

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:*

• **FOR APPLICANTS WHO OBTAINED A SENIOR CERTIFICATE BEFORE 2008:**

Admission requirement(s):

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

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

Admission requirement(s):

A National Senior Certificate or an equivalent qualification, with 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 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**.

Recommended subject(s):

Electrical Technology and Engineering Graphics and Design.

• **FOR APPLICANTS WHO OBTAINED A QUALIFICATION FROM TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) COLLEGES (PREVIOUSLY KNOWN AS FET COLLEGES):**

Applicants with a National Certificate (Vocational) at NQF Level 4:

Admission requirement(s):

A National Certificate (Vocational) at NQF Level 4, with a higher certificate endorsement, issued by the Council for Quality Assurance in General and Further Education and Training (Umalusi), with at least 50% for English and Mathematics and at least 40% for Physical Sciences and any three vocational subjects.

Selection criteria:

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



Recommended subject(s):

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

Applicants with a National N Certificate as published in Nated 191: N3 (NQF Level 4):**Admission requirement(s):**

A National Senior Certificate and a National N Certificate as published in Nated 191: N3 (NQF Level 4) issued by both the Department of Higher Education (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 two N3 vocational subjects.

Selection criteria:

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

Recommended subject(s):

Electrical Trade Theory, Electro Technology, Engineering Drawing and Industrial Electronics.

- b. *Assessment procedure:*
All applications received by the published due dates will be ranked according to the APS achieved. After consideration of the Departmental Student Enrolment Plan (SEP), only the top performing applicants will be selected. A waiting list consisting of the remainder of the applicants will provide an opportunity for applicants to fill places created by accepted students failing to meet the enrolment dates. Applicants will be informed per official letter from the Office of the Registrar.
- c. *Minimum duration:*
One year.
- d. *Presentation:*
Day classes. Classes and assessments may take place on Friday afternoons and/or Saturdays.
- e. *Intake for the qualification:*
January only.
- 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. *Module credits:*
Module credits are shown in brackets after each module.

CURRICULUM

ATTENDANCE

CODE	MODULE	NQF-L	CREDIT
COM105X	Communication Skills	(5)	(8)
CPL105X	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)
ELC115C	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 8 August 2018, 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 (CPL105X)

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 (ELC115C)**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 Engineering, Mechatronics and Industrial Design)*

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)



WORKSHOP PRACTICE (WSP115C)**CONTINUOUS ASSESSMENT**

(Subject 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)

