NATIONAL DIPLOMA: BUILDING
Qualification code: NDBU04 - NQF Level 6

Campus where offered: Pretoria Campus (day classes)
Last year of new intake: 2016
Teach-out (phase-out) date: 31 December 2021

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.

Key to asterisks:
* Information does not correspond to information in Report 151.
(Deviations approved by the Senate in August 2005.)

CURRICULUM
Consult the 2016 Faculty Prospectus for the full contents of the qualification.

FIRST YEAR
Subjects printed in bold are not for registration purposes.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
SUBJECT GROUP A: MANAGEMENT, APPLIED AND COMMUNICATION (MAC): A student may not register for a total number of subjects exceeding 0,584 credits.			
ABC101T	Applied Building Science I	(0,166)*	
CMN101T	Construction Management I	(0,167)	
COM151T	Communication I	(0,083)	
SUBJECT GROUP B: TECHNOLOGY, SITE SURVEYING, QUANTITY SURVEYING (TSQ): A student may not register for a total number of subjects exceeding 0,584 credits.			
COA111C	Computer Applications I	(0,083)	
CTY111T	Construction Technology I	(0,167)	
QSU101T	Quantity Surveying I	(0,167)	
SSU101T	**Site Surveying I**		
SSU10XT	Site Surveying: Applications I	(0,084)	
SSU10YT	Site Surveying: Practical I	(0,083)	
TOTAL CREDITS FOR THE FIRST YEAR:		**1,000**	

SECOND YEAR
During this practical year, students must submit a report, in the form of an assignment, on actual experience which must be verified by supervisors in each of the following subjects:

RE-REGISTRATION SUBJECTS ARE OFFERED IN BOTH SEMESTERS.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
CMN200T	Construction Management II (year subject)	(0,166)*	Construction Management I
CMN201R	Construction Management II (re-registration)	(0,000)	
CTY210T	Construction Technology II (year subject)	(0,167)	Construction Technology I
CTY211R	Construction Technology II (re-registration)	(0,000)	
QSU210T	Quantity Surveying II (year subject)	(0,167)	Quantity Surveying I
QSU211R	Quantity Surveying II (re-registration)	(0,000)	

The following must be completed (students must compile and maintain a logbook of work completed, which must be certified by the supervisor at the place of employment):

EXP1BDG	Work-Integrated Learning I	(0,250)	
EXP2BDG	Work-Integrated Learning II	(0,250)	Work-Integrated Learning I

TOTAL CREDITS FOR THE SECOND YEAR: **1,000**

THIRD YEAR
Subjects are offered in both semesters. Subjects printed in bold are not for registration purposes.

CODE	SUBJECT	CREDIT	PREREQUISITE SUBJECT(S)
SUBJECT GROUP A: MANAGEMENT, ACCOUNTING, CONCRETE AND STRUCTURES (MAC): **A student may not register for a total number of subjects exceeding 0,584 credits.**			
CMN301T	Construction Management III	(0,166)*	Construction Management II
CSA311T	Construction Accounting III	(0,166)*	Construction Management II
SEK301T	**Structures and Concrete III**		
SEK30XT	Structures and Concrete: Structures III	(0,083)	Applied Building Science I
SEK30YT	Structures and Concrete: Concrete III	(0,084)	Applied Building Science I
SUBJECT GROUP B: TECHNOLOGY, QUANTITY SURVEYING AND PRICE ANALYSIS AND ESTIMATING (TSQ): **A student may not register for a total number of subjects exceeding 0,584 credits.**			
CTY311T	Construction Technology III	(0,167)	Construction Technology II
PAY311T	Price Analysis and Estimating III	(0,167)	Quantity Surveying II
QSU311T	Quantity Surveying III	(0,167)	Quantity Surveying II

TOTAL CREDITS FOR THE THIRD YEAR: **1,000**

TOTAL CREDITS FOR THE QUALIFICATION: **3,000**

SUBJECT/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 subject. On 13 October 2017, the syllabus content was defined as follows:

A

APPLIED BUILDING SCIENCE I (ABC101T) **1 X 3-HOUR PAPER**
(Subject custodian: Department of Building Sciences)
Basic mathematics. Basic algebra, geometry, mensuration, trigonometry, calculus. Basic applied mechanics as applied to concrete, steel and timber constructions in the building industry. Expansion and contraction. Convection, conduction and radiation of heat in buildings. Heat energy and units of measurement. Thermal conductivity and resistance. Sound: sound propagation and units of measurement, sound insulation, sound reflection, reverberation and acoustics. Reticulation and electricity consumption. Definition of basic electricity terms. Direct and indirect current. Serial and parallel circuits. Three-phase supply lines and power consumption of household appliances, pumps and lifts. Lighting in buildings: light propagation, photometry, basic units of measurement in lighting, artificial light. Basic concepts of hydrology. Pressure in liquids. Hydraulic jacks. Flow of liquid through pipes. Different types of pumps. Basic probability and statistics. (Total tuition time: ± 180 hours)

C

COMMUNICATION I (COM151T) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Applied Languages)
Communication theory, non-verbal communication (body language). Oral presentations, interviews, developing leadership and participation skills. Technical reports and correspondence. (Total tuition time: ± 180 hours)

COMPUTER APPLICATIONS I (COA111C) **1 X 3-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

Components of a microcomputer system, engineering applications of software. Managing personal computers. Introduction to computers. Basics of operating systems. Application programs, such as word-processing and spreadsheet programs. (Total tuition time: ± 180 hours)

CONSTRUCTION ACCOUNTING III (CSA311T) **1 X 3-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

The purpose of accounting. Records and first entries. Transactions up to trial balance of business and banking transactions. Closing entries up to balance sheet. Contract, sole owners, partnership, limited company and close corporation accounts. Application of a construction accounting computer program. (Total tuition time: ± 180 hours)

CONSTRUCTION MANAGEMENT I (CMN101T) **1 X 3-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

Organisations involved in the building industry. Parties involved in the construction process. Construction undertakings and their organisational structures. Obtaining contracts. Introduction to site administration and cost control. Site meetings. Management functions and components: productivity and work study. Introduction to project planning. Introduction to personnel management. Subcontractors. Principles and applications of microeconomics. Scarcity, choice, elasticity utility and demand efficiency and equity, production and costs, price determination under different market structures: perfect competition, imperfect competition as well as monopoly. (Total tuition time: ± 180 hours)

CONSTRUCTION MANAGEMENT II (CMN200T, CMN201R) **PROJECT ASSESSMENT**

(Subject custodian: Department of Building Sciences)

Introduction to Contract Law and the JBCC Minor Works contract. Projects based on relevant and appropriate site operations, which cover as many of the following topics as possible: legislation and company policy, communication in the micro-environment on the site, coordination of subcontractors, application of management functions and procedures, collection and application of information on plant, drawing up applications of bar charts, labour schedules, material schedules, plant-use schedules, plant maintenance schedules, networks, simple work study exercises. Application of the procurement and completion of materials for a building site. Application of the procurement and completion of materials for a building site. Principles and applications of macroeconomics. Measuring macroeconomic performance, simple Keynesian model, money and banking, fiscal and monetary policy, exchange rates and the balance of payments and introduction to international trade. Introduction to Building Information Modeling (BIM). BIM and the client. BIM in project management. Construction sequencing. Conflict, interference and collision detection. Facilities management. Faster and more effective processes. Controlled whole-life costs and environmental data. Lifecycle data. (Total tuition time: not available)

CONSTRUCTION MANAGEMENT III (CMN301T) **1 X 3-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

JBCC documentation. Construction management. Policy and planning. Pre-tender planning. Contract planning. Planning techniques. Network techniques, resource scheduling and optimum cost analysis. Bar charts. Line of balance techniques. Financial reporting and control. Perspectives on estimating, valuations, cost assessment, cost control and production control. Office and site administration and documentation. Applicable clauses from the standard contract for private work. Quality control. Labour relations and labour legislation. Industrial psychology. Human resource management. Occupational safety, health and welfare. Public relations. Introduction to law of contracts. Principles of construction law. Sale agreements and building contracts. Insolvency law. Insurance law. Dispute resolution. Tender conditions and adjudications. (Total tuition time: ± 180 hours)

CONSTRUCTION TECHNOLOGY I (CTY111T) **1 X 3-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

Draughtmanship and interpretation of drawings. Substructure and setting out of different types of foundations. Superstructure, i.e. walls, windows, doors. Concrete and timber suspension floors with stairs and railing. Roof construction and coverings. Electrical and plumbing services. Carpentry items, i.e. built-in cupboards, skirtings and ironmongery on fillings. Finishes on walls, floors and ceilings. Materials and properties in the building industry. (Total tuition time: ± 180 hours)

CONSTRUCTION TECHNOLOGY II (CTY210T, CTY211R) **PROJECT ASSESSMENT**

(Subject custodian: Department of Building Sciences)

Projects based on form-work materials and re-use factors. Precast concrete beams and floors. Metal doors and windows. Timber doors and windows. Glass properties. Prefabricated timber trusses. Roof coverings, eaves, flashings and rainwater goods. Dormer windows and use of attic space in roofs. Fireplaces. Fixing methods, fastenings and adhesives. Floor, wall and ceiling finishes. Drainage and plumbing detail. Paint to metal, plaster and timber. Industrial buildings. BIM and the architect. BIM and the engineer. BIM in construction management. BIM in building operations and maintenance. (Total tuition time: not available)

CONSTRUCTION TECHNOLOGY III (CTY311T) **1 X 3-HOUR PAPER**

(subject custodian: Department of Building Sciences)

Framed and load-bearing, multi-floor concepts. Use of shoring and strutting for lateral support of adjacent property. Types of soils. Testing of ground pressure resistance. Types of excavations. Keeping excavations free from water. Planking and strutting in excavations. Foundations: piles, raft foundations. Basements: wall construction and waterproofing. Form work and concrete: in situ concrete, pre-stress and after-stress concrete. Steel structures. Cladding of buildings. Installation of services such as air-conditioning, lifts, escalators, fire fittings and inspection trap doors. Special finishes on walls, ceilings and floors. (Total tuition time: ± 180 hours)

P

PRICE ANALYSIS AND ESTIMATING III (PAY311T) **1 X 3-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

Specification of items for analysis of unit rates in bills of quantities. Different methods of estimating. Factors which could influence the estimate. Cost calculation. Compiling unit rates. Material, labour, overheads and profit. Waste and storage of material. Analysis of costs of mechanical equipment. Subcontractors and suppliers. Analysis of unit rates. Pricing of specialist items. Provisional sums and prime cost items. Pricing of model preliminaries according to a standard system. Drawing up of unit rates for composite items such as additions and renovations. (Total tuition time: ± 180 hours)

Q

QUANTITY SURVEYING I (QSU101T) **1 X 3-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

Introduction to the principles, processes and methods of measurement and documentation of builders' work. Drawing up of bills of quantities. Drawing up a list of dimensions. Calculation of quantities. Measurement and description of the following elements of a single-storey building: foundations, including site clearance and simple demolitions, superstructure brickwork, solid floor construction, roofs, finishes, comprising plaster, paint and tiling on walls, conventional floors and plastered and boarded ceilings on brandering. Stock steel, timber and aluminium windows. Stock flush and hard-wood doors, including timber and metal frames. Adjustments for windows, doors and plain openings. Working up by squaring, abstracting and billing. (Total tuition time: ± 180 hours)

QUANTITY SURVEYING II (QSU210T, QSU211R) **PROJECT ASSESSMENT**

(Subject custodian: Department of Building Sciences)

Projects based on load-bearing structures, including measuring, abstracting and billing with full descriptions and specifications. Reference to manufacturer catalogues and the ASAQS Model Preambles regarding the following: precast and pre-stressed concrete beams and floors, standard metal doors and windows, standard timber doors and windows, glass, prefabricated timber trusses, roof coverings, eaves, flashing and rainwater goods, floor, wall and ceiling finishes, drainage and plumbing detail, paint. The above projects should be augmented with the following systems when compiling a bill of quantities: traditional method x, computerised method, the use of the model preambles and x preliminaries. The appointment of the members of the professional team and their fee scales. The use of standard forms for certificates. BIM in quantity surveying. BIM and cost estimating. (Total tuition time: not available)

QUANTITY SURVEYING III (QSU311T) **1 X 3-HOUR PAPER**

(Subject custodian: Department of Building Sciences)

Measurement and description of the following elements of multi-storey buildings: bulk earthworks and site clearance, load-bearing and framed concrete and brick structures, flat roofs, waterproofing to concrete roofs, sheet-metal covering and boarded roofs. Staircases, including balustrade walls, balustrading and finishes.

Structural steelwork. Finishes, comprising facings, in-situ terrazzo, patent plaster finishes, more complex tiling, panelling, other non-standard finishes and suspended ceilings. Purpose-made timber and aluminium windows and doors, including sidelights, fanlights and adjustments. Joinery fittings. Plumbing and drainage complete. Prime cost and provisional sums, payment certificates, including final account adjustments and builders' work regarding specialist installations. Practical working up and drawing up of bills of quantities, complete with trade preambles. (Total tuition time: ± 180 hours)

S

SITE SURVEYING: APPLICATIONS I (SSU10XT) **1 X 3-HOUR PAPER**
(Subject custodian: Department of Geomatics)
Linear surveying. Methods of measuring with a tape. Interpretation and layout of scale model drawings. Contouring and the use of laser equipment. Surveys of existing buildings. (Total tuition time: ± 100 hours)

SITE SURVEYING: PRACTICAL I (SSU10YT) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Geomatics)
Setting out sites and buildings by means of levelling and elementary tacheometry. Setting out and determining contours. Determining of heights of benchmarks by means of levelling instruments. (Total tuition time: ± 100 hours)

STRUCTURES AND CONCRETE: CONCRETE III (SEK30YT) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Civil Engineering)
Reinforced concrete column design, steel columns. Earth pressures and foundations. Concrete: properties of concrete, mix design, batching, mixing, transporting, placing, compaction and curing of concrete, ready-mixed concrete, concrete pumping, quality control, special techniques, repair of concrete and cost analysis. (Total tuition time: ± 180 hours)

STRUCTURES AND CONCRETE: STRUCTURES III (SEK30XT) **CONTINUOUS ASSESSMENT**
(Subject custodian: Department of Civil Engineering)
Structures: elementary structural analysis, calculation of sectional properties, shear force and bending moment diagrams of simple supported beams with dead loads, as well as the design of beams in timber and steel. Deflection of simple beams. (Total tuition time: ± 180 hours)

W

WORK-INTEGRATED LEARNING I (EXP1BDG) **WORK-INTEGRATED LEARNING**
WORK-INTEGRATED LEARNING II (EXP2BDG) **WORK-INTEGRATED LEARNING**
(Subject custodian: Department of Building Sciences)
Students are required to work for six months with approved employers who are –
- building contractors (preferably with MBA or BIA);
- registered quantity surveyors; or
- other employers approved by the Department of Building Sciences as being able to provide students with suitable Work-Integrated Learning.

Students should be given a broad introduction to the building industry and gain as much experience in the Build Industry as possible. (Total tuition time: six months)