

HIGHER CERTIFICATE IN ELECTRICAL ENGINEERING

Qualification code: HCEE18 - NQF Level 5 (140 credits)

SAQA ID: 97909, CHE NUMBER: H/H16/E033CAN

Campus where offered:

Pretoria and eMalahleni campuses

REMARKS

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

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

Admission requirement(s):

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

Selection criteria:

To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20**.

Recommended subject(s):

None.

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

Admission requirement(s):

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

Applicants who do not meet the requirements for Mathematics, Physical Sciences, or any of the two additional subjects may enroll for these subjects at any Technical and Vocational Education and Training (TVET) College (see National N Certificate requirements), and if these are successfully passed at a performance level of at least 50%, they may re-apply for admission to the University.

Selection criteria:

To be considered for this qualification, applicants must have an Admission Point Score (APS) of at least **20** (excluding Life Orientation).

Recommended subject(s):

Electrical 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 or a diploma, or a higher certificate 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 50% for Life Orientation (excluded for APS calculation) and 40% (APS of 3) for Science, and 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 **20** (excluding Life Orientation).



Recommended subject(s):

Digital Electronics, Electrical Principles and Practice, Electrical Principles and Construction, Electrical Workmanship and Electronic Control.

• **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 **20** (excluding Life Orientation).

Recommended subject(s):

None.

• **APPLICANTS WITH A N4 CERTIFICATE IN A RELATED ENGINEERING FIELD AS PUBLISHED IN REPORT 191: N4:**

Admission requirement(s):

A N4 Certificate in a related Engineering field as published in Report 191: N4 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 an average of 50% for the qualification, and successful completion of an English Language Proficiency Assessment (done by the University).

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.

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. Classes and assessments may take place on Friday afternoons and/or Saturdays.

f. *Minimum duration:*
One year.

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



CURRICULUM

ATTENDANCE

CODE	MODULE	NQF-L	CREDIT
COM105X	Communication Skills	(5)	(8)
CML105X	Computer Literacy	(5)	(10)
EGL105C	Engineering Graphics	(5)	(14)
EPH105C	Engineering Physics	(5)	(14)
INL125C	Information Literacy (block module)	(5)	(1)
LFS125X	Life Skills (block module)	(5)	(2)
TMA105C	Technical Mathematics	(5)	(21)

FIRST SEMESTER

EEN115C	Electrical Technology	(5)	(14)
WSP115C	Workshop Practice	(5)	(14)

SECOND SEMESTER

DSY115C	Digital Technology	(5)	(14)
ETY115C	Electronic Technology	(5)	(14)

plus one of the following modules:

ATE115C	Autotronic Technology	(5)	(14)
ELA115C	Electronic Assembly	(5)	(14)

TOTAL CREDITS FOR THE QUALIFICATION: **140**

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. On 01 October 2019, the syllabus content was defined as follows:

A

AUTOTRONIC TECHNOLOGY (ATE115C)

CONTINUOUS ASSESSMENT

(Module custodian: Department of Electrical Engineering)

Basic Electrical Technology. Measurement principles. Electrochemical energy storage and generation. Electromagnetic actuators and principles of sensors. Alternating Current Theory, generation, regulation, application. Digital techniques and field programmable gate arrays. Electronic Communication networks (CAN bus) and wireless networks (Android based). Project. (Total tuition time: ± 140 hours)

C

COMMUNICATION SKILLS (COM105X)

1 X 2-HOUR PAPER

(Module custodian: Department of Applied Languages)

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 (CML105X)**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)

D**DIGITAL TECHNOLOGY (DSY115C)****1 X 3-HOUR PAPER****(Module custodian: Department of Electrical Engineering)**

Introductory digital concepts; Number systems (Decimal, Binary, Hexadecimal, Octal); Logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR), Boolean Algebra, Karnaugh Maps, Design Techniques and Code Converters; Combinational Logic: Adders, Comparators, Multiplexers, Demultiplexers, Encoders, Decoders, Code converters; Latches and Flip-Flops, 555 Timers; Asynchronous and Synchronous counters. (Total tuition time: ± 140 hours)

E**ELECTRICAL TECHNOLOGY (EEN115C)****1 X 3-HOUR PAPER****(Module custodian: Department of Electrical Engineering)**

Basic Electrical Technology (DC). Electrical Circuits (DC). Electrostatics (DC). Magnetism and electromagnetism. Alternating Current Theory. Alternating Current Circuits. Electrical System Networks. (Total tuition time: ± 140 hours)

ELECTRONIC ASSEMBLY (ELA115C)**CONTINUOUS ASSESSMENT****(Module custodian: Department of Electrical Engineering)**

Introduction to manufacturing and production processes; Tools, components and PCB selection and preparation; Through-hole assembly techniques; Surface mount assembly techniques; Cleaning, inspection, testing, and packaging of electronic assemblies. (Total tuition time: ± 140 hours)

ELECTRONIC TECHNOLOGY (ETY115C)**1 X 3 HOUR PAPER****(Module custodian: Department of Electrical Engineering)**

Passive and active components, Diodes and special diodes; Power supply construction; Bipolar Junction Transistors; Field Effect Transistors; Introduction to signal analysis. (Total tuition time: ± 140 hours)

ENGINEERING GRAPHICS (EGL105C)**CONTINUOUS ASSESSMENT****(Module custodian: Department of Mechanical and Mechatronics Engineering)**

Introduction to graphics communication. Dimensioning and tolerance practices. Geometrical construction. Pictorial projections. Interpenetration and development. Machine drawings. Civil drawings including electrical diagrams. (Total tuition time: ± 140 hours)

ENGINEERING PHYSICS (EPH105C)**1 X 3-HOUR PAPER****(Module custodian: Department of Physics)**

Basic mathematics for physics. Introduction to calculus-based physics. Measurements. Kinematics in 1-D and 2-D. Forces and Newton's laws of motion. Dynamics of uniform circular motion. Work energy and power. Impulse and momentum. Rotational kinematics and dynamics. Elasticity. Static and dynamic fluids, temperature and heat. The ideal gas law and kinetic theory. Electric forces and fields. Electric potential energy and the electric potential. Electric circuits. Reflection of light: mirrors, lenses and optical instruments. (Total tuition 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 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)

T**TECHNICAL MATHEMATICS (TMA105C)****1 X 3-HOUR PAPER****(Module custodian: Department of Mathematics and Statistics)**

Matrices, engineering calculations, functions for engineers, trigonometry, geometry, vectors, Introduction to differentiation and integration, applications of differentiation and integration, data handling. (Total tuition time: not available)

W**WORKSHOP PRACTICE (WSP115C)****CONTINUOUS ASSESSMENT****(Module custodian: Department of Electrical Engineering)**

Workshop safety. First aid. Measuring techniques. Tools (hand tools, pneumatic/hydraulic/electric). Soldering. Printed circuit board design. Wiring circuits (electrical). Construction and application. (Total tuition time: ± 140 hours)

