

15.1.0 GENERAL BUILDING CONSTRUCTION I

15.1.1 Introduction
This module unit involves construction of buildings and related building works from foundations, walls, roofs, finishes and demolitions work. It is designed to equip the trainee with knowledge, skills and attitudes necessary to enable the trainee to work in a workshop or in a construction site.

The trainee should have basic knowledge in technical/building drawing and skills in use of tools and equipment used in building trades as well as building materials.

15.1.2 General Objectives
By the end of the module unit, the trainee should be able to:

- appreciate the need of observing safety rules at the place of work
- demonstrate ability to use tools and equipment safely and correctly
- appreciate the need of matching colours of the interior furnishings
- understand the purpose of fixing or applying finishes to a building construction project

15.1.3 Module Unit Summary and Time Allocation (77 Hours)

Code	Sub Module Units	Content	Time Hours	
			Theory	Pract
15.1.01	Introduction to Construction	<ul style="list-style-type: none"> Evolution of the Built Environment 	2	2
15.1.02	Site Investigation	<ul style="list-style-type: none"> Site Investigation Site Clearance 	2	2
15.1.03	Levelling	<ul style="list-style-type: none"> Methods of Levelling Tools and Equipment Used in Levelling 	2	3
15.1.04	Setting Out	<ul style="list-style-type: none"> Tools and Equipment Procedures 	2	6
15.1.05	Foundation	<ul style="list-style-type: none"> Tools and 	2	6

Code	Sub Module Units	Content	Time Hours		
			Theory	Pract	Total
		Equipment <ul style="list-style-type: none"> • Excavation • Dewatering Techniques • Electro-Osmosis • Freezing • Well Point • Set-Up Method • Trench Excavation Method 			
15.1.06	Type Of Foundations	<ul style="list-style-type: none"> • Kenya Building Code Requirements • Types of Foundations 	2	6	8
15.1.07	Wall Construction	<ul style="list-style-type: none"> • Functional Requirements • Forms of Wall Construction • Classification of Walls • Dimensional Co-Ordination • Moisture Prevention • Openings in Walls • Termite Control 	2	6	8
15.1.08	Door Frames	<ul style="list-style-type: none"> • Functional Requirements of Door Frames • Methods of Installation 	2	4	6
15.1.09	Window Frames	<ul style="list-style-type: none"> • Functional Requirements of Window 	2	4	6

Code	Sub Module Units	Content	Time Hours	
			Theory	Pract
		<ul style="list-style-type: none"> • Frames • Methods of Installation 		
15.1.10	Fire Places, Flues and Chimneys	<ul style="list-style-type: none"> • General Principles • Technical Terms • Construction • Faults 	6	4
15.1.11	Ground Floors	<ul style="list-style-type: none"> • Functional Requirements of Ground Floors • Procedure of Constructing Concrete Ground Floors 	6	4
Total			30	47

15.1.0 GENERAL BUILDING CONSTRUCTION I

15.1.01 INTRODUCTION TO CONSTRUCTION

Theory

- 15.1.01T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) explain the evolution of the built environment
 - b) describe the stages involved in the building process
 - c) explain the measures to be taken to ensure that quality of work is achieved

- 15.1.01C *Competence*
The trainee should have the ability to:
- i) borrow and infuse historical perspective in architectural design
 - ii) select an appropriate site
 - iii) blend architectural design with the environment

- 15.1.01T1 *Content*
Evolution of the built environment
- pre-historic dwellings

- traditional dwellings
- modern dwellings

- 15.1.01T2 Building process
conception
selection of site
construction

- 15.1.01T3 Quality Assurance
materials
work process

15.1.02 SITE INVESTIGATION

Theory

- 15.1.02T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) describe the work involved in site investigation
 - b) describe the work involved in site clearance
 - c) identify buildings to be demolished

- 15.1.01C *Competence*
The trainee should have the ability to:
- i) investigate a given site
 - ii) clear a given site

- 15.1.02T1 *Content*
Site investigation
- site access
 - existing services
 - adjoining structures

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- 15.1.02T1
- soil conditions
 - Site clearance
 - removal of trees and bushes
 - removal of vegetable soil
 - removal of termite nests
 - demolition
 - o condemned structures
 - o safety during demolition works

Practice

- 15.1.02P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) carry out site investigation
 - b) clear a given site
 - c) drill/excavate trial holes and preserve samples for testing
 - d) determine site condition

Content

- 15.1.01P1 Site investigation
15.1.01P2 Extraction of samples
15.1.01P3 Preservation
15.1.01P4 Site condition

15.1.03 **LEVELLING**

Theory

- 15.1.3T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) describe methods of levelling a construction site
 - b) select tools and equipment used in levelling

15.1.03C

Competence

- The trainee should have the ability to:
- i) level a given site
 - ii) use levelling equipment appropriately on a given site

Content

- 15.1.03T1 Methods of levelling
- cut and fill
 - cut
 - fill

- 15.1.03T2 Tools and equipment in levelling
- shovel
 - jembe/ho
 - levelling equipment

Practice

- 15.1.03P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:

- a) select tools and equipment used in levelling
- b) reduce levels of a given site

Content

- 15.1.03P1 Tools and equipment for levelling
- 15.1.03P2 Reducing levels on site

15.1.04 **SETTING OUT**

Theory

- 15.1.04T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
 - a) identify tools and equipment used for setting out
 - b) describe procedures for setting out

- 15.1.04C *Competence*
The trainee should have the ability to:
 - i) read and interpret working drawings
 - ii) set out a building
 - iii) handle tools and equipment correctly

Content

- 15.1.04T1 Tools and equipment
 - levelling tools and equipment
 - setting out materials
- 15.1.04T2 Procedures
 - level site

- sloping site

Practice

- 15.1.04P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
 - a) describe the procedure of setting out
 - b) set out a given building

Content

- 15.1.04P1 Equipment and tools
- 15.1.04P2 Methods
 - 3:4:5
 - Builders square
 - Surveying instruments

15.1.05 **FOUNDATIONS**

Theory

- 15.1.05T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
 - a) identify tools and equipment used for excavating
 - b) describe the methods of excavations for foundations
 - c) explain the methods of dewatering a site

- 15.1.05C *Competence*
The trainee should have the ability to:
- select suitable excavation tools and equipment
 - carry excavation works
 - support sides of trenches
 - dewater trenches and pits

- Content*
- 15.1.05T1 Tools and equipment
15.1.05T2 Excavation
- equipment tools and materials
15.1.05T3 Dewatering techniques
- electro-osmosis
- freezing
- ringing system
- progressive

Practice

- 15.1.05P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- identify tools and equipment used for excavating
 - excavate a given type of foundation
 - describe different methods of timbering to trenches
 - protect trench sides
 - dewater a waterlogged trench/site

- Content*
- 15.1.05P1 Tools and equipment excavating
15.1.05P2 Excavation for foundation
- width
- depth
- stepped/slope
- level
- methods
15.1.05P3 Timbering to trenches
- firm soil
- loose soil
- wet soil
- methods
15.1.05P4 Protection of sides of trenches
- soil heaps
- side rails
- drums filled with sola and rails
15.1.05P5 Dewatering
- equipment
- methods

15.1.06 TYPES OF FOUNDATIONS

Theory

- 15.1.06T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- state building code requirements for foundations
 - describe different types of foundations

- c) describe methods of underpinning

- 1.06C *Competence*
The trainee should have the ability to:
- i) design a simple strip and pad foundation
 - ii) lay foundation to required specification

- 15.1.06T1 *Content*
Building code requirements
- strip foundations
 - stepped foundations
- 15.1.06T2 Types of foundations
- strip
 - stepped
 - deep strip
 - pad
 - raft

Practice

- 15.1.06P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) select suitable foundations for various soil conditions
 - b) design a simple strip and pad foundation
 - c) lay a given type of foundation

- 15.1.06P1 *Content*
Selection of a suitable foundation

- soil condition
 - load on foundation
- 15.1.06P2 Foundation Design

- loads on foundation
 - Width/depth
 - Mix ratios
- 15.1.06P3 Laying a foundation
- preparation of bed
 - formwork
 - depth and width
 - finishing

15.1.07 **WALL CONSTRUCTION**

Theory

- 15.1.07T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) explain functional requirements of walls
 - b) describe the forms of wall construction
 - c) classify walls according to load-bearing
 - d) explain the dimensional coordination system
 - e) explain the methods of preventing moisture penetration into buildings
 - f) explain the methods of forming openings in walls
 - g) control termites from entering the building

- 15.1.07C *Competence*
The trainee should have the ability to:
- i) build walls to the required dimensions
 - ii) make openings in walls to standard sizes of doors and windows
 - iii) lay damp proofing material at correct positions

Content

- 15.1.07T1 Functional requirements
- strength and stability
 - weather resistance
 - thermal insulation
 - sound insulation
 - fire resistance
- 15.1.07T2 Forms of wall construction
- monolithic
 - masonry
 - timber
- 15.1.07T3 Classification of walls
- load bearing
 - non-load bearing
- 15.1.07T4 Dimensional co-ordination
- definition of terms
 - need for system
 - sizes and tolerance
 - control of dimensions
- 15.1.07T5 Moisture prevention
- entry routes
 - damp proofing
- 15.1.07T6 Openings in walls

15.1.07T7

- arches
- lintels
- Termite control
- termite hills
- insecticide

Practice

15.1.07P0

- Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) set out and build masonry walls
 - b) set out and build timber walls
 - c) build in and lay damp proof courses and membranes
 - d) form openings in walls
 - e) apply termite control on foundations and floors

Content

15.1.07P1

Setting out masonry walls

- working drawing
- walling units
- common bond

15.1.07P2

Setting out timber walls

- foundation bases
- framed structure
- facings and infills

15.1.07P3

Laying DPC's and DPM's

- positions

- selection of materials
- method

1.07P4 Forming openings

- working drawings
- positions
- types

5.1.07P5 Termites control

- backfill and treatment
- treatment of surrounding ground

- iv) construct the door frame
- v) fix a door frame
- vi) fix metal door frame, aluminium and steel

15.1.08 DOOR FRAMES

Theory

15.1.08T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:

- state the functional requirements of door frames
- identify different types of doors frames
- explain the methods of installing door frames

15.1.08C *Competence*
The trainee should have the ability to:

- prepare door frames schedules
- select suitable materials
- prepare materials for door frames

15.1.08T1 *Content*
Functional requirements of door frames

- Types of door frames
 - o timber
 - o steel

15.1.08T2 *Content*
Methods of installation

- wall pass
- wood pallets
- lugs

Practice

15.1.08P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:

- construct a given door frame
- outline the procedure of fixing door frames
- fix a door frame

15.1.08P1 *Content*
Construction of door frames

- selection of materials
- preparation of materials
- assembling the frames

15.1.08P2 *Content*
Methods of installation

- during construction of wall
 - after construction of wall
- 15.1.08P3 Fixing a door frame
- as work progresses
 - after completing the walling

15.1.09 WINDOW FRAMES

Theory

- 15.1.09T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) state the functional requirements of a window frame
 - b) identify materials for window frames
 - c) describe methods of fixing a window frame

- 15.1.09C *Competence*
The trainee should have the ability to:
- i) prepare window frame schedules
 - ii) construct the window frame
 - iii) fix the window frame

- 15.1.09T1 *Content*
Functional requirements
- 15.1.09T2 Materials for a window frame

- timber
 - steel
 - aluminum
- 15.1.09T3 Methods of fixing window frames
- wood pallets
 - wall pass
 - lugs

Practice

- 15.1.09P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) construct a window frame
 - b) construct a steel window

Content

- 15.1.09P1 Construction of a window frame
- 15.1.09P2 Welding of steel window casement

15.1.10 FIRE PLACES, FLUES AND CHIMNEYS

Theory

- 15.1.10T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- a) describe the general principles of design of fireplaces
 - b) define the terminologies for fire places and flues

5.1.10C **Competence**
 The trainee should have the ability to:

- i) set out fire place
- ii) construct fire places
- iii) cure smokey chimneys
- iv) observe safety requirements

15.1.10T1 **Content**
 General principles of fire places design:

- secure maximum heat
- precaution against spread of fire
- effective removal of smoke
- avoidance of down draught

15.1.10T2 **Terminologies for fire places and flues**

- breast
- gathering
- head
- jambs
- pargetting
- throat
- curing

Practice

15.1.10P0 **Specific Objectives**
 By the end of the sub-module unit, the trainee should be able to:

- a) construct a fire place and chimney
- b) keep to dimensional control

c) cure smokey chimneys

15.1.10P1 **Content**
 Fireplace and chimney construction

- working drawings
- layout
- materials
- treatment at hearth, throat and flue

15.1.10P2 **Dimensional control**

- height of opening to width
- depth of firebox
- size of throat
- size of flue

15.1.10P3 **Curing smokey chimneys**

- appraisal
- materials
- re-design

15.1.11 **GROUND FLOORS**

Theory

15.1.11T0 **Specific Objectives**
 By the end of the sub-module unit, the trainee should be able to:

- a) explain the functional requirements of ground floors
- b) describe the construction of ground floors

- 15.1.11C *Competence*
The trainee should have the ability to:
- select suitable DPM and DPC
 - choose an appropriate position for DPM and DPC
 - lay and level concrete in ground floors
 - construct timber ground floors

- 15.1.11T1 *Content*
Functional requirements of ground floors
- 15.1.11T2 *Content*
Procedure of constructing concrete ground floors

Practice

- 15.1.011P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- select suitable DPM and DPC
 - provide DPM and DPC appropriately
 - lay and level concrete on ground floors
 - construct timber ground floors

- 15.1.11P1 *Content*
Selecting suitable DPC and DPM
- 15.1.11P1 *Content*
Provision of DPM and DPC
- 15.1.11P1 *Content*
Laying and levelling of concrete ground floors

- 15.1.11P1 *Content*
Construction of timber ground floors

Suggested Teaching/Learning Methods

- Discussion
- Measuring
- Cutting
- Joining
- Fixing
- Welding

Suggested Teaching/Learning Resources

- Text books
- Model
- Charts
- Realia
- Materials
- Tools and equipment

Suggested Assessment Methods

- Oral tests
- Written test
- Working drawings
- Practical exercises
- Assignment
- Project

Tools and Equipment

- Setting out tools (pegs, strings, plumb bobs, spirit levels, builder's squares)
- Laying tools
- Drawing tools
- Shovels, jembes
- Pangas
- Levels

- Hammers
- Hand drills
- Concrete mixers

- Poker vibrators
- Vibrating rods/rollers

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