

**Blocklaying, Bricklaying and Concreting - National
Technical Certificate (NTC) and Advanced National
Technical Certificate (ANTC)**

Concreting

**PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN BRICKLAYING, BLOCK MAKING
CONCRETING**

MODULE: CONCRETING

Course Code: CBC 14

Contact Hours: 12hrs/wk

GOAL: This module is designed to provide the trainee with the basic knowledge of the properties and application of concrete as well as the skill in the production of sound concrete structures.

GENERAL OBJECTIVES:

On completion of this module, the trainee should be able to:

1. State the functions and methods of care of common concreting tools and equipment
2. State the properties of aggregates in relation to their use in concrete production
3. Know the properties and application of different types of cement
4. Understand the use and application of stones in construction
5. Relate the properties of concrete to its application as a construction material
6. Understand the use and application of earth soil and latrite in construction
7. Understand the principles and methods of proportioning, mixing and testing concrete and be able to carry out the operations.
8. Know the principles and methods of handling, placing and curing concrete.
9. Understand the principles and methods of constructing joints in concrete structures
10. Understand the use of form-work in construction and the principles of construction.
11. Understand the basic principles and methods of reinforcing simple concrete structures.
12. Understand the basic principles and conventional methods of structural detailing.
13. Produce sound reinforced and mass concrete structures to specification.
14. Understand the basic principles of production and use of pre-stressed concrete in the construction industry

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN BRICKLAYING, BLOCKLAYING & CONC. WORK			
Module: CONCRETING		Module Code: CBC 14	Contact Hours 12hrs./wk
Module Specification:			
General Objective 1.0: The functions and methods of caring for common concreting tools and equipment			
Week	Specific Learning Objective:	Teachers' Activities	Resources
1	1.1 Identify and describe with sketches the concreting common hand tools and equipment eg club hammer, tapping rod, wheel barrow, head pan, mixing board, spirit level tamper. 1.2 State the functions of the tools and equipment in 1.1 1.3 State reasons for routine care and maintenance of the tools and equipment.	<ul style="list-style-type: none"> The teacher demonstrates to the students how these tools and equipment are cared for and maintained 	<ul style="list-style-type: none"> Wheel barrow, spirit level, head pan, club hammer etc.
General Objective 2.0: UNDERSTAND THE PROPERTIES OF AGGREGATES IN RELATION TO THEIR USE IN CONCRETE PRODUCTION.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
2	2.1 Classify aggregates as natural and artificial, and list examples under each class and state their uses. 2.2 Distinguish between the range of particles size of coarse and fine aggregates and state the factors to be considered in specification of maximum particle size for given jobs. 2.3 State the purpose of sieve test. 2.4 Explain the purpose of the following tests and describe methods of carrying them out: <ol style="list-style-type: none"> silt bulking mixture content colour metric physical tests. 2.5 Specify the quantities of aggregates (fine and coarse) for concrete work and state reasons for the specification.	<ul style="list-style-type: none"> The teacher lists the natural and artificial aggregates to students eg natural – sand, gravel, crushed stone, etc. Artificial – foamed slag, clinker breeze, slag, saw-dust. The teacher gives examples of factors to include (a) dimension of concrete member to be cast. (b) cover for reinforcement (c) Ease of handling wet concrete (workability). 	<ul style="list-style-type: none"> Sketches, sand gravel crushed stone saw-dust etc.

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Module Specification:			
General Objective 2.0: UNDERSTAND THE PROPERTIES OF AGGREGATES IN RELATION TO THEIR USE IN CONCRETE PRODUCTION.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
	<p>2.6 Use the test in 2.4 to determine the quantities of given samples of aggregates.</p> <p>2.7 Describe three methods of measuring the quantity and suitability of aggregates on sites.</p> <p>2.8 Describe methods of storing and protecting aggregates on sites e.g. Stock piling, use of storage bins, rock ladder etc.</p>	<ul style="list-style-type: none"> • Teacher/Student practice sieve test procedures as it involves aggregate sampling, sieving recording of results. • The teacher demonstrates the tests with the students in the school laboratory e.g. Silt them out, test colour-metric test, physical test. 	
General Objective: 3.0 AT THE END OF THE MODULE STUDENTS WILL UNDERSTAND BASIC PRINCIPLES OF MANUFACTURES, PROPERTIES AND APPLICATION OF DIFFERENT TYPES OF CEMENTS.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
3	<p>3.1 List the properties and uses of the following types of cements: Ordinary Portland, Rapid hardening Portland, Sulphate resisting Portland, Portland-blast furnace, white Portland, Portland Pozzolana, super sulphated cement and High alumina.</p> <p>3.2 Describe the process of manufacture of ordinary Portland cement.</p> <p>3.3 Explain the importance of the following properties of ordinary Portland cement (i) fineness (ii) Soundness (iii) Setting time.</p> <p>3.4 Define hydration and distinguish between setting and hardening of cement.</p>	<ul style="list-style-type: none"> • Carry out simple tests to determine fineness, Soundness and setting time of ordinary Portland cement. • Show a line diagram of the production process of ordinary Portland cement. 	Charts

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Module Specification:			
General Objective: 3.0 AT THE END OF THE MODULE STUDENTS WILL UNDERSTAND BASIC PRINCIPLES OF MANUFACTURES, PROPERTIES AND APPLICATION OF DIFFERENT TYPES OF CEMENTS.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
	<p>3.5 Explain the relative advantage of handling cement in silos and in bags and state storage precautions.</p> <p>3.6 List health hazards related to cement handling and state the precaution measures against them.</p> <p>3.7 Describe three methods of assessing the quantity and suitability of ordinary Portland cement on site</p>		
General Objective: 4.0 UNDERSTAND THE USE AND APPLICATIONS OF STONES IN CONSTRUCTION WORK			
Week	Specific Learning Objective:	Teachers' Activities	Resources
4-5	<p>4.1 Describe the various types of stones used in construction works such as, lime stone, sand stone granite, slates etc.</p> <p>4.2 Enumerate the uses of each of the stones.</p> <p>4.3 Describe the composition of the stones.</p> <p>4.4 Discuss the methods of production of these stones.</p> <p>4.5 Describe the characteristics such as specific weights, compressive strength, water absorption, effect on fire, moisture expansion, effect of chemicals, resistance to salts, thermal expansion, conductivity, durability</p>	<ul style="list-style-type: none"> The teacher guides the students to make models of walls, cladding, plinths, steps, floor stairs, coping etc with stones. 	<ul style="list-style-type: none"> Charts, various types of stones.

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Module: CONCRETING		Module Code: CBC 14	Contact Hours 12hrs./wk
Module Specification:			
General Objective 5.0: UNDERSTAND THE PROPERTIES OF CONCRETE IN RELATION TO ITS APPLICATION AS CONSTRUCTION MATERIAL.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
	5.1 Define concrete and state the functions of each ingredient in concrete. 5.2 Outline the properties that make concrete an important construction material eg mould ability, strength, durability, fire resistance etc. 5.3 Explain the use of mass/dense and light-weight concrete in construction. 5.4 Assess concrete terms of the following properties – Drying Shrinkage, fire resistance, thermal movement compressive and tensile strength, sound transmission permeability, creep Durability, Density.	<ul style="list-style-type: none"> The teacher and the students mix fine and coarse aggregates with cement and add water to the correct ratio to form the concrete. Examine the mix and tell the texture, colour and also observation 	a. Charts concrete. b. Chart c. Cement d. Sand e. Water
General Objective 6.0: UNDERSTAND THE USE AND APPLICATION OF EARTH, SOIL AND LATRITE IN CONSTRUCTION WORKS.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
	6.1 Describe earth, soil and latrite. 6.2 Distinguish between earth, soil and latrite. 6.3 Discuss the various applications of soils, earth and latrite. 6.4 Enumerate the characteristics of earth soil and latrite. 6.5 Explain the problems of earth soil and latrite. 6.6 Discuss the remedies of the problems explained above. 6.7 Discuss the various field tests required to carry out on earth, soil and latrite. 6.8 Collect samples by standard methods.	<ul style="list-style-type: none"> Carry out tests on earth, soil and latrite by the following tests methods (a) Touch, washing, visual, water retention, dry strength, wet-sieving grain size etc. 	<ul style="list-style-type: none"> Samples of earth, soil and latrite.

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Module: CONCRETING

Module Code: CBC 14

**Contact Hours
12hrs./wk**

Module Specification:

General Objective: 7.0 UNDERSTAND THE PRINCIPLES AND METHODS OF PROPORTIONING, MIXING AND TESTING CONCRETE AND BE ABLE TO CARRY OUT THE OPERATION.

Week	Specific Learning Objective:	Teachers' Activities	Resources
8 – 11	<p>7.1 Distinguish between designed mix and prescribed mix and state factors to be considered in determining mix ratio e.g. Strength of finished concrete, types of concrete, structure to be cast etc.</p> <p>7.2 Define water:- cement ratio and aggregate: cement ratio and explain their relationship with the quality of mix and hardened concrete.</p> <p>7.3 Specify (a) the quality of water for mixing concrete (b) mixing ratios for a common range of jobs e.g. Strip foundation, basement floor, floor slab, lintel, concrete-roof and roof gutter, road kerbs, etc..</p>	<ul style="list-style-type: none"> • The teacher demonstrates the mixing ratios for a common range of jobs like strip foundation. • Operate and maintain a given light duty batch mixer e.g. 31/2 T mixer. • The teacher allows every student to operate the mixer under his guide. 	<ul style="list-style-type: none"> • Pre-cast – Slabs batch mixer charts • Charts batch mixer.
	<p>7.4 Define batching and describe two methods of batching i.e. by volume and by weight-taking into account necessary precautions to ensure quality.</p> <p>7.5 Distinguish between the following mixers in terms of their main features, working principles and uses (a) Continuous mixer (b) batch mixer (tilting and non-tilting).</p> <p>7.6 Explain the use of the following mixers in (i) Central batch – mixing plant (ii) transit mixer, truck mixer (iii) stationary mixer. E.g. Paddle mixer).</p>	<ul style="list-style-type: none"> • Explain the difference between the various mixers. 	

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Week	Specific Learning Objective:	Teachers' Activities	Resources
	<p>7.7 Explain methods of ensuring least variation in mix quality from a batch mixer.</p> <p>7.8 Identify common admixtures and explain their applications. Examples of admixtures may include (i) Pudlo (ii) calcium chloride (iii) air – entraining agents; (iv) fly-ash (v) Retarders (vi) impermo etc.</p> <p>7.9 Calculate the quantity of materials required for producing a specified batch using a prescribed mix.</p>	<ul style="list-style-type: none"> • Give the students assignment to calculate the quantity of ingredients required in any given batch with prescribed mix. • The teacher with the students carry out slump test in the workshop. • Organise and execute mixing operations. 	
	<p>7.10 Define workability and state factors which determine workability.</p> <p>7.11 Explain the reduction in bulk of the aggregates during mixing and state the appropriate shrinkage value.</p> <p>7.12 Determine workability of a given mix sample by slump test or compacting factor test</p> <p>7.13 Specify the slump range for common concrete structures.</p>		

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Module: CONCRETING		Module Code: CBC 14	Contact Hours 12hrs./wk
Module Specification:			
General Objective 8.0: UNDERSTAND THE PRINCIPLES AND METHOD OF HANDLING, PLACING AND CURING OF CONCRETE.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
	<p>8.1 Explain the use of the following equipment in wet concrete transporting and placing operations – head pan, steel concrete barrow, power barrow, tower crane skip, mobile truck mixer conveyor belt, pipe line.</p> <p>8.2 State the precautions (operational and safety) to be taken when using the equipment in 8.1.</p> <p>8.3 Explain the use of pumped and ready-mixed concrete taking into account their relative advantages and precautions to be taken during application.</p> <p>8.4 List factors to be considered in the choice of methods of transporting wet concrete to placing point e.g. Quantity to be handled, distance to placing point, site conditions etc.</p>	<p>The teacher demonstrates with the students the use of the equipment in wet concrete transporting and placing operations.</p> <p>The teacher practise with the students the use of pumped and ready-mixed concrete.</p> <ul style="list-style-type: none"> • The teacher demonstrates the use of common tools for compacting wet concrete. • A visit the a constructional site is advised. 	<ul style="list-style-type: none"> • Head pan steel concrete barrow charts. • Rammer/tamper • Sketches and charts of raft, pad, strip foundations. • Lintel, bean & Column. • Floor slab, walls etc. • Cube mould.
	<p>8.5 Outline the safety and operational precautions to be observed when placing wet concrete by the methods in 8.1 above.</p> <p>8.6 State reasons for vibrating or compacting wet concrete.</p> <p>8.7 Identify common tools for compacting wet concrete and describe with sketches their main features and methods of use (compacting tools may include poker vibrators, clamp on vibrators, rammer/tamper.</p> <p>8.8 Outline safety and operational precautions in the use of mechanical vibrators.</p> <p>8.9 Identify appropriate compacting tools for the following concrete structures – (i) raft foundation (ii) pad foundation – (combined and Isolated) (iii) strip foundation (mass and reinforced) (iv) Lintel and bean (v) Column (vi) floor slabs (vii) walls (including parapet walls)(vii) concrete pavement (viii) concrete ground floor.</p>	<ul style="list-style-type: none"> • Teacher demonstrates testing of cube with the students. 	<ul style="list-style-type: none"> • Sketches and charts of raft, pad, strip foundations. • Lintel, bean & Column. • Floor slab, walls etc. • Charts cube mould

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Week	Specific Learning Objective:	Teachers' Activities	Resources
	<p>8.10 Describe the methods of concreting under the following conditions – (a) very hot and dry weather (Severe harmattan) (b) wet weather (c) under weather.</p> <p>8.11 State reasons for curing concrete and describe common curing methods eg. Pending, sprinkling, wet covering, use of water-proof paper, curing. Compounds, plastic sheets, steam curing.</p> <p>8.12 Identify situations where the curing methods in 8.11 above are most suitable.</p>		
	<p>8.13 Describe the making and testing of cube taking into account precautions to be taken against variation of result.</p> <p>8.14 Determine by the cube test the compressive strength of given mix sample.</p>		<p>Charts</p> <p>Cube mould</p>
13	EXAMINATIONS: Theory 40%, Practical 60%		

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Module Specification:

General Objective 9.0 UNDERSTAND THE PRINCIPLES AND METHODS OF CONSTRUCTING JOINTS IN CONCRETE STRUCTURE.

Week	Specific Learning Objective:	Teachers' Activities	Resources
1-2	<p>9.1 Explain with sketches, the purpose of the following joints in concrete structures – (a) Joints in water tanks and reservoirs (b) Construction joints (c) sliding and slip joints.</p> <p>9.2 Name common jointing materials and state their specific applications Example of materials may include (a) bitumen (b) asphalt (c) corking compound (d) soft board (e) mastic etc</p> <p>9.3 Describe the method of making construction joints in structures such as floors, beams, column, concrete roofs and parapets, taking into consideration, construction precautions.</p> <p>9.4 Describe with sketches methods of constructing expansion/contraction joint in structures such as floors, columns, concrete roofs, foundation (strip and pad).</p> <p>9.5 Apply the knowledge of shear stress distribution in structures in the determination of construction joint location at the end of the day's work.</p>	<ul style="list-style-type: none"> • The teacher sketches these joints on the chalk board and instructs the students, to draw them into their note books. • Teacher sketches expansion and contraction joints in floors, columns, concrete floors, strip and pad foundations for the students to draw. • Construct with the students, expansion, contraction, compression and construction joints in concrete structures in the workshop. 	<ul style="list-style-type: none"> • Sketches on joints in water – tanks and reservoirs etc. • Sketches showing expansion and contraction joints in floors, columns concrete roofs and strip and pad foundation.

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Module: CONCRETING		Module Code: CBC 14	Contact Hours 12hrs./wk
Module Specification:			
General Objective 10.0: UNDERSTAND THE USE OF FORMWORK IN CONSTRUCTION.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
3-4	<p>10.1 State the functions of formwork.</p> <p>10.2 Outline the basic requirements in formwork construction eg adequate support, rigidity, use of appropriate materials, ease of stripping, leak-proof, repetitive use, minimum cost</p> <p>10.3 Explain the relative advantages of steel and timber forms.</p> <p>10.4 Explain with sketches the construction of forms for the following structures (a) Column, (b) beam and slab (c) lintel (d) concrete arch (circular, semi-circular equilateral, gothic arch) straight flight, dogleg stairs, open – well stairs window hood, concrete fascia parapet wall, road side channel or gutter.</p>	<ul style="list-style-type: none"> The teacher explains the functions of formwork and the basic requirements in formwork construction (1) adequate support (2) rigidity (3) Use of appropriate materials (4) Ease of stripping leak-proof repetitive use. In the workshop the teacher demonstrates to the students how soft soap solution and grease are applied to formwork. 	<ul style="list-style-type: none"> Soft soap Solution Grease
	<p>10.5 Outline the procedures and precautions to be taken in striking formwork from the structures in 10.4 above and in subsequent storage and preservation.</p> <p>10.6 State the functions of mould oil and form liners and specify their qualities.</p> <p>Name the types of mould oil in common use and state the necessary precaution in their use, e.g. soft soap solution, grease etc.</p>		

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12hrs./wk**

Module Specification:

General Objective: 11.0 UNDERSTAND THE BASIC PRINCIPLES AND METHODS OF CONSTRUCTING CONCRETE STRUCTURES.

Week	Specific Learning Objective:	Teachers' Activities	Resources
5-6	<p>11.1 Explain the need for reinforcing concrete.</p> <p>11.2 Illustrate the following stress effects in concrete structures – bending, buckling, stretching, twisting, shearing.</p> <p>11.3 Illustrate the normal stress effects in the following concrete structures – (a) foundations, retaining walls, columns, beams, slab (simple supported continuous and cantilevered).</p> <p>11.4 Make sketches to show typical methods of reinforcing the following concrete structures, beams (free support beams) lintel, column, floor slab (one way and two-way span) straight flight and dog-leg stairs, roof gutter and parapet wall, road slab, retaining walls, cantilevers</p>	<ul style="list-style-type: none"> • The teacher draws on the chalk board stress effects in concrete structures on bending, buckling, stretching, twisting shearing. • After explaining them to the students, the teacher instructs them to the notes on the chalkboard into their personal notes. 	<ul style="list-style-type: none"> • Sketches,

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Module Specification:

General Objective 12.0: UNDERSTAND THE BASIC PRINCIPLES AND CONVENTIONAL METHODS OF STRUCTURAL DETAILING.

Week	Specific Learning Objective:	Teachers' Activities	Resources
7-8	<p>12.1 Interpret common representation and symbols in structural drawings e.g. R,Y,X,B,T, alt, Stg, a,b,r, etc.</p> <p>12.2 Illustrate with Sketches the conventional rules in structural detailing.</p> <p>12.3 Illustrate the conventional methods of calling up; (a) bars eg 26 R 1011 – 200 (b) kicker (c) blinding (d) Cover.</p> <p>12.4 Interpret simple structural drawings to obtain formwork construction drawings to obtain formwork construction and steel fixing details</p> <p>12.5 Produce reinforcement schedules using appropriate structural detailed drawings.</p>	<ul style="list-style-type: none"> • The teacher instructs the students to draw the conventional rules in structural detailing as shown on the chalkboard. 	<ul style="list-style-type: none"> • Sketches and drawings.

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Module Specification:			
General Objective 13.0: UNDERSTAND HOW TO PRODUCE SOUND REINFORCED AND MASS CONCRETE STRUCTURES TO SPECIFICATION.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
	<p>13.1 Identify common reinforcing steels and state their uses (reinforcing steels should include plain round bars, plain square bars, twisted bars, steel fabrics etc.</p> <p>13.2 Specify with reasons the qualities of reinforcing steel for concrete production.</p> <p>13.3 State reasons for the use of the following:- (a) blinding at foundation (b) hardcore (e) kicker at column base, (d) spacer block (concrete biscuits), (e) starter bars at column base.</p> <p>13.4 Describe methods of casting and curing the following in-situ concrete structures in wet or hot and dry weather (severe harmattan) conditions.</p> <ul style="list-style-type: none"> - Strip foundation (mass and reinforced. - Lintels, beams, columns. - Ground and upper floors - Walls (including parapet) - Large areas eg petrol station 	<ul style="list-style-type: none"> • The teacher practicalizes the use of common reinforcement materials like bars, steel fabrics etc in concreting with the students participation. • The teacher demonstrates the uses of blinding at foundation, hardcore kicker at column base spacer block and starter bars at the workshop with the students. • Organise and execute the production of in-situ reinforced concrete structures eg simple structural frames, culverts, channels and stairs. 	<ul style="list-style-type: none"> • Sketches, and short lengths of:- • Plain round bars. • Plain square bars. • Twisted Fabrics • Steel fabrics • Get some spacer blocks, starter bars kicker etc. • Charts and field-trip
	<p>13.5 Fix to specification steel reinforcements in sample concrete structures eg. Column, beam, floor slab, parapet wall of simple building.</p> <p>13.6 Describe methods of producing the integral finishes on insitu concrete:-</p> <ol style="list-style-type: none"> a. exposed aggregate b. board marked surface c. screen-board damped and rolled surface 	<ul style="list-style-type: none"> • Cast to specification precast units of the following: • Concrete blocks • paving slabs • Kerbs • Fence posts • Terrazzo Tiles • The teacher and the students produced specified integral finish on concret 	

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Week	Specific Learning Objective:	Teachers' Activities	Resources
	<p>13.7 Fix to specification steel reinforcements in sample concrete structures eg. Column, beam, floor slab, parapet wall of simple building.</p> <p>13.8 Describe methods of producing the integral finishes on insitu concrete:-</p> <ol style="list-style-type: none"> exposed aggregate board marked surface screen-board damped and rolled surface 	<ul style="list-style-type: none"> Cast to specification precast units of the following: Concrete blocks paving slabs Kerbs Fence posts Terrazzo Tiles The teacher and the students produced specified integral finish on concrete structures 	
General Objective 14.0: UNDERSTAND THE BASIC PRINCIPLES OF PRODUCTION AND USE OF PRESTRESSED CONCRETE IN THE CONSTRUCTION INDUSTRY.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
	<p>14.1 State the advantages of pre-Stressed concrete e.g.</p> <ol style="list-style-type: none"> reduced tendency to cracking Non-use of shear reinforcement Comparative to reduction in size and weight of members etc. <p>14.2 Explain the meaning of pre-tensioning and post-tensioning and state their relative advantages.</p> <p>14.3 State reasons for the use of the following materials in the production of pre-stressed concrete.</p> <ol style="list-style-type: none"> Medium and high tensile wires or rods High strength concrete 	<ul style="list-style-type: none"> Visit a production site with students to have on-the-site experience production process of pre-tension and post-tension concrete. 	<ul style="list-style-type: none"> Charts and samples of these units.

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Week	Specific Learning Objective:	Teachers' Activities	Resources
	14.4 Describe at least one methods of producing- a. Pre-tensioned concrete units b. Post-tensioned concrete units. 14.5 State with examples the use of pre-stressed concrete in the Nigerian construction scene 14.6 State necessary safety precautions in the production of pre-stressed concrete.		
13	EXAMINATION		
1-3	Carry out the following operations as regards sieve analysis: a. aggregate sampling b. quartering c. sieving d. recording of results and e. interpretation of results	<ul style="list-style-type: none"> The Teacher should guide the students to carry out the given test/project work to specification and supervise them adequately to obtain the results to industry standard. 	<ul style="list-style-type: none"> Sieves Aggregates Sample
4 - 6	Experimentally carry out the following tests on aggregates: a. silt test b. bulking test c. moisture content test d. colourmetric test e. physical test f. record result g. Interpret results.		<ul style="list-style-type: none"> Aggregate samples Measuring vessels Weighing machine
7 - 9	Carry out laboratory tests on cements a. Student should carry out the following tests on ordinary Portland cements b. fineness c. Soundness d. Setting time	- do -	<ul style="list-style-type: none"> Sample of ordinary Portland cement Water Time Clock

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Week	Specific Learning Objective:	Teachers' Activities	Resources
10 – 12	Produce good quality concrete by manual method after batching either by volume or by weight.	- do-	<ul style="list-style-type: none"> • Mixing surface • Aggregates • Cement • Water • Bricklayers tools
	Using light duty batch mixer (e.g. 3½T mixer) produce good quality concrete after batching.	- do -	<ul style="list-style-type: none"> • 3½T mixer • Aggregates • Cement • Water
13	Examination: Practical 60%; Theory 40%.		
	Carry out concrete transportation placing and curing operations. Student should transport the already mixed concrete by any specified mode, place and cure the concrete using appropriate materials/equipment as specified	- do-	<ul style="list-style-type: none"> • Concrete mix • Transportation equipment • Curing materials or equipment
5 – 6	While carrying out a simple concreting job student should construct the following joints. a. Expansion/contraction joint b. Compression/construction joints	- do-	<ul style="list-style-type: none"> • Ready mixed concrete • Masons' and bricklayers' tool
7-8	With the ready mixed concrete student should produce concrete biscuits. Cast concrete spacers for use in a given situation.	- do-	<ul style="list-style-type: none"> • Ready mixed concrete • Mould • Bricklayers' tool

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General Objective 14.0: UNDERSTAND THE BASIC PRINCIPLES OF PRODUCTION AND USE OF PRESTRESSED CONCRETE IN THE CONSTRUCTION INDUSTRY.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
9 & 10	<p>Fix to specification steel reinforcement in simple concrete structures cast to specification precast concrete units.</p> <p>Student should fix steel reinforcements in simple concrete structures e.g.</p> <ol style="list-style-type: none"> Column Floor slab Parapet wall <p>Cast to specification the following pre-cast units.</p> <ol style="list-style-type: none"> concrete blocks Paving slabs Kerbs <p>Fence posts Terrazzo tiles</p>	- do-	<ul style="list-style-type: none"> • Steel reinforcement • Simple concrete structures. • Concrete mix • Mould • Cement • Aggregates • Bricklayers' tools • Water
EXAMINATION 70% Practical ; 30% Theory			