

BACHELOR OF ENGINEERING TECHNOLOGY IN MECHANICAL ENGINEERING

BEngTech (Mechanical Engineering) - NQF Level 7 (420 credits)

Qualification code: **BPME18**

SAQA ID: 99638, CHE NUMBER: H/H16/E024CAN

Campus where offered: Pretoria Campus

REMARKS

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

• **APPLICANTS WITH A SENIOR CERTIFICATE OBTAINED BEFORE 2008:**

Admission requirement(s):

A Senior Certificate with a matriculation endorsement or an equivalent qualification, with a C symbol at Standard Grade or a D symbol at Higher Grade for English, and B symbols at Standard Grade or C symbols at Higher Grade for Mathematics and Physical Science.

Selection criteria:

To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

Recommended subject(s):

None.

• **APPLICANTS WITH A NATIONAL SENIOR CERTIFICATE OBTAINED IN OR AFTER 2008:**

Admission requirement(s):

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

Selection criteria:

To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

Recommended subjects:

Engineering Graphics and Design and Mechanical Technology.

• **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 endorsement, issued by the Council for Quality Assurance in General and Further Education and Training (Umalusi), with at least a 50% (APS of 4) for English, 50% for Life Orientation (excluded for APS calculation), and 60% (APS of 5) for Mathematics and Science, and 60% (APS of 5) for any other three compulsory vocational subjects.

Selection criteria:

To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28** (excluding Life Orientation).

Recommended subject(s):

None.



- **APPLICANTS WITH A NATIONAL N CERTIFICATE/NATIONAL SENIOR CERTIFICATE AS PUBLISHED IN REPORT 191: N3 (NQF LEVEL 4):**

Admission requirement(s):

A National Senior Certificate or a National N Certificate with languages as published in Report 191: N3 (NQF Level 4) issued by both the Department of Higher Education and Training (DHET) and the Council for Quality Assurance in General and Further Education and Training (Umalusi), with at least 50% for English, Mathematics N3, Engineering Sciences N3 and any other two additional subjects.

Selection criteria:

To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **28**.

Recommended subject(s):

None.

- **APPLICANTS WITH A N6 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N6:**

Admission requirement(s):

A N6 Certificate in a related Engineering field as published in Report 191: N6 issued by both the Department of Higher Education and Training (DHET) and the Council for Quality Assurance in General and Further Education and Training (Umalusi), with an average of at least 60% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

Recommended subject(s):

None.

- **APPLICANTS WITH QUALIFICATIONS ON THE HIGHER EDUCATION QUALIFICATION SUB-FRAMEWORK (HEQSF) OFFERED BY UNIVERSITIES OF TECHNOLOGY:**

The applicant will be considered for admission to the programme, if any of the following qualifications has been completed:

- Higher Certificate in Mechanical Engineering (NQF Level 5 - 140 credits): an average of at least 60% for the qualification, and 60% in each of the following modules: Engineering Graphics, Engineering Physics, Mechanics and Technical Mathematics.
- Advanced Certificate in Mechanical Engineering (NQF Level 6 - 140 credits): an average of at least 60% for the qualification.
- Diploma in Mechanical Engineering Technology (NQF Level 6 - 280 credits): an average of at least 55% for the qualification.
- National Diploma: Engineering: Mechanical (NQF Level 6 - 3,000 credits): an average of at least 55% for the qualification.

- b. *Assessment procedure(s):*

No further assessment will be done (except for candidates with a N4 Certificate). Applicants who achieve the minimum APS will be considered until the programme complement is full. All completed applications received within the published due dates will be ranked. After consideration of the Departmental Student Enrolment Plan, only the top ranking applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill places of those who did not register on time. Applicants will be informed of their status per official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

Applicants who do not meet the minimum requirements, might be transferred to the Higher Certificate in Mechanical Engineering, provided that he/she meets the minimum requirements.



- c. *Recognition of Prior Learning (RPL), equivalence and status:*
See Chapter 30 of Students' Rules and Regulations.
- d. *Intake for the qualification:*
January only.
- e. *Presentation:*
Day classes.
- f. *Minimum duration:*
Three years.
- g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations.

CURRICULUM

FIRST YEAR

| CODE | MODULE | NQF-L | CREDIT | PREREQUISITE MODULE(S) |
|---------|-------------------------------------|-------|--------|------------------------|
| COL105X | Computer Literacy | (5) | (5) | |
| COS105X | Communication Skills | (5) | (6) | |
| EGE105B | Engineering Graphics | (5) | (14) | |
| ELC105B | Electrical Circuits | (5) | (28) | |
| EMA105B | Engineering Mathematics I | (5) | (28) | |
| INL125C | Information Literacy (block module) | (5) | (1) | |
| LFS125X | Life Skills (block module) | (5) | (2) | |
| MEC105B | Mechanics | (5) | (28) | |

FIRST SEMESTER

| | | | | |
|---------|-----------------|-----|------|--|
| MAN115B | Manufacturing I | (5) | (14) | |
|---------|-----------------|-----|------|--|

SECOND SEMESTER

| | | | | |
|---------|-------------------------|-----|------|--|
| SOM115B | Strength of Materials I | (5) | (14) | |
|---------|-------------------------|-----|------|--|

TOTAL CREDITS FOR THE FIRST YEAR: **140**

SECOND YEAR

| CODE | MODULE | NQF-L | CREDIT | PREREQUISITE MODULE(S) |
|---------|----------------------------|-------|--------|--|
| DOM206B | Design of Machines | (6) | (28) | Engineering Mathematics I Mechanics |
| EMA206B | Engineering Mathematics II | (6) | (14) | Engineering Mathematics I |
| EMT206B | Engineering Materials | (6) | (14) | Manufacturing I |
| FLM207B | Fluid Mechanics | (7) | (28) | Engineering Mathematics I Mechanics |
| PAS206B | Probability and Statistics | (6) | (14) | Engineering Mathematics I |
| THE207B | Thermodynamics | (7) | (28) | Engineering Mathematics I |

FIRST SEMESTER

| | | | | |
|---------|----------------------|-----|------|--|
| SCP216B | Scientific Computing | (6) | (14) | |
|---------|----------------------|-----|------|--|

TOTAL CREDITS FOR THE SECOND YEAR: **140**



THIRD YEAR

| CODE | MODULE | NQF-L | CREDIT | PREREQUISITE MODULE(S) |
|---------|----------------------------|-------|--------|---|
| MEP307B | Mechanical Design Projects | (7) | (28) | Design of Machines Engineering Materials Engineering Mathematics II Probability and Statistics Scientific Computing |
| SOM307B | Strength of Materials II | (7) | (28) | Strength of Materials I |

FIRST SEMESTER

| | | | | |
|---------|------------------------------|-----|------|---|
| CMH316B | Control of Machines | (6) | (14) | Engineering Mathematics II |
| EPE316B | Electrical Power Engineering | (6) | (14) | Electrical Circuits |
| MAN317B | Manufacturing II | (7) | (14) | Engineering Materials Engineering Mathematics I Manufacturing I |

SECOND SEMESTER

| | | | | |
|---------|----------------------|-----|------|---|
| DYN317B | Dynamics | (7) | (14) | Engineering Mathematics I Mechanics |
| EPR317B | Engineering Practice | (7) | (14) | |
| HTR317B | Heat Transfer | (7) | (14) | Engineering Mathematics II Fluid Mechanics Thermodynamics |

TOTAL CREDITS FOR THE THIRD YEAR: **140**

TOTAL CREDITS FOR THE QUALIFICATION: **420**

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 module. At time of publication, the syllabus content was defined as follows:

C

COMMUNICATION SKILLS (COS105X)

1 X 2-HOUR PAPER

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

To identify and apply basic competencies related to communicating in a technical or engineering environment. These competencies include presenting technical information to a variety of audiences, preparing technical reports, participating constructively in formal meetings and preparing a variety of business and technical documents. (Total notional time: 60 hours)

COMPUTER LITERACY (COL105X)

CONTINUOUS ASSESSMENT

(Module custodian: End User Computing Unit)

This module provides foundational knowledge in computing fundamentals, essential digital skills in key applications based on MS Office Suite and network basics (i.e. MS Outlook and Internet). Online exams are mapped with End-User Computing: SAQA 49077 (61591) Core Element as well as Internet and Computing Core Certification. (IC3). (Total notional time: 50 hours)



CONTROL OF MACHINES (CMH316B)**1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To equip the student with a fundamental understanding of electro pneumatics and hydraulics and its associated control systems in an industrial setting. (Total notional time: 140 hours)

D**DESIGN OF MACHINES (DOM206B)****1 X 3-HOUR PAPER (PRESCRIBED OPEN BOOK)****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To develop the advanced knowledge and understanding of the student in the process of problem assessment and design. At the end of this module, provided that the student has completed all tutorials, assignments and presentations successfully, the student will have a theoretical and practical understanding and knowledge of problem definition, design, communication and computer skills, use of engineering science and knowledge, and can undertake advanced tasks related to the design of components, assemblies and related equipment. (Total notional time: 280 hours)

DYNAMICS (DYN317B)**1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

The purpose of this module is to equip the student with a foundational framework of dynamics. A large section of this module deals with "vibration" which is a sub-discipline of dynamics and deals with repetitive motion. In most mechanical systems and structures, vibration is unwanted and even destructive. The task of this unit is to teach the student how to analyse vibration, using principles of dynamics. The concepts and formulations presented in this module are intended to provide the skills needed for designing vibration systems with desired properties that enhance vibration when it is wanted and reduce vibration when it is unwanted. (Total notional time: 140 hours)

E**ELECTRICAL CIRCUITS (ELC105B)****1 X 3-HOUR PAPER****(Module custodian: Department of Electrical Engineering)**

Direct current circuits. Magnetism and electromagnetism. Single phase alternating current systems. Active components in electric circuits. Alternating current with passive and active components in electric circuits. Three-phase alternating current systems. (Total notional time: 280 hours)

ELECTRICAL POWER ENGINEERING (EPE316B)**1 X 3-HOUR PAPER****(Module custodian: Department of Electrical Engineering)**

To provide an understanding of the use of electrical power in the working of machines and drives. (Total notional time: 140 hours)

ENGINEERING GRAPHICS (EGE105B)**CONTINUOUS ASSESSMENT****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

Introduction to graphics communication. Dimensioning and tolerance practices. Geometrical construction. Orthographic projections. Machine drawing and introduction to computer aided design and Assemblies. (Total notional time: 140 hours)

ENGINEERING MATERIALS (EMT206B)**1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To equip the student with a fundamental understanding of how Engineering Materials are Processed and utilised in design problem. The module will give an overview of the fundamentals of engineering materials, processing techniques, properties and how each process interrelates with the other phases of manufacturing processes. (Total notional time: 140 hours)

ENGINEERING MATHEMATICS I (EMA105B)**2 X 2-HOUR PAPERS****(Module custodian: Department of Mathematics and Statistics)**

Trigonometry, geometry, functions, complex numbers, vector algebra, matrices and transformations, single-variable differentiation and integration, partial differentiation, multiple-variable intervals, introduction to differential equations. (Total notional time: 280 hours)



ENGINEERING MATHEMATICS II (EMA206B)**1 X 3-HOUR PAPER****(Module custodian: Department of Mathematics and Statistics)**

Mathematical modelling, first-order ordinary differential equations (ODEs), higher-order ODEs, Laplace transforms, systems of ODE's, numerical solutions of ODEs, Sturm-Liouville problems, partial differential equations. (Total notional time: 140 hours)

ENGINEERING PRACTICE (EPR317B)**CONTINUOUS ASSESSMENT****(Module custodian: Department of Electrical Engineering)**

To prepare the student to effectively plan and execute projects. Write quality technical reports and communicate all project information to peers. (Total notional time: 140 hours)

F**FLUID MECHANICS (FLM207B)****1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To equip the student with a fundamental understanding of fluid statics and fluid dynamics principles and how to apply the same in solving practical problems in various aspects of fluid mechanics. (Total notional time: 280 hours)

H**HEAT TRANSFER (HTR317B)****1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

A comprehensive introduction to the rates of thermal energy systems for students in mechanical engineering. It is designed to give students a necessary foundation for a comprehensive understanding of rate of transfer of thermal energy in energy systems. (Total notional time: 140 hours)

I**INFORMATION LITERACY (INL125C)****CONTINUOUS ASSESSMENT****(Module custodian: Directorate of Library and Information Services)**

Introduction of information literacy. Development of a search strategy and application of a search string to search engines and academic databases. Evaluation of information sources. Ethical and legal use of information. (Total notional time: 10 hours)

L**LIFE SKILLS (LFS125X)****CONTINUOUS ASSESSMENT****(Module custodian: Directorate of Student Development and Support)**

Personal, socio-emotional and academic skills development for students in higher education. This module includes 1. Intra- and interpersonal skills (e.g. emotional intelligence, relationships, and conflict management); 2. General study skills (e.g. time management, goal setting, learning styles); 3. Health and wellness (e.g. HIV/AIDS, GBV issues, substance abuse); 4. Student life and adjustment (e.g. identity development, adjusting to a higher education environment); and 5. Financial management. (Total notional time: 20 hours)

M**MANUFACTURING I (MAN115B)****1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To equip the student with a fundamental understanding of mechanical manufacturing materials and processes and how to apply these to a design problem. (Total notional time: 140 hours)

MANUFACTURING II (MAN317B)**1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To develop a broad-based knowledge and understanding of the student in the field of Tooling. (Total notional time: 140 hours)

MECHANICAL DESIGN PROJECTS (MEP307B)**CONTINUOUS ASSESSMENT****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To develop the advanced knowledge and understanding of the student in the process of problem assessment and design. (Total notional time: 280 hours)



MECHANICS (MEC105B)**1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To equip the student with a fundamental understanding of mechanics and how to apply these to a design problem. (Total notional time: 280 hours)

P**PROBABILITY AND STATISTICS (PAS206B)****1 X 3-HOUR PAPER****(Module custodian: Department of Mathematics and Statistics)**

Sampling techniques and descriptive statistics. Probability. Counting rules. Inferential statistics. Analysis of variance. Regression and correlation analysis. Non-parametric tests. (Total notional time: 140 hours)

S**SCIENTIFIC COMPUTING (SCP216B)****CONTINUOUS ASSESSMENT****(Module custodian: Department of Electrical Engineering)**

Scientific computing and programming environment. Fundamentals of programming: Selection and loop statements. Use-defined functions. Input, output and graphics. Engineering application case studies and simulations. (Total notional time: 140 hours)

STRENGTH OF MATERIALS I (SOM115B)**1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To provide a thorough foundation to the behaviour of materials under the action of external forces as required at higher levels of study and for the purpose of economically designing machine components. (Total notional time: 140 hours)

STRENGTH OF MATERIALS II (SOM307B)**1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To provide a sound foundation in the study of Mechanical of Materials advanced knowledge to the behaviour of materials under the action of external forces as required at higher levels of study and for the purpose of economically designing Machine Components. (Total notional time: 280 hours)

T**THERMODYNAMICS (THE207B)****1 X 3-HOUR PAPER****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

To equip the student with a fundamental understanding of the principles of thermodynamics and how these fundamentals are applied in the design and analysis of thermo-fluid systems. (Total notional time: 280 hours)

