BACHELOR OF ENGINEERING TECHNOLOGY IN INDUSTRIAL ENGINEERING

Qualification code: BPIE19 - NQF Level 7 (420 credits)

SAQA ID: 101698, CHE NUMBER: H/H16/E027CAN

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

b. *Assessment Procedure:*
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 Industrial 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. *Minimum duration:*
Three years.

f. *Presentation:*
Day classes. Working students with a National Diploma may be permitted to register for certain modules on a block-mode basis.

g. *Exclusion and readmission:*
See Chapter 2 of Students' Rules and Regulations.

Key to asterisks:
* Modules may be offered in block mode to working students. Full details on the offering is available from the department.

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)	
EMA105B	Engineering Mathematics I	(5)	(28)	
INL125C	Information Literacy (block module)	(5)	(1)	
IWS105B	Industrial Work Systems	(5)	(42)	
LFS125X	Life Skills (block module)	(5)	(2)	
MEC105B	Mechanics	(5)	(28)	
TOTAL CREDITS FOR THE FIRST YEAR:			**126**	

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EMA206B	Engineering Mathematics II*	(6)	(14)	Engineering Mathematics I
PAA206B	Production and Automation	(6)	(42)	Engineering Mathematics I
PAS206B	Probability and Statistics*	(6)	(14)	Engineering Mathematics I
PRE206B	Production Engineering	(6)	(28)	Engineering Mathematics I
FIRST SEMESTER				
OPR216B	Operational Research	(6)	(14)	Engineering Mathematics I
POE215B	Project Engineering*	(5)	(14)	
SECOND SEMESTER				
SCP216B	Scientific Computing*	(6)	(14)	
SID216B	Simulation Design*	(6)	(14)	Engineering Graphics Engineering Mathematics I
TOTAL CREDITS FOR THE SECOND YEAR:			**154**	

THIRD YEAR

CODE	MODULE	NQF-L	CREDIT	PREREQUISITE MODULE(S)
EBM307B	Engineering Business Management*	(7)	(28)	
IDP307B	Industrial Design Projects*	(7)	(28)	
QMS307B	Quality Engineering and Management Systems*	(7)	(28)	
SYE307B	System Engineering*	(7)	(28)	
FIRST SEMESTER				
EPR317B	Engineering Practice*	(7)	(14)	
SECOND SEMESTER				
One of the following modules:				
AMF317B	Advanced Manufacturing*	(7)	(14)	
SCS317B	Supply Chain Systems*	(7)	(14)	
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:

A

ADVANCED MANUFACTURING (AMF317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Industrial Engineering)

General manufacturing knowledge, as well as cognitive and conceptual tools, other modules in the qualification and in the workplace. The relationship between the scientific theory and real life emphasized. (Total tuition time: ± 140 hours)

C

COMMUNICATION SKILLS (COS105X) **1 X 2-HOUR PAPER**

(Module custodian: Department of Chemical, Metallurgical and Materials 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 tuition time: ± 40 hours)

COMPUTER LITERACY (COL105X) **CONTINUOUS ASSESSMENT**

(Module custodian: End User Computing Unit)

Students have to acquire foundational knowledge in Computing Fundamentals, essential digital skills in key applications based on Ms Office Suite (i.e. MS Word, MS Excel, MS PowerPoint, MS Visio Professional and MS Access) and network basics (i.e. MS Outlook and Internet). A complete syllabus and module outlines are described in the study guide. Students will do online exams that are mapped with SAQA and IC3 Essential Skills for Digital Literacy (International Certification). (Total tuition time: not available)

E

ENGINEERING BUSINESS MANAGEMENT (EBM307B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Industrial Engineering)

Cost accounting and financial management in engineering projects, strategies for allocation of cost as well as the tools to assist in decision making to optimise business success through making good choices. Analyse and interpret engineering financial reports. Human aspects in project management are addressed and dealing with teams and the approaches to managing change. Software utilised in the industry for financial analysis is considered. (Total tuition 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 tuition time: not available)

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 tuition time: not available)

ENGINEERING MATHEMATICS II (EMA206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Mathematics and Statistics)

Mathematical modelling, first-order ordinary differential equations (ODEs), higer-order ODEs, Laplace transforms, systems of ODE's, numerical solutions of ODEs, Sturm-Liouville problems, partial differential equations. (Total tuition time: not available)

ENGINEERING PRACTICE (EPR317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Electrical Engineering)

Effective plan and execute projects. Write quality technical reports and communicate project information. Managerial as well as human resource functions, ethical behaviour in the workplace. Contract law as well as entrepreneurship will be presented during the module enabling the student to identify and assess new business opportunities within an ethical and legal context. (Total tuition time: ± 140 hours)

I

INDUSTRIAL DESIGN PROJECTS (IDP307B) **PROJECT ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Integration of theoretical concepts gained in various disciplines into a project that will solve a problem, guide on how to apply industrial engineering inputs in any design project and also encourage development of team spirit necessary to be attained in preparation for the world of work. (Total tuition time: ± 280 hours)

INDUSTRIAL WORK SYSTEMS (IWS105B) **2 X 3-HOUR PAPERS**

(Module custodian: Department of Industrial Engineering)

Productivity. Problem solving and operation analysis tools. Method Study. Work measurement. Compensation. Facilities design. Assembly Lines. Material Handling. Storage and warehousing. Computers in facilities design. Legislation. (Total tuition time: ± 420 hours)

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 tuition time: ± 10 hours)

L

LIFE SKILLS (LFS125X) **CONTINUOUS ASSESSMENT**

(Module custodian: Directorate of Student Development and Support)

Academic, personal and socio-emotional skills development for students in higher education. Personal and social dimensions address: Effective planning and self-management (goal setting and time management); Adjusting to university life (student life, diversity and change); Intra- and interpersonal skills development (conflict management, self-esteem, relationship management); Effective living (healthy living, HIV education, substance abuse). Academic dimension addresses: Academic skills for university (e.g. critical thinking, creativity, managing assignments and assessments). (Total tuition time: ± 20 hours)

M

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 tuition time: ± 280 hours)

O

OPERATIONAL RESEARCH (OPR216B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Industrial Engineering)

Fundamentals of decision theory. Decision trees. Linear programming: graphic methods. Linear programming: the simplex method. Linear programming: sensitivity analysis, duality. Linear programming: applications. Transportation and assignment methods. Integer programming, goal programming and the branch and bound method. Waiting Lines. Introduction to project management using PERT diagram. Simulation modeling. Markov analysis. (Total tuition time: ± 140 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 tuition time: not available)

PRODUCTION AND AUTOMATION (PAA206B) **2 X 3-HOUR PAPERS**

(Module custodian: Department of Industrial Engineering)

Manufacturing processes, design and development of products. Theory, laboratory work and practical. Manufacturing and the technologies associated with the design and analysis of products processes. Automation and associated technologies. (Total tuition time: ± 420 hours)

PRODUCTION ENGINEERING (PRE206B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Industrial Engineering)

Identifying and investigating factors that hamper productivity in the organisation; Selecting the appropriate methodologies that will solve operational problems; Proposing solutions to operational dysfunctions by applying the prescribed methodologies; Identifying and investigating factors that hamper productivity in the organisation; proposing solutions to operational dysfunctions by applying the prescribed method study techniques; Selecting the appropriate direct work measurement technique(s) to measure the work content of a given task; Whilst taking into consideration the work environment, The human factor and the impact of technology on the particular business environment. (Total tuition time: ± 280 hours)

PROJECT ENGINEERING (POE215B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Industrial Engineering)

Need for and advantages of project management. Definition of the project. Modern project planning methods. Communication and presentation of information. Feasibility studies (affordability). Project implementation. Support of the operational systems. Case studies, projects and computer applications. (Total tuition time: ± 140 hours)

Q

QUALITY ENGINEERING AND MANAGEMENT SYSTEMS (QMS307B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Industrial Engineering)

Analyse different management systems and process to ensure effective operations. Enhance the understanding of quality and management systems in industry. Knowledge regarding management and management systems to solve broadly defined engineering problems in the industrial engineering environment. Problem solving will be developed. (Total tuition time: ± 280 hours)

S

SUPPLY CHAIN SYSTEMS (SCS317B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Industrial Engineering)

Provide general supply chain knowledge, as well as the fundamental ways in which a supply chain can be designed, implemented and managed. (Total tuition time: ± 140 hours)

SCIENTIFIC COMPUTING (SCP216B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Electrical Engineering)

To provide students with an introduction, as well as cognitive and conceptual tools, for implementation in other modules in the qualification and in the workplace. The focus will be on modelling applications in engineering. (Total tuition time: ± 140 hours)

SIMULATION DESIGN (SID216B) **CONTINUOUS ASSESSMENT**

(Module custodian: Department of Industrial Engineering)

Modes of simulation and its application in solving real life engineering problems. Knowledge of Simulation Design is essential for component development in engineering disciplines. Introduce simulation software, operations scheduling and other modules to become competent in simulation designs. The relationship between simulation design and real life models will be emphasised in all units. (Total tuition time: ± 140 hours)

SYSTEM ENGINEERING (SYE307B) **1 X 3-HOUR PAPER**

(Module custodian: Department of Industrial Engineering)

Systems thinking, concepts, methodologies, models, and tools needed to understand, tailor, and apply systems engineering to most types of human made systems. Interdisciplinary application of scientific and engineering effort, role as systems thinkers and process engineers. The nature of systems engineering being life-cycle orientated ensures the study of systems engineering encompasses, economic, environmental and social implications of bringing systems into being, whether it be products, services, operations, temporary or permanent projects. (Total tuition time: ± 280 hours)