

# BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL

Qualification code: BTME05 - NQF Level 7

Campus where offered: Pretoria Campus (block-mode classes)  
Last year of new intake: July 2019  
Teach-out (phase-out) date: 30 June 2023

Students registered for this qualification should complete their studies according to the teach-out date prescribed for the qualification, subject to the stipulations of Regulation 3.1.11 and 3.1.13 in the Students' Rules and Regulations.

Information on phased-out programmes can be obtained from the TUT website, [www.tut.ac.za](http://www.tut.ac.za).

## CURRICULUM

Consult the 2019 Faculty Prospectus for the full contents of the qualification.

### 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)	
<b>plus two of the following subjects:</b>			
FMS411T	Fluid Mechanics IV	(0,125)	Hydraulic Machines III
MMH411T	Mechanics of Machines IV	(0,125)	Mathematics III Theory of Machines III
SMT411T	Strength of Materials IV	(0,125)	Applied Strength of Materials III Mathematics III
TDN401T	Thermodynamics IV	(0,125)	Mathematics III
<b>plus two of the remaining subjects above and two of the following subjects or four of the following subjects:</b>			
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:		<b>1,000</b>	



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

### A

**AUTOMATIC CONTROL IV (ATC411T)** **1 X 3-HOUR PAPER**  
(Subject custodian: Department of Mechanical and Mechatronics Engineering)  
Gyroscopes. Elements of automatic control. Automatic control. Transducers. System design. (Total tuition time: ± 68 hours)

### E

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

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 and Mechatronics Engineering)**

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 and Mechatronics Engineering)**

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

