouped into design,
maintenance, electromechanical and project work where the latter includes aspects such
as planning of projects, cost control, evaluation of tenders, negotiations with contractors,
control over the progress of the project, co-ordination of all the interested departments
and commissioning of the completed project.

3.1 Who is a professional Technologist?
The holder of the B Tech degree, has the necessary practical experience and is registered with the Engineering Council of South Africa as a professional person. Such a person can perform work of an engineering nature
prescribed by the Minister as the kind of work reserved for persons registered in terms of
an Act of Parliament. This person can offer a consulting service in the field in which
he/she has received the necessary academic and practical training.

3.2 What is the certificate of competency as Engineer?
The Certificate of Competency as a Mechanical and / or Electrical Engineer is issued by the
Department of Labour (Factories) or the Department of Mineral and Energy Affairs
(Mines) to a person with the necessary academic (diploma / degree) and practical
experience 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 of Technology is one of a few tertiary institutions which
offers accredited Diplomas (by both Departments mentioned above) as
preparation for the examination for this Certificate.

4. Career opportunities
In any heavy or light manufacturing industry, eg. 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.

5. Enquiries
Learner Registrations, Vaal University of Technology, Private Bag X021,
VANDERBULTPARK 1900
Further enquiries may be addressed to:
The Head: Department of Mechanical Engineering
Vaal University of Technology, Private Bag X021, VANDERBULTPARK 1900
Tel: (016) 950-9302, Fax: (016) 950-9797 e-mail: suzie@vut.ac.za
Metallurgical Engineering
Faculty: Engineering and Technology
Department: Metallurgical Engineering
National Diploma: Engineering: Metallurgical
B Tech Engineering: Metallurgical 4 years
M Tech Engineering: Metallurgical 5 years

Currently under revision. View www.vut.ac.za for updates

1. Admission Requirements:

Currently under revision - view VUT website for updates

2. National Diploma

Semester 1
Chemistry, Physics, Mathematics, Metallurgy, Mechanical Engineering Drawing, Computer Skills, Applied Communication Skills I(X), English Language.

Semester 2

Optional subjects:
Chemistry, Physics, Mathematics, Metallurgy, Mechanical Engineering Drawing, Computer Skills, Applied Communication Skills I(X), English Language.

Semester 3

Optional subjects:
Strength of Materials (PM option) or Mineral Processing (EM option).

Semester 4
Quality Control, Metallurgical Thermodynamics, Physical Metallurgy (PM option) or, Applied Mineral Processing (EM option), Applied Communication Skills 2(X).

Optional subjects:
Three subjects from the following:
Materials Testing: Metallurgy (PM option), Extraction of Non-Ferrous Metals (EM option), Production of Iron & Steel (EM), Foundry Technology (PM & EM), Ferroalloy Technology (EM option), Geology (EM option), Mechanical Deformation Technology (PM option), Chemical Metallurgy (EM option), Refractories (EM option).

Semester 4
Physical Metallurgy (PM option) or Applied Mineral Processing (EM option), Applied Communication Skills 2(Y).

Optional subjects:
Four subjects from the following:
Foundry Technology (PM & EM), Corrosion (PM & EM), Quality Control (PM & EM), Chemical Metallurgy (EM option), Mechanical Metallurgy (PM option), Welding Technology (PM option), Mechanical Deformation Technology (PM option), Extraction of Non-Ferrous Metals (EM option), Production of Iron & Steel (EM option), Heat and Mass Transfer (PM & EM), Refractories (EM option).

Remarks
The programme consists of a minimum of 24 credits, spread over a minimum of four semesters, plus one year Work Integrated Learning at an approved employer. The programme will therefore take a minimum of 3 years to complete.

3. B Tech

The prerequisite for this qualification is a completed National Diploma, including 12 months Work Integrated Learning, with a minimum of 65% average for the semester 4 subjects / all diploma subjects.

This course is offered from January to November, on Fridays (1 year).
The course consists of a year-long project plus a minimum of three subjects from the options listed below.

Option A: Physical Metallurgy

Compulsory subject:
Physical Metallurgy

Optional subjects:
Mechanical Deformation Technology, Metallurgical Thermodynamics, Corrosion.

A minimum of two subjects from any other engineering discipline as approved by the Head of the Department.

Option B: Extractive Metallurgy

Compulsory Subjects:
At least one of the following:
Applied Mineral Processing, Extraction of Non-ferrous Metals, Production of Iron and Steel.

Optional subjects:
The balance, to a total of three subjects from the following:
Metallurgical Thermodynamics, Mineralogy, Corrosion.

4. M Tech

B Tech or equivalent:
This is a purely research qualification. The student should prove that he/she has passed an approved course in research methodology.

5. What are the functions of the Metallurgical Technician?

He/she will be involved in:
Developing new processes/procedures in the extraction/manufacturing industry as well as optimising/improving existing processes, ensuring the quality of products during the different stages of the process, testing and inspection of the final material/product.

6. Career Opportunities

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

7. Enquiries

Enquiries may be addressed to:
Head of Department: Metallurgical Engineering
Vaal University of Technology
Private Bag X021
VANDERBUIJPARK 1900
Tel: (016) 950 9243; Fax: (016) 950 9957
E-mail: patience@vut.ac.za
Website: www.vut.ac.za
Civil Engineering
Faculty: Engineering and Technology
Department: Civil Engineering and Building
National Diploma: Engineering: Civil
B Tech: Engineering: Civil
M Tech: Engineering: Civil
D Tech: Engineering: Civil

Hierarchy of Qualifications
The National Diploma is the first level of qualification (3 years). Beyond that, the following degree hierarchy exists:

Degrees
Baccalaureus Technologiae (B Tech) 4 years
Magister Technologiae (M Tech) 5 years
Doctor Technologiae (D Tech) 7 years

1. Admission Requirements:

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<thead>
<tr>
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</tr>
<tr>
<td>Physical Science</td>
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</tr>
<tr>
<td>English</td>
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<td>4x4=16</td>
</tr>
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</tr>
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</table>

Note: Scholars who do not qualify for the National Diploma Programmes may apply for the pre diploma programmes. Tel: (016) 950-9589. For details on the pre diploma programmes see VUT website: www.vut.ac.za

2. Course Structure of the National Diploma
This is a 3 year course and consists of:
Four semester university attendance (27 subjects).
Two semesters experiential training in industry which should preferably be done after the second semester of university attendance.
2.1 University Attendance
All the subjects are compulsory.

Semester 1

Semester 2

2nd Year
This year is devoted to experiential training in industry. Structured guidelines exist and evaluation is done through prescribed reports, supervision and monitoring visits. Engineering Practice: Civil II, Engineering Practice: Civil III.
Whilst the University will provide assistance to students to find placement for experiential training, such placement cannot be guaranteed.

Semester 3
Applied Communication Skills 2.1, Management: Civil II, Transportation Engineering II, Geotechnical Engineering II, Structural Steel and Timber Design III, Structural Analysis III, Water Engineering II.

Semester 4
Documentation III, Transportation Engineering III, Geotechnical Engineering III, Reinforced Concrete and Masonry Design III, Structural Analysis III, Water Engineering III.

BACCALAUREUS TECHNOLOGIAE (B Tech)
SPECIALISATION FIELDS: Transportation, Water, Structural, Urban Engineering.
COURSE DURATION: It is offered by means of part-time classes. Two subjects per semester. This programme will therefore take a minimum of two years to complete.

MAGISTER TECHNOLOGIAE (M Tech)
COURSE DURATION: Minimum formal time is one year.
COURSE STRUCTURE: This instructional programme comprises of a thesis only, provided that the learner has already passed an instructional offering in research methodology.

3. 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.

4. Careers
The following selection of careers are available:
Design draughtsmen, project official, site agent, municipal technician, engineering surveyor, quantity technician, designer, laboratory technician, contracts manager, project planner, estimator, quality controller, geotechnician.

4.1 Career Opportunities
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. This career is accessible to men and women of all races.

5. Enquiries
Enquiries may be addressed to:
The Head of Department
Civil Engineering and Building - Block R
Vaal University of Technology, Private Bag X021 VANDERBIJLPARK 1900
Tel: (016) 950-9241; Fax: (016) 950-9957
e-mail: patienceb@vut.ac.za
website: www.vut.ac.za

Note: For details on the pre diploma programmes see VUT website: www.vut.ac.za


Total 31

Note: Scholars who do not qualify for the National Diploma Programmes may apply for the pre diploma programmes. Tel: (016) 950-9589. For details on the pre diploma programmes see VUT website: www.vut.ac.za
Welcome
The Sport Academy would like to extend a warm welcome to you as a new student on campus. We invite you to make use of the numerous well equipped sport facilities that are available. We have top quality coaches who are willing to help with your needs. Through sport we build the image of VUT. We wish you a happy and successful sporting experience.

Admission Requirements
Registration at any one of the sport clubs is open to all full time, part time, as well as non-students at the Vaal University of Technology. Acceptance to clubs depend on that club’s constitution. There is no discrimination with regard to gender, colour or creed at the Sport Academy and its associated divisions and clubs. This is also the policy at the Vaal University of Technology. Kindly note that only bona fide VUT students will qualify for selection to national student teams and for representing the VUT at the University Sport South Africa (USSA) tournaments.

Sport Codes
USSA and Provincial Leagues
Track and Field
Cross Country
Road Running
Tennis
Table Tennis
Dance
Karate
Cricket
Hockey
Rugby
Basketball
Softball
Volleyball
Netball
Body Building
Aerobics
Chess
Football

Dean: Mr GB Koen (016) 950-9918
Head of Department (Sport and Recreational Services): (016) 950-9248
Secretary (016) 950-9282
Stadium Manager: Mr Hannes Hattingh (016) 981 6403

Facilities
Isak Steyl Stadium
2 rugby fields (floodlit)
grandstand & VIP lounge
3 soccer fields (floodlit)
1 athletics track (floodlit)
throws practice nets (floodlit)
Astro Hockey field (floodlit)
2 hockey grass fields (floodlit)
hockey/cricket/soccer clubhouse
2 cricket fields (2 x floodlit)
8 cricket nets
hockey/cricket open pavillion
6 netball courts (floodlit)
6 tennis courts (floodlit)
3 basketball courts (floodlit)
weight training room
VUT radio station

Hostels
3 tennis courts (floodlit)
2 soccer fields
1 gymnasium

Sport Merit Bursaries
Merit bursaries are available, with the minimum requirements being provincial colours. Priority is given to USSA sports.
The annual closing date is 31 October.

Sport Awards
Honours:
Awarded to athletes who are selected at a senior provincial level or higher and to those who are selected to represent the different USSA teams.

Merits:
Awarded to athletes who are selected for provincial junior teams.
General:
The Sport Academy works in conjunction with the Academic Faculties and the Sport Management Department as well as
The Sport Academy works in conjunction with the Academic Faculties and the Sport Management Department as well as with South African Sport Federations such as Athletics South Africa, Basketball South Africa, Gauteng Cricket Board, Falcons Rugby etc.

**Enquiries**

Sport Academy  
Vaal University of Technology  
Private Bag X021  
Vanderbijlpark 1900  
Tel: (016) 950-9917  
Fax: (016) 950-9763

Sport and Recreation  
Tel: (016) 950-9282  
Fax: (016) 950-9763

GPS coordinates  
S26, 42' 15.1 / E 27, 52' 35.1
**VISION**
To become recognised as a leading administrative section providing a creative, holistic personalised and satisfactory service to a wide range of clients, to the maximum benefit of all concerned.

**MISSION**
Financial Aid Office strives to offer a comprehensive internal and external administrative service to all stakeholders, specifically catering for individual needs in a creative and professional manner in order to make a meaningful contribution to their success and in so doing to foster a long term working relationship.
The Financial Aid Office offers the following services in order to help students to obtain bursaries and/or loans to be able to complete their studies. Bursaries and/or loans are offered in all study fields at the Vaal University of Technology.

1. **SPORT BURSARIES**
The Vaal University of Technology offers Sport Bursaries to students who have excelled in sport. The value of these bursaries is determined by the level of competitions in which candidates have participated.
The retention of a sport bursary is dependent on statisfactory academic progress.
Contact number: (016) 950 9282 / 9307

2. **MERIT AWARD (Academic)**

<table>
<thead>
<tr>
<th>2013 GRADE 12 RESULTS</th>
<th>Criteria</th>
<th>Bursary</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td></td>
<td>Bursary</td>
</tr>
<tr>
<td>75%+</td>
<td>Science, Engineering &amp; Technology,</td>
<td>R 15 000</td>
</tr>
<tr>
<td>70%+</td>
<td>Photography, Fine Arts</td>
<td>R 12 000</td>
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<tr>
<td>65%+</td>
<td>Accounting</td>
<td>R 10 000</td>
</tr>
<tr>
<td>75%+</td>
<td>Accounting</td>
<td>R 10 000</td>
</tr>
<tr>
<td>70%+</td>
<td>Accounting</td>
<td>R 6 000</td>
</tr>
<tr>
<td>65%+</td>
<td>Accounting</td>
<td>R 4 000</td>
</tr>
<tr>
<td>75%+</td>
<td>Other</td>
<td>R 7 500</td>
</tr>
<tr>
<td>70%+</td>
<td>Other</td>
<td>R 5 000</td>
</tr>
<tr>
<td>65%+</td>
<td>Other</td>
<td>R 3 000</td>
</tr>
</tbody>
</table>

TOTAL

Closing date: 31 January each year
Contact number: (016) 950 9342 / 950 9486

2.2 **SENIOR STUDENTS**
Please note:
A list of all qualified students will be published no later than 31 March.
Funds are allocated in the following manner:
Annual aggregate of 75+(Minimum 3 registered subjects per annum), R5000 automatic award.

3. **PRESTIGE AWARDS**
Depending on the availability of funds, students can receive prestige awards dependant on involvement in student activities throughout the year.
Contact number: (016) 950 9900

4. **COMPANY BURSARIES**
At the Vaal University of Technology we fully provide assistance to all company sponsored students.
Students who are in possession of confirmation letters must report to the Financial Aid Bureau where their registration will be dealt with.
The following assistance is provided
* Meal vouchers
* Book vouchers
* Booking of residence
* Sending of statements
* Sending of Academic Records
* Handling of all refunds
* Debt Collection
* Company Visits

NOTE: The Vaal University of Technology is not responsible in funding nor seeking sponsorship (s) for students. It also remains the responsibility of the student to ensure that their accounts are settled on time.

Should any information be required feel free to contact the following numbers:
Tel: (016) 950 9342  Fax: (016) 950 9106

The Vaal University of Technology will provide assistance to students in securing placements for experiential training but does not guarantee such placements.
5. LOANS

i) NSFAS LOANS

What is NSFAS?
The National Student Financial Aid Scheme (NSFAS) is a loan and bursary scheme operating in terms of Act 56 of 99 and funded by the National Department of Education. NSFAS has been established to assist academically deserving and financially needy students to achieve academic goals at tertiary educational institutions in South Africa, with particular concern in overcoming barriers created by structural disadvantage.

What does NSFAS offer?
- The means to obtain a tertiary qualification
- Loans at low interest rates
- Loans without guarantees
- A reasonable repayment plan

NSFAS convert loan(s) to a Bursary.
Up to 40% of the award may be converted into a bursary depending on your end of year results.

- If you pass all the courses for which you have registered, you qualify for a 40% bursary.
- If you pass three quarters of the course, you qualify for a 30% bursary.
- If you pass half of the courses, you qualify for a 20% bursary.
- If you pass one quarter of the course, you qualify for a 10% bursary.
- If you pass none of the courses, you qualify for no bursary at all.

What is a loan?
- A loan is the money you borrow to cover tertiary studies.
- This loan has to be repaid.

Who qualifies for a NSFAS loan?
You can qualify for a NSFAS loan if you are:
- A South African citizen;
- Registered at a South African university or University of Technology;
- An undergraduate, studying for a first tertiary educational qualification; or
- Studying for a second tertiary qualification, if this is necessary to practice in your chosen profession; (e.g. LLB or HDE)
- Able to demonstrate potential for academic success;
- Financially needy;
- You will, however, be expected to make your own family contribution towards the total costs of your studies (EFC)

How much money do you get?
- There is a minimum award and a maximum award, which is determined annually by NSFAS. Please enquire at the Financial Aid Office for the current limits.

Where do you apply for a loan?
At the Financial Aid Office of the Vaal University of Technology.

NOTE: Interest on NSFAS awards is determined annually by NSFAS.
Closing dates:
Senior students (year and first semester courses) 04 October 2013
First year students (year and semester courses) 31 October 2013. Late first year applicants: 24 January 2014.
Late applicants will only be considered for awards if funds are available.

Contact numbers: (016) 950 9484, 9972, 9486, 9485, 9571
Brochures for NSFAS ‘Students guide to funding’ are available at the Financial Aid Bureau office.

ii) EDU-LOAN

Do you need study finance?
You can apply for Edu-loan at the VUT campus (Finance). Edu-loan offers hassle free educational finance. As long as you, or a family member, receive a salary, paid into a bank account then you could qualify for an Edu-loan. What’s more, if we have an agreement with your, or your family member’s employer, we won’t even have to carry out credit checks.

Once your loan is approved we will:
Pay your student fees to the educational institution of your choice.
Assure you of affordable interest rates with a fixed monthly instalment.
Give you the option of an Edu-Xtras Smart Card for books and accessories.
You don’t even have to pay a deposit.

Contact numbers EDU-LOAN (016) 950 9948/9373
Call Centre: 0861 861 888 or 0861 861 VUT

Financial Aid Office
Vaal University of Technology
Private Bag X021
VANDERBIJLPARK
1900

Financial Aid Office support a care free education.
Major expenses for the year
Registration fee, Accommodation, Class / course fees, Books, Pocket money, Transport to campus. For costs see VUT website www.vut.ac.za (look under: Study at VUT, Tuition fees & Study loans.)

Application for Admission and Accommodation
Prospective students are advised to apply early in the year preceding registration for admission to the course, and/or for hostel accommodation. Arrangements can be made to visit the campus in this regard. Closing dates for admission and/or accommodation applications 31 October.

International students: 31 October.

How to apply: See front page of application form or VUT website (www.vut.ac.za) click on ‘Study at VUT’ and then ‘Admissions and How to apply’ and then on ‘How to apply’.

Enquiries
General Tel: (016) 950 9924/5 or Call Centre 0861 861 888
Admission Enquiries: (016) 950-9356

Application Status : Self-check
Go to VUT website – www.vut.ac.za.
Click on “admissions new students”.
Click on “check your application status”.
Click on blue block “check your application status”.
Enter your student or identification number.
Click “submit”.

The Department of Co-operative Education assists in experiential learning administration and placements.
Contact details: Tel: 016-950-9496, Fax: 016-950-9759, E-mail: wil@vut.ac.za

The Institution makes every attempt to accommodate students with disabilities.

Whilst every effort has been made to present you with the relevant information in this brochure, program offerings may be subject to change in order to keep abreast with new developments in the higher education landscape. The institution therefore reserves the right to unilaterally change or amend any of the content/structures contained herein.