

HIGHER CERTIFICATE IN CONSTRUCTION ENGINEERING

HCert (Construction Engineering) - NQF Level 5 (140 credits)

Qualification code: HCCE18

(Specialisation code for admission and registration: HCCM18 / HCCW18)

SAQA ID: 97887, CHE NUMBER: H/H16/E034CAN

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 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):

Civil Technology and Engineering Graphics and Design.

• **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 50% (APS of 4) 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):

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 **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(s):*

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
CML105X	Computer Literacy	(5)	(10)
COM105X	Communication Skills	(5)	(8)
CPM105C	Construction Management	(5)	(21)
EGC105C	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)

plus one of the following options:

Option 1: Construction Material Testing (HCCM18)

FIRST SEMESTER

ENC115C	Engineering Chemistry	(5)	(7)
STC115C	Soil Technology	(5)	(14)

SECOND SEMESTER

BAT115C	Bitumen and Asphalt Technology	(5)	(14)
ECC115C	Concrete and Aggregate Technology	(5)	(14)

Option 2: Water and Wastewater Engineering Infrastructural Operations and Maintenance (HCCW18)

FIRST SEMESTER

ENC115C	Engineering Chemistry	(5)	(7)
WRO115C	Water Reticulation Operation and Maintenance	(5)	(14)

SECOND SEMESTER

WSO115C	Water System Operation and Maintenance	(5)	(14)
WWS115C	Wastewater System Operation and Maintenance	(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. At time of publication, the syllabus content was defined as follows:

B

BITUMEN AND ASPHALT TECHNOLOGY (BAT115C) *(Module custodian: Department of Civil Engineering)*

1 X 3-HOUR PAPER

Bitumen and asphalt properties. Bitumen and asphalt tests and result interpretation and safety system. (Total notional time: 140 hours)



C**COMMUNICATION SKILLS (COM105X)****1 X 2-HOUR PAPER****(Module custodian: Department of Industrial 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 notional time: 80 hours)

COMPUTER LITERACY (CML105X)**CONTINUOUS ASSESSMENT****(Module custodian: End User Computing Unit)**

This module provides foundational knowledge in computing fundamentals, essential digital skills in key applications based on MS Office Suite and network basics (i.e. MS Outlook and Internet). Online exams are mapped with End-User Computing: SAQA 49077 (61591) Core Element as well as Internet and Computing Core Certification. (IC3). (Total notional time: 100 hours)

CONCRETE AND AGGREGATE TECHNOLOGY (ECC115C)**1 X 3-HOUR PAPER****(Module custodian: Department of Civil Engineering)**

Aggregate properties. Aggregate tests and result interpretation. Concrete properties. Concrete tests and result interpretation and Safety system. (Total notional time: 140 hours)

CONSTRUCTION MANAGEMENT (CPM105C)**1 X 3-HOUR PAPER****(Module custodian: Department of Civil Engineering)**

Basic principles of management. Organisational structures. Procurement and storage of materials, plant and equipment. Cost control of resources. Safety and occupational health in work place. Engineering ethics. Sustainable development and legal Issues in construction industry. (Total notional time: 210 hours)

E**ENGINEERING CHEMISTRY (ENC115C)****1 X 3-HOUR PAPER****(Module custodian: Department of Civil Engineering)**

This module provides knowledge for Civil Engineers on concepts used in the industry that need a basic chemical background. The Concepts covered in this module are: Atoms, protons, neutrons, electrons, atomic and mass number, isotopes, the periodic table, molecules, empirical and molecular formula, ions, oxidation, reduction, naming chemical compounds, Bohr model, electron configuration of atoms, covalent bond, ionic bond, polar covalent bond, Hydrogen bond, single replacement reaction, double replacement reaction, combination reaction, decomposition reaction, balancing ionic and net ionic reactions, oxidation numbers, balancing redox reactions, moles, Avogadro's number, conversion of moles to mass/molecules, calculation of reaction mass, mole calculations in solutions, volume calculations of solutions, concentration calculations of solutions, calculation of percentage yield, hydration reaction of cement, role of gypsum as flash setting inhibitor, chemistry of extenders used in cement (GGBS, FA, CSF), chemical composition of various types of clay, the ion exchange reaction, chemical stabilization of clay in soil, water purification process, coagulation, flocculation, sedimentation, filtration, chemical composition of bitumen and polymer modifiers used in bitumen, asphaltenes, resins, aromatics, saturates, production of penetration grade bitumen, types of penetration grade bitumen, types of modifiers. (Total notional time: 70 hours)

ENGINEERING GRAPHICS (EGC105C)**CONTINUOUS ASSESSMENT****(Module custodian: Department of Civil Engineering)**

Drawing apparatus, drawing basics, construction geometry, orthographic projection, sections, isometric projection, CAD fundamentals and application of CAD to building drawings. (Total notional time: 140 hours)

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

Basic mathematics and vectors. Measurements. Kinematics in 1 dimension. Forces and Newton's laws of motion. Work energy and power. Elasticity. Static and dynamic fluids. Temperature and heat. Wave properties. Reflection of light and mirrors; refraction of light and lenses and optical instruments. (Total notional 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 notional time: 10 hours)

L**LIFE SKILLS (LFS125X)****CONTINUOUS ASSESSMENT****(Module custodian: Directorate of Student Development and Support)**

Personal, socio-emotional and academic skills development for students in higher education. This module includes 1. Intra- and interpersonal skills (e.g. emotional intelligence, relationships, and conflict management); 2. General study skills (e.g. time management, goal setting, learning styles); 3. Health and wellness (e.g. HIV/AIDS, GBV issues, substance abuse); 4. Student life and adjustment (e.g. identity development, adjusting to a higher education environment); and 5. Financial management. (Total notional time: 20 hours)

S**SOIL TECHNOLOGY (STC115C)****1 X 3-HOUR PAPER****(Module custodian: Department of Civil Engineering)**

Soil properties. Geotechnical site investigation. Soil tests and result interpretation and safety system. (Total notional time: 140 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 notional time: 210 hours)

W**WATER RETICULATION OPERATION AND MAINTENANCE (WRO115C)****1 X 3-HOUR PAPER****(Module custodian: Department of Civil Engineering)**

Storage facilities. Reticulation facilities. Water quality characteristics in reticulation networks and reticulation network operation and maintenance. (Total notional time: 140 hours)

WATER SYSTEM OPERATION AND MAINTENANCE (WSO115C)**1 X 3-HOUR PAPER****(Module custodian: Department of Civil Engineering)**

Water Sources and treatment. Wells. Water treatment plants and disinfection. (Total notional time: 140 hours)

WASTEWATER SYSTEM OPERATION AND MAINTENANCE (WWS115C)**1 X 3-HOUR PAPER****(Module custodian: Department of Civil Engineering)**

Waste collection, treatment and discharge systems. Septic tanks and pumping systems. Wastewater treatment and effluent discharge methods. Collection systems and maintenance and troubleshooting. (Total notional time: 140 hours)

