

BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL

Qualification code: BTME05 - NQF Level 7

Campus where offered: Pretoria Campus

Important notification to new applicants:

Students who intend to enrol for this qualification should take note that no new applications will be accepted as from 2020. Potential students are advised to consult the University's website for possible new qualifications which are aligned with the newly-implemented Higher Education Qualification Sub-Framework.

REMARKS

a. *Admission requirement(s):*

A National Diploma: Engineering: Mechanical or an NQF Level 6 (old NQF and new HEQF) qualification in Mechanical Engineering (or a closely related field), obtained from an accredited South African university. Preference will be given to candidates with an average of 60% or more. Candidates who do not meet the 60% requirement will be evaluated by the Department and may be requested to provide a portfolio of relevant work experience (excluding P1 and P2) in order to be considered for selection.

National Diploma students at TUT who are busy with their final semester (P2) and do not have more than one theoretical subject outstanding may also apply for admission and may be considered based on the average of their completed theoretical subjects, but admission will be subject to the successful completion of the National Diploma and the Faculty's Student Enrolment Plan (SEP).

Holders of any other equivalent South African or international qualifications may also be considered, but will have to apply at least six months in advance for the recognition of such qualifications. Candidates will be required to submit an evaluation of their qualifications by the South African Qualifications Authority (SAQA) with their application forms for admission. The University and/or Faculty reserves the right to assess these qualifications and the applicant's suitability and/or competence for admission to the programme. Depending on the nature of such an equivalent qualification, the completion of certain additional subjects may be required. Proof of English proficiency may be required.

b. *Selection criteria:*

Due to capacity constraints, candidates will be selected based on academic performance and/or work experience. Selection will be done after the closing date for applications. Please note that meeting the minimum requirements does not guarantee admission.

c. *Minimum duration:*

One year.

d. *Presentation:*

Block-mode classes presented three days per month over a period of one or two years. Classes and assessments may take place on Friday afternoons and/or Saturdays.

e. *Intake for the qualification:*

January and July.

f. *Exclusion and readmission:*

See Chapter 2 of Students' Rules and Regulations.

g. *Recognition of Prior Learning (RPL), equivalence and status:*

See Chapter 30 of Students' Rules and Regulations.



- h. *Engineering Design Project IV:*
A student may register (and re-register) for the subject Engineering Design Project IV (EDP400T/R) only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the project only and to prevent them from failing and having to re-do it.
- i. *Accreditation by professional body:*
This qualification has been accredited by the Engineering Council of South Africa (ECSA).
- j. *Waiving of prerequisite subjects:*
Prerequisites will only be waived in highly exceptional cases, based on a motivation by the Head of the Department and approved by the Executive Dean (prerequisite subjects published in Report 151 are excluded).
- k. *Subject credits:*
Subject credits are shown in brackets after each subject.

CURRICULUM

FIRST OR SECOND SEMESTER

Subjects are offered as determined by the Head of the Department.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
EDP400T	Engineering Design Project IV (year subject)	(0,250)	Mechanical Engineering Design III
EDP401R	Engineering Design Project IV (re-registration)	(0,000)	

plus two of the following subjects:

FMS411T	Fluid Mechanics IV	(0,125)	Hydraulic Machines III
MMH411T	Mechanics of Machines IV	(0,125)	Mathematics III
SMT411T	Strength of Materials IV	(0,125)	Theory of Machines III Applied Strength of Materials III
TDN401T	Thermodynamics IV	(0,125)	Mathematics III Mathematics III Steam Plant III

plus two of the remaining subjects above and two of the following subjects or four of the following subjects:

ATC411T	Automatic Control IV	(0,125)	Mathematics III Theory of Machines III
MFE401T	Manufacturing Engineering IV	(0,125)	Mechanical Manufacturing Engineering III
RAC401T	Refrigeration and Air Conditioning IV	(0,125)	Steam Plant III
SAN401T	Stress Analysis IV	(0,125)	Applied Strength of Materials III Mathematics III
TRM401T	Turbo Machines IV	(0,125)	Hydraulic Machines III

TOTAL CREDITS FOR THE QUALIFICATION: 1,000

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:



A**AUTOMATIC CONTROL IV (ATC411T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Gyroscopes. Elements of automatic control. Automatic control. Transducers. System design. (Total tuition time: ± 68 hours)

D**DIGITAL CONTROL SYSTEMS IV (DCS401T)****1 X 3-HOUR PAPER (OPEN BOOK)****(Subject custodian: Department of Electrical Engineering)**

Discrete-time models and sampled data systems, difference equations, mathematical representation of the sampling process using the Z-transform, analysis of sampled data systems, stability considerations of sampled data systems, design of compensation for sampled data systems, using transform techniques. (Total tuition time: ± 70 hours)

E**ENGINEERING DESIGN PROJECT IV (EDP400T, EDP401R)****PROJECT ASSESSMENT****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Engineering management, project management, human resource management, law of contract, accounting and financial management, budgeting and the completion of an industrial project. (Total tuition time: ± 68 hours)

F**FLUID MECHANICS IV (FMS411T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Dimensional analysis and similarity. Flow over immersed bodies, external flow. Compressible flow. Advanced flow in pipes. (Total tuition time: ± 68 hours)

M**MANUFACTURING ENGINEERING IV (MFE401T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

The management of computer-integrated manufacturing (CIM) systems will be dealt with in two parts: Part 1: Computer-Aided Engineering (CAE), which covers quality, process and capacity planning and costs, Part 2: Computer-Aided Manufacturing (CAM), which covers aspects such as automation and implementation. Individual aspects of CIM, such as robotics, flexible assembly systems (FAS) and flexible Manufacturing systems (FMS), will be covered in project work. (Total tuition time: ± 68 hours)

MECHANICS OF MACHINES IV (MMH411T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Fundamentals of vibration, free vibration of single degree of freedom systems, free vibration of an undamped translational and torsional system, free vibration with viscous damping, response of an undamped and damped system under harmonic force, response of a damped system under the harmonic motion of the base and under rotating unbalance, two degree of freedom systems, multidegree of freedom systems, determination of natural frequencies and mode shapes of a multidegree of freedom system. (Total tuition time: ± 68 hours)

R**REFRIGERATION AND AIR CONDITIONING IV (RAC401T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Air-conditioning. Refrigeration. Cold storage. Solar power. (Total tuition time: ± 68 hours)

S**STRENGTH OF MATERIALS IV (SMT411T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Theories of elastic failure. Deflection of beams. Energy methods – coplanar frames. Asymmetrical bending, shear stress in beams. Strains beyond the elastic limit. Struts. Contact stress (Hertz stress). (Total tuition time: ± 68 hours)



STRESS ANALYSIS IV (SAN401T)**1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Energy methods (space frames). The finite element method. Finite element (modelling techniques). Solutions using a commercially available finite element programme. Stress concentration. Stress in rotation machinery. (Total tuition time: ± 68 hours)

T**THERMODYNAMICS IV (TDN401T)****1 X 3-HOUR PAPER****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Basics of heat transfer, heat conduction equation, steady heat conduction, fundamentals of convection, external forced convection, internal forced convection, natural convection, fundamental of thermal radiation, radiation heat transfer, heat exchanger. (Total tuition time: ± 68 hours)

TURBO MACHINES IV (TRM401T)**1 X 3-HOUR PAPER (PRESCRIBED OPEN BOOK)****(Subject custodian: Department of Mechanical Engineering, Mechatronics and Industrial Design)**

Axial fans and pumps. Axial and centrifugal turbines and compressors. (Total tuition time: ± 68 hours)

