NATIONAL DIPLOMA: ENGINEERING: INDUSTRIAL  
(Extended curriculum programme with foundation provision)  
Qualification code: NDEIF0 - NQF Level 6

Campus where offered: Pretoria Campus

Important notification to new applicants:  
Students who intend to enrol for this qualification for the first time in 2017 or thereafter, should note that it will not be possible to continue with any Baccalaureus Technologiae as from 2020, since it is being replaced by qualifications aligned with the newly-implemented Higher Education Qualification Sub-Framework. Potential students are advised to consult the University’s website for any new qualifications which might not be published in this Prospectus.

REMARKS

a. Admission requirement(s) and selection criteria:

• FOR APPLICANTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:

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

  Selection criteria:
  To be considered for the National Diploma, applicants must have an Admission Point Score (APS) of at least 20 to 27.

  Assessment procedure:
  All applications received by the published due dates (as indicated on page 3) will be ranked according to the APS achieved. After consideration of the Departmental Student Enrolment Plan (SEP), only the highest ranked applicants will be accepted to fill the available places. A waiting list consisting of the remainder of the applicants will provide an opportunity for applicants to fill places created by accepted students failing to meet the enrolment dates.

• FOR APPLICANTS WHO OBTAINED A NATIONAL SENIOR CERTIFICATE IN OR AFTER 2008:

  Admission requirement(s):
  A National Senior Certificate with a bachelor’s degree or a diploma endorsement, or an equivalent qualification, with an achievement level of at least 4 for English (home language or first additional language), 4 for Mathematics and 3 for Physical Sciences.

  Applicants who do not meet the above criteria for Mathematics and/or Physical Sciences for admission to the National Diploma or National Diploma (extended), may enrol for Mathematics N3/N4 and/or Engineering Sciences N3/N4 or Mathematics and/or Engineering Sciences, as presented as part of the National Certificate Vocational (NCV) at NQF Level 4, at any Technical and Vocational Education and Training (TVET) College. If these subjects are successfully passed at a performance level of at least 60% (for the National Diploma), or 50% (National Diploma - extended), they may re-apply for admission to the qualification at the University.

  Selection criteria:
  To be considered for the National Diploma, applicants must have an Admission Point Score (APS) of at least 20 to 27.

  Assessment procedure:
  All applications received by the published due dates (as indicated on page 3) will be ranked according to the APS achieved. After consideration of the Departmental Student Enrolment Plan (SEP), only the highest ranked applicants will be accepted to fill the available places. A waiting list consisting of the remainder of the applicants will provide an opportunity for applicants to fill places created by accepted students failing to meet the enrolment dates.
FOR APPLICANTS WHO OBTAINED A QUALIFICATION FROM TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) COLLEGES (PREVIOUSLY KNOWN AS FET COLLEGES):

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

Admission requirement(s):
A National Certificate (Vocational) at NQF Level 4 with a bachelor’s degree or a diploma endorsement issued by the Council for Quality Assurance in General and Further Education and Training (Umalusi), with at least 50% (APS of 4) for English and Mathematics, and at least 60% (APS of 5) for Physical Sciences/Applied Engineering Technology and any two other vocational subjects.

Selection criteria:
To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least 23.

Applicants with a National N Certificate as published in Nated 191: N3 (NQF Level 4) and N4/N5/N6 (NQF Level 5):
A National Senior Certificate or a National N Certificate as published in Nated 191: N3 (NQF Level 4) and N4/N5/N6 (NQF Level 5) issued by the Council for Quality Assurance in General and Further Education and Training (Umalusi), with at least 50% (APS of 4) for English and 60% (APS of 5) for Mathematics N3 and Engineering Sciences N3.

Applicants will be exempted from certain subjects on the grounds of N4/N5/N6 subjects passed (a minimum of 50% of the qualification’s subjects). Exemption will be granted from equivalent engineering subjects (including Mathematics and Engineering Sciences) passed with at least 60% (APS of 5).

Applicants with a National N Diploma (NQF Level 6):
Applicants with a National N Diploma (Nated 191: N6 with a Trade Certificate) issued by the Council for Quality Assurance in General and Further Education and Training (Umalusi), who obtained at least 60% for all subjects completed for N4/N5/N6 certificates at NQF Level 5 (including Mathematics and Engineering Sciences), will be –
- exemption from certain S1/S2 subjects on the grounds of N4/N5/N6 subjects passed (a maximum of 50% of the qualification’s subjects); and

b. Minimum duration:
Three and a half years.

c. Presentation:
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.

d. Intake for the qualification:
January only.

e. Exclusion and readmission, Work-Integrated Learning I and II, practicals, waiving of prerequisite subjects and Recognition of Prior Learning (RPL), equivalence and status:
See National Diploma: Engineering: Industrial (NDEI03).

f. Extended subjects:
Should a student fail any of the subjects, the Faculty reserves the right to refer the student to Student Development and Support (SDS) for an evaluation and career guidance. A student will only be allowed to repeat extended subjects based on a favourable recommendation by Student Development and Support and the consideration of relevant mitigating factors meriting for re-submission.

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

Students who repeat a subject must register for a different subject code. Even though the credits are published as 0,000, the correct credit will reflect on the academic record once the subject is passed.

#### CODE

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>CREDIT</th>
<th>PREREQUISITE SUBJECT(S)</th>
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<tbody>
<tr>
<td>FPCAI01 Computer-Aided Draughting (Extended) I</td>
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<td>FPCAIR1 Computer-Aided Draughting (Extended) I (for repeaters)</td>
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**TOTAL CREDITS FOR THE FIRST YEAR:** 0,506

### SECOND YEAR

#### FIRST SEMESTER

After completion of all the extended subjects (see paragraph f in the remarks).

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<tr>
<td>EWK121T Engineering Work Study I</td>
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<tr>
<td>MAT271B Mathematics II</td>
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<tr>
<td>MFR201T Manufacturing Relations II</td>
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<td>MME201T Mechanical Manufacturing Engineering II</td>
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<td>PEI111T Production Engineering: Industrial I</td>
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<tr>
<td>QTQ101T Qualitative Techniques I</td>
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**TOTAL CREDITS FOR THE SEMESTER:** 0,498

#### SECOND SEMESTER

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<td>EWK221T Engineering Work Study II</td>
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| Production Engineering: Industrial I         |         |                          |
### THIRD YEAR

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<td>EWK321T</td>
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### FOURTH YEAR

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<td><strong>FIRST SEMESTER</strong></td>
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<tr>
<td>EXP2IEN</td>
<td>Work-Integrated Learning II*</td>
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<td><strong>TOTAL CREDITS FOR THE QUALIFICATION:</strong></td>
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**SUBJECT/MODULE INFORMATION (OVERVIEW OF SYLLABUS)**

The syllabus content is subject to change to accommodate industry changes. Please note that a more detailed syllabus is available at the Department or in the study guide that is applicable to a particular subject. On 13 October 2017, the syllabus content was defined as follows:
AUTOMATION III (ATM301B) 1 X 3-HOUR PAPER

*(Subject custodian: Department of Industrial Engineering)*


COMPUTER-AIDED DRAUGHTING (EXTENDED) I (FPCAI01, FPCAIR1) CONTINUOUS ASSESSMENT

*(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)*

Students will be introduced to operating systems (Windows environment), basic word-processing skills (MS-Word), spreadsheets (MS-Excel), presentations tools (PowerPoint), communications, connectivity, the internet and the Web, computer-aided draughting (CAD), various software packages and compound drawings. (Total tuition time: ± 136 hours)

COSTING II (CSG201T) 1 X 3-HOUR PAPER

*(Subject custodian: Department of Managerial Accounting and Finance)*

Basic methods and a group of selected techniques of cost accounting for application in the business environment. The subject consists of two modules. (Total tuition time: ± 68 hours)

ELECTROTECHNOLOGY (EXTENDED) I (FPETT01, FPETTR1) 1 X 3-HOUR PAPER

*(Subject custodian: Department of Electrical Engineering)*

Atom theory, electricity, magnetism and electromagnetism, inductors, capacitors, RLC networks. The correct use of SI units and their applications. Construction and care of batteries. WS theory and different measuring instruments. The influence of magnetic lines, the application and use of magnetic fields, inductance and the factors that influence it. Capacitors and their functioning. (Total tuition time: ± 140 hours)

ENGINEERING COMMUNICATION (EXTENDED) I (FPEGN01, FPEGNR1) CONTINUOUS ASSESSMENT

*(Subject custodian: Department of Applied Languages)*

Speaking and communication skills, listening skills, reading for academic understanding, academic vocabulary, learning strategies and information gathering, writing, business and life skills. Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 136 hours)

ENGINEERING WORK STUDY I (EWK121T) 1 X 3-HOUR PAPER

*(Subject custodian: Department of Industrial Engineering)*


ENGINEERING WORK STUDY II (EWK221T) 1 X 3-HOUR PAPER

*(Subject custodian: Department of Industrial Engineering)*


ENGINEERING WORK STUDY III (EWK321T) 1 X 3-HOUR PAPER

*(Subject custodian: Department of Industrial Engineering)*

Performance improvement programs. Productivity improvement, Objective Matrix, South African Excellence Model. Systems analyses and design for management. (Total tuition time: ± 68 hours)
F

FACILITY LAYOUT AND MATERIALS HANDLING II (FLM201T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

I

INDUSTRIAL ACCOUNTING III (IAC321T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Accounting)
Introduction to financial management. Financial analysis, planning and control. Working capital management. Investment decisions. Computer applications. (Total tuition time: ± 68 hours)

INDUSTRIAL ENGINEERING SYSTEMS DESIGN II (IED201T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)
Introduction to systems engineering, the systems design process from conceptual to detail design, models for economic evaluations, design for operational feasibility with emphasis on reliability and maintainability. (Total tuition time: ± 68 hours)

INDUSTRIAL LEADERSHIP III (ILE301T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Management and Entrepreneurship)
Leaders and management. Management planning, organising, leading and control. (Total tuition time: ± 68 hours)

M

MANUFACTURING RELATIONS II (MFR201T) 1 X 3-HOUR PAPER
(Subject custodian: Department of People Management and Development)

MATHEMATICS (EXTENDED) I (FPMAT04, FPMATR4) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mathematics and Statistics)
Basic algebra, functions, exponents and logarithm, differential calculus, trigonometry, geometry. Basic mathematics. Differentiation. Integration. Matrices and determinants. Vectors. Data handling. Complex numbers or mensuration. (Total tuition time: ± 120 hours)

MATHEMATICS II (MAT271B) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mathematics and Statistics)
Revision of differentiation. Differentiation of functions with more than one variable. Further integration. Numerical methods. First-order ordinary differential equations. Matrices (Gauss elimination). (Total tuition time: ± 60 hours)

MATHEMATICS III (MAT351T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mathematics and Statistics)

MECHANICAL ENGINEERING DRAWING (EXTENDED) I (FPMDR01, FPMDR1)
(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)
Lettering, line work and freehand sketches, geometric construction, fasteners, dimensioning, methods of projection, sectioning, interpenetration curves and pipe developments, conversions: imperial to metric, terms

MECHANICAL MANUFACTURING ENGINEERING (EXTENDED) I (FPMME01, FPMMER1) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)

MECHANICAL MANUFACTURING ENGINEERING II (MME201T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)
Measurement. Operative practical testing. Quality and dimensional control. Gauging and measurement. Measuring instruments. Comparators. Surface measurement. (Total tuition time: ± 68 hours)

MECHANICS (EXTENDED) I (FPMHC01, FPMHCR1) 1 X 3-HOUR PAPER
(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)
Module 1: measurements, mechanics, motion in one-dimension kinematics, laws of motion dynamics, kinetic theory of matter and properties of matter. Module 2: atoms, molecules and ions, chemical formulas and equations, the periodic table, chemical bonding, nomenclature of inorganic compounds, phases of matter, solutions, the rate of chemical reactions, equilibrium in chemical reactions, acids and bases, oxidation, reduction and electrochemical cells. Motion in one dimension. Uniform motion. Instantaneous velocity. Motion with constant acceleration. Free fall. Instantaneous acceleration, scalars, vectors, coordinate systems and vector components, vector algebra, force, Newton's first law, Newton's second law, Newton's third law, ropes and pulleys, motion in a circle. Impulse and momentum. Energy. Work. Fluids and elasticity. Thermodynamics. (Total tuition time: ± 180 hours)

OPERATIONAL RESEARCH III (ORS321T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)

PRODUCTION ENGINEERING: INDUSTRIAL I (PEI111T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)
Introduction to production management. Production management in perspective. The nature of operating systems and operations management. Product service design. Facility planning and layout. Capacity management. (Total tuition time: ± 68 hours)

PRODUCTION ENGINEERING: INDUSTRIAL II (PEI211T) 1 X 3-HOUR PAPER
(Subject custodian: Department of Industrial Engineering)
QUALITATIVE TECHNIQUES I (QTQ101T)  
(Subject custodian: Department of Mathematics and Statistics)  
1 X 3-HOUR PAPER  

QUALITY ASSURANCE II (QAS201T)  
(Subject custodian: Department of Industrial Engineering)  
1 X 3-HOUR PAPER  
Essentials of a quality management system. Statistical process control: introduction to quality improvement. The quality life cycle, introduction to statistical process control, basic statistical calculations, analyses and interpretation of control charts, control of attribute control charts, design of experiments, principles of statistical design and analysis, experiments. (Total tuition time: ± 90 hours)

WORK-INTEGRATED LEARNING I (EXP1IEN)  
(Subject custodian: Department of Industrial Engineering)  
Workshop factors: labour machine technology (types and uses), workshop planning and control, inventory control and storage, drawing office practice (design and interpretation), maintenance. Industrial engineering aspects: method study, time studies, labour standards, distribution line analysis, labour schedules. (Total tuition time: six months)

WORK-INTEGRATED LEARNING II (EXP2IEN)  
(Subject custodian: Department of Industrial Engineering)  
Work study. Quality assurance. Production. Systems. Facility layout and materials handling. The following fields could be covered: material-handling analysis, equipment specifications, selection and evaluation, mechanisation and automation, plant layout (analysis and renewal), office layout and planning, productivity (equipment utilisation studies and capacity analysis), form design and control, industrial systems analysis and design. (Total tuition time: six months)