NATIONAL VOCATIONAL TRAINING INSTITUTE

TESTING DIVISION

REGULATIONS AND SYLLABUS

TRADE: MASONRY

LEVEL: CERTIFICATE ONE

A. INTRODUCTION:

i. The review of this syllabus has been generally influenced by the demands of industries due to its continuous change as a result of technological advancement and the changing needs of society.

It was also influenced by the TVET reforms under the directions of the new educational reforms with the view to opening up further education and training opportunities to TVET graduates.

The certificate ONE syllabus is designed to respond to the following level descriptors:

QUALIFICATION	KNOWLEDGE LEVEL	SKILLS AND ATTITUDE:
Certificate 1	1. To demonstrate a broad knowledge base incorporating some technical concepts. 2. To demonstrate knowledge of the theoretical basis of practical skills. 3. To demonstrate knowledge in numeracy, literally, IT and Entrepreneurial skills	1. Require a wide range of technical skills 2. Are applied in a variety of familiar and complex contexts with minimum supervision. 3. Require collaboration with others in a team

ii. The rational for this programme is to train students, apprentices and other categories of trainees as craftsmen and women. Its purpose is to provide sound understanding of the skills processes and techniques of the craft and appreciation of the trade technology, trade science and calculation, trade drawing, relevant to the work of the brick and blockwork industry. It will also enhance the capabilities of trainees to work under minimum supervision.

B. GENERAL OBJECTIVE

The prime objective of the programme is to provide and sharpen the knowledge and skill competence of a trainee in a broad range of varied work activities in a variety of contexts in the building and Construction industry and in a manner that will best meet the needs of the global challenges in the building/construction industry.

C. THE COURSE COMPONENTS

The course comprises of:

a. Trade Theory
b. Trade Science and Calculation

c. Trade Drawing
d. General Paper
e. Trade Practical

EXAMINATION: The candidates would be examined in the FIVE components listed in 'C' above.

Practical work must be carefully planned to illustrate the application of trade Technology, Science and Calculations, and Drawing; so as to provide maximum opportunity for craft practice. It is recommended that not less than 60% of the course time should be allowed for craft practice.

D. KNOWLEDGE AND SKILLS REQUIREMENT

The prime objective of the programme is to provide knowledge and skills of the trade in a manner that will best meet the needs of the trade as well as industries using professional equipments

E. ENTRY TO THE COURSE

Minimum education: Must have passed JHS or SHS examination/Foundation Certificate. However, the selection of the students for the course is within the discretion of the head of the institution.

F. ELIGIBILITY FOR ENTRY TO EXAMINATION

Candidates may enter for examination only as internal candidate; that is those who at the time of entry to the examination are undertaking (or) have already completed the course at an approved establishment.

G. EXTERNAL EXAMINERS

The practical work of candidates will be assessed by an external examiner appointed by the Trade Testing Commissioner.

H. EXAMINATION RESULTS AND CERTIFICATES

Each candidate will receive record of performance given the grade of performance for the components Taken. These are:

i) Distinction

ii) Credit
iii) Pass
iv) Referred/Fail

Certificates would be issued to candidates who pass in all the components.

NOTE:

All Technical and Vocational trainees who aspire to take advantage of the opportunities opened to them in the educational reforms should NOTE that, for a trainee to progress to certificate Two (2) a pass in Certificate One (1) is compulsory.

I. ACKNOWLEDGEMENT

NVTI wishes to acknowledge the team of experts, for preparing the materials which have been incorporated into this syllabus.these are:

Mr. Amos Ayi – ATTC
Mr. Adu Bandoh – Cape-Coast Polytechnic
Mr. Christian Agordah, Manager, New Ayomah VTI
Rev. E.O. Ankrah (Dip.-Civil Eng; Dip-Mangt.)

Government's desire to improve the lot of Technical/Vocational Training, which led to the preparation of this syllabus, is hereby acknowledged.

J. LIST OF RECOMMENDED TEXT BOOKS

1. Brickwork – By W.G. Nash Vol. 1,2,3
2. Construction Technology – By R. Chudley. Vol. 1,2,3,&4
3. Construction Technology – By J.T. Grundy. Vol.1.2 &3
4. Brickwork Associate – Vol. 1,2,& 3
5. Science And Building – By E.C. Adams Bk. 1&2
6. Engineering Science – By Hughs And Hughs
7. Metric Calculations – By F.L. Tabberer, Bk. 1&2
8. The Construction Of Buildings – By Barry, Bk 1,2,&3
9. Building Geometry And Drawing – By Frank Hilton
10. Technical Drawing For School Certificate and GCE (Metric Edition) By J.N. Green

11. Basic Civil Engineering – By Dr. B.C. Punmig, Ashok K. Jain, Arun K. Jain
12. Chudley Handbook
13. Building Construction – By W.B. Mackay, VOL. 1,2,3 & 4

TOOLS

1. Trowel (All types)
2. Spirit level
3. Plumb line
4. Straight edge
5. Mason line
6. Float
7. Shoves
8. Pickaxes
9. Chisel and Hammer
10. Morehammer
11. Headpans

EQUIPMENT

1. Dumpy level
2. Theodolite
3. Wheelbarrow
4. Hoist
5. Crane
6. Dumper

CERTIFICATE ONE – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
1.0	SAFETY	1.1 Understand basic principles in workshop and site safety	1.2.1 Define safety 1.2.2 State types and causes of accidents at the workplace 1.2.3 List safety equipment 1.2.4 List the methods of preventing accident at the workplace observe (Safety rules) 1.2.5 Apply appropriate first aid on a victim in need of first aid e.g. falling from a height, shock etc.	• Demonstrate how to operate safety equipment and causes of accidents at the workplace. • Show the methods by demonstrating the methods of preventing accident at the workplace.

				• Identify the appropriate first aid on a victim and show hot to apply.
2.0	SAFETY	2.1 Understand basic principles in workshop and site safety	2.2.1 Define safety 2.2.2 State types and causes of accidents at the workplace 2.2.3 List safety equipment 2.2.4 List the methods of preventing accident at the workplace observe (Safety rules) 2.2.5 Apply appropriate first aid on a victim in need of first aid e.g. falling from a height, shock etc.	• Demonstrate how to operate safety equipment and causes of accidents at the workplace. • Show the methods by demonstrating the methods of preventing accident at the workplace • Identify the appropriate first aid on a victim and show hot to apply.
3.0.	TOOLS AND EQUIPMENT	3.1 Know the use of common hand tools and equipment in the construction industry	3.2.1 Identify and describe basic hand tools and equipment 3.2.2 Identify and select tools and equipment under specific skills 3.2.3 Describe the correct use of various tools and equipment under specific skills 3.2.4 Describe, care and maintenance of tools and equipment	• Show the methods of care and general maintenance of tools and equipment • Indicate the importance of care and maintenance
4.0	MATERIALS	4.1 Understand the use of materials and basic processes	4.2.1 Identify the various materials used in masonry 4.2.2 State the sources of obtaining fine aggregate (i.e. sand) coarse aggregate (i.e. stone) and other building materials. 4.2.3 State the process of the manufacture of bricks, blocks, cement and lime 4.2.4 State the characteristics and classification of building materials. 4.2.5 State the factors influencing the choice of building materials.	• Identify the right and appropriate materials used at its various stages. • Demonstrate to show how they are used. • Differentiate to show the right materials for various work types
5.0	AGGREGATES	5.1 Understand the main physical properties and	5.2.1 Define aggregates and distinguish between fine and coarse	• Identify all the types of

		application of various types of aggregates	aggregates 5.2.2 List types of fine and coarse aggregates and their advantages and disadvantages	aggregates and show them the types. • Distinguish them and contrast to show their advantages and disadvantages
6.0	AGGREGATES	6.1 Understand the main physical properties and application of various types of aggregates	6.2.1 Describe the grading of aggregates 6.2.2 State the physical properties and characteristics of aggregates 6.2.3 State the types of test applicable to aggregates (sieve analysis, silt, colour and bulking) 6.2.4 Describe various methods of storing aggregates on the site	• Differentiate the various materials used in grading. • Show physically how it is done • Demonstrate to show how these tests are done; as well as relating to its storage at site. •

CERTIFICATE ONE – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
7.0	MORTAR	7.1 Preparation and uses of mortar	7.2.1 Define mortar 7.2.2 State the functions of the components of mortar 7.2.3 State and describe the types of mortar (e.g. cement, lime, composite,	• Demonstrate to show how mortar is mix. • Show by identifying them.

			clay, refractory).	
8.0	MORTAR	Preparation and uses of mortar	8.2.1 Describe methods of mixing mortar. (manual and mechanical). 8.2.2 Describe the preparation of mortar using plasticizers and other additives 8.2.3 Classification of mortar (e.g. Water resisting), fire resisting, chemical resisting) 8.2.4 State the characteristics of a good mortar	• Demonstrate and show the various methods of mixing mortar. • Identify and recognize the types of mortar. • Relate them to its usage at various areas required.
9.0	CONCRETING	9.1 Understanding concrete materials and their functions	9.2.1 Define concrete 9.2.2 List the materials used in concreting and state their properties 9.2.3 State the functions of the materials 9.2.4 State the types of concrete 9.2.5 Identify the uses	• Identify and discover how concrete and its properties are essential in construction industry • Distinguish between its functions and its types.
10.0	CONCRETING	10.1 Understanding the methods of batching of concreting materials	10.2.1 Define batching 10.2.2 List the methods of batching (volume and weight). 10.2.3 Advantages and disadvantages of the methods 10.2.4 State the ratios for types of concrete	• Compare contrast the methods used in batching concrete
11.0	CONCRETING	11.1 Understanding the principle of mixing concrete	11.2.1 State the methods of mixing concrete. (manual or mechanical) 11.2.2 Describe the process of mixing concrete. (manual or mechanical) 11.2.3 Explain the term mixing time and mixing cycle. 11.2.4 List type of concrete mixers. (Continuous and batch mixers)	• Differentiate between and show the various methods in mixing concrete
12.0	CONCRETING	12.1 Understand the principles and methods of preparing concrete	12.2.1 Explain the term transporting of concrete 12.2.2 List tools and equipment used in transporting of concrete.	• Show how transporting of concrete is done.

			12.2.3 State the methods of transporting of concrete 12.2.4 List factors to be considered in the choice of methods of transporting wet concrete	• Identify the types of tools and equipments used in transporting concrete. • Identify and show how it could be achievable.
13.0	CONCRETING	13.1 Understand the principles and methods of preparing concrete	13.2.1 Explain the term placing and consolidation of concrete. 13.2.2 List the tools and equipment used in the consolidation of concrete 13.2.3 Explain the term segregation 13.2.4 State the causes of segregation	• Discover how placing and consolidation of concrete is done. • Show the relevant tools and equipments. • Demonstrate how segregation is achieved.
14.0	CONCRETING	14.1 Understand the principles and methods of preparing concrete	14.2.1 State the methods of preventing segregation 14.2.2 Explain the effect of segregation on the finished products 14.2.3 Explain the difference between cast in-situ and pre-cast concrete	• Identify the various methods in preventing segregation. • Show how finished products could experience it. • Differentiate between the two types of concrete relating it to the site.
15.0	CONCRETING	15.1 Understand the principles and methods of preparing concrete	15.2.1 Define curing 15.2.2 State the methods of curing 15.2.3 List materials for curing 15.2.4 Advantages and disadvantages of curing 15.2.5 State the properties of concrete in its fresh and hardened states	• Show what is curing • Identify methods of curing and materials used • Explain advantages and the disadvantages
16.0	CONCRETING	16.1 Understand the principles and methods of preparing concrete	16.2.1 Define bulking 16.2.2 List the causes and effect of bulking 16.2.3 List the methods of preventing bulking	• Identify bulking and show its causes and effect • Differentiate between its methods of

				preventing bulking
17.0	CONCRETING	17.1 Understand the principles and methods of preparing concrete	17.2.1 Explain the term shrinkage 17.2.2 State the factors affecting shrinkage 17.2.3 State the methods of preventing shrinkage	• Show what is shrinkage • Identify its methods, areas that are affected.
18.0	FOUNDATION	18.1 Understand the principle and the design of foundations and its types	18.2.1 Understand the design principle of foundation. Define foundation (natural and artificial) 18.2.2 List and sketch types of foundations 18.2.3 State the factors affecting the choice of foundation 18.2.4 State the rule of thumb for determining the width of foundation 18.2.5 State the purpose of foundation and where they can be applied.	• Describe the design of foundations. • Identify all types of foundations • Show where various types are needed. • Show by illustration determination of the width of foundation.

NO	**TASK**	**CRITICAL POINTS**	**SUB-POINTS**	**INSTRUCTIONAL TECHNIQUES**
19.0	FOUNDATION	19.1 Understand the principle and the design of foundations and its types	19.2.1 State the characteristics of a good foundation 19.2.2 Explain the term settlement 19.2.3 Causes and effect of settlement 19.2.4 Explain the term bearing pressure and bearing capacity of the foundation	• Describe the characteristics of a good foundation. • Identify the term settlement and its causes relating to its effect in settlement. • Differentiate the term bearing pressure and bearing capacity of the

				foundation and show them
20.0	SETTING OUT	20.1 Understanding the principles involved in locating and setting out of buildings	20.2.1 Explain the term orientation in building and location of building 20.2.1 Define setting out 20.2.2 List tools and equipment for setting out 20.2.3 Illustrate with sketches methods of setting out right angles 20.2.4 State the methods of checking the accuracy of setting out. (3:4:5); builders square etc).	• Identify, distinguish and show how setting out is done. • Outline the process of orientation in building and location. • Show the tools and equipments needed. • Show the methods of checking its accuracy.
21.0	SETTING OUT	21.1 Understanding the principles involved in locating and setting out of buildings	21.2.1 Explain the purpose of profile in setting out 21.2.2 Illustrate with sketches the intermediate, corner and perimeter (loop) profiles 21.2.3 State the advantages and disadvantages of a profile board in setting out.	• Identify profile in setting out. • Differentiate between the corner, intermediate and perimeter profiles • Outline the advantages and disadvantages in setting out.

CERTIFICATE ONE – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
22.0	SETTING OUT	22.1 Understanding the principles involved in locating and setting out of buildings	22.2.1 Define the term Datum 22.2.2 Explain the purpose of a datum in setting out 22.2.3 Illustrate with sketches the datum peg 22.2.4 Illustrate with sketches the setting out of simple building	• Identify datum point • Show the purpose of a datum in setting out. • Show with drawing the position of a datum peg. • Illustrate the term building line in relating

			22.2.5 Explain the term building line in relation to setting out	to setting out.
23.0	SITE PREPARATION	23.1 Understand the principles and methods of site preparation	23.2.1 Explain site clearance 23.2.2 State the methods of site clearance and the equipment used 23.2.3 Outline the basic consideration in the preparation of site for the construction of buildings e.g. access roads, electricity supply, storage facilities, temporary structure, hoarding, water etc. 23.2.4 Define site stripping	• Identify the site clearance methods. • Identify the equipments used. • Outline the process of site preparation
24.0	EXCAVATION	24.1 Know the basic principles relating to excavation of trenches	24.2.1 Explain the term excavation of trenches 24.2.2 State the methods of excavation 24.2.3 List types of excavation 24.2.4 List tools and equipments for excavation 24.2.5 State the causes of collapse of the side of trenches	• Identify excavation of trenches. • Show the types of excavation. • Outline the types of excavation. • Indicate the causes of collapse and put the necessary remedies.

CERTIFICATE ONE – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
25.0	EXCAVATION	25.1 Know the basic principles relating to excavation of trenches	25.2.1 State and explain the safety precautions in excavation 25.2.2 Explain the term angle of repose 25.2.3 Explain the term bottom-up and formation level in trenches 25.2.4 Illustrate with sketches the fixing of pegs to indicate thickness of the foundation concrete	• Identify the safety methods. • Show the angle of repose. • Show with sketches pegs and thickness of the foundation

				concrete.
26.0	BONDING	26.1 Know the types of bond and understand the principles of bonding and distribution of loads through walls	26.2 Demonstrate preparation to be made before the pouring of concrete into the trench 26.2.1 Define the term bonding 26.2.2 State the purpose of bonding 26.2.3 State the principles of bonding 26.2.4 Define the following a) Straight joints b) Perpend c) Toothing d) Racking back e) Stopped ends f) Laps g) Bed joints h) Course j) Broken bond	• Demonstrate and show how preparation are made before pouring of concrete into the trenches. • Show how bonding is done by sketches. • Identify and show its ways of bonding. • Differentiate between all the various joints and others.
27.0	BONDING	28.1 Know the types of bond and understand the principles of bonding and distribution of loads through walls	27.2.1 State the types of bonding a) Stretcher bond b) Header bond c) English bond d) Flemish bond e) English garden wall bond f) Flemish garden wall bond g) Monk bond h) Dutch bond etc. 27.2.2 Illustrate with sketches the various types of bonds as stated above	• Identify all types of bonding. • Demonstrate with sketches all types of bonding

CERTIFICATE ONE – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
28.0	WALLING	28.1 Understand the principles and functional requirements of a wall	28.1.1 Define the term wall 28.1.2 List types of walls 28.1.3 Define the various types of walls 28.1.4 State the functions of the various types of walls 28.2.5 Illustrate with sketches cross walls	• Identify all types of walling. • Outline various types of walls. • Show and distinguish types of walls.

29.0	WALLING	29.1 Understand the principles and functional requirements of a wall	29.2.1 State the functional requirements of walls. 29.2.2 State the types of loads on walls	• Differentiate all its requirements in relation to walls. • Differentiate and show all types of loads on the walls.
30.0	OPENINGS OF WALLS	30.1 Understand the need for ventilation and day light in buildings	30.2.1. Define openings in walls 30.2.2 State the purpose of creating openings 30.2.3 List types of openings and their functions	• Identify all openings • Show its purpose • Outline the types of openings
31.0	OPENINGS OF WALLS	31.1 Understand the behaviour and properties of materials used in openings 31.1 Understand the behaviour and properties of materials used in openings	31.2.1 List types of materials used in construction of doors and windows for openings 31.2.2 State the seasonal effects on materials used in openings and prevent the seasonal effects 31.2.3 Define jambs 31.2.4 State types of jambs 31.2.5 Illustrate with sketches the difference between jambs and reveal of an openings 31.2.6 State the methods of fixing wooden and metal door and window frames in walls	• Identify, illustrate with demonstration openings in walls.

CERTIFICATE ONE – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
32.0	SITE PERSONNEL	32.1 Understand the critical role and functions of site personnel in construction	32.2.1 State the functions of the following personnel on the construction sites: a) Architect b) Site Engineer	• Identify, indicate and explain those personnel and their functions in construction site

			c) Quantity Surveyor d) Site Surveyor e) Clerk of works f) Building Inspector g) Contractor h) Site foreman i) Tradesmen j) Draughtsman k) Labourers l) Gang leader	

CERTIFICATE ONE - TRADE SCIENCE AND CALCULATION

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
1.0	OPERATIONAL SIGNS	1.1 Understand the principles of operational signs	1.2.1 Calculate using the following operational signs: a) Additions b) Subtractions c) Multiplications	• Demonstrate with examples how to solve questions on : a) additions b) subtractions

			d) Division e) Positive and Negative figures e.g. [-(2)-(2)]	c) multiplications d) division e) positive and negative figures e.g (-2)-(2)
2.0	OPERATIONAL SIGNS	2.1 Understand principles of operational signs	2.2.1 Calculate using the following operational signs: a) Additions b) Subtractions c) Multiplications d) Division e) Positive and Negative figures e.g. [-(2)-(2)]	• Continue to solve more questions on the operational signs as indicated above
3.0	OPERATIONAL SIGNS	3.1 Understand addition, multiplication division and subtraction of fractions.	3.2.1 Use of improper fractions in operation 3.2.2 Change vulgar fractions into decimals 3.2.3 Adding, subtracting, multiplication and division	• Solve more questions to differentiate the various improver fractions, vulgar fractions, decimals, addition, subtraction, multiplications and division
4.0	OPERATIONAL SIGNS	4.1 Understand addition, multiplication division and subtraction of fractions.	4.2.1 Use of improper fractions in operation 4.2.2 Change vulgar fractions into decimals 4.2.3 Adding, subtracting, multiplication and division of decimals.	• Show the various formular in solving improper fractions, change vulgar fractions into decimals, adding, subtracting, multiplication and division of decimals

CERTIFICATE ONE - TRADE SCIENCE AND CALCULATION

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
5.0	OPERATIONAL SIGNS	5.1 Understand addition, multiplication division and subtraction of fractions.	5.2.1 Ratios and proportions 5.2.2 Square and cube roots 5.2.3 Scale calculations	• Identify and differentiate by solving problems on ratios and proportions; square and cube roots; scale calculations.
6.0	OPERATIONAL SIGNS	6.1 Understand addition, multiplication division and subtraction of fractions.	6.2.1 Transformation of formulars 6.2.2 Significant figures 6.2.3 Averages and percentages 6.2.4 Indices	• Discover various types of formulars, significant figures, averages, indices and percentages. • Solve problems and show examples
7.0	OPERATIONAL SIGNS	7.1 Understand the addition, multiplication, division and subtraction of fractions.	7.2.1 Transformation of formulars 7.2.2 Significant figures 7.2.3 Averages and percentages 7.2.4 Indices	• Discover various types of formulars, significant figures, averages, indices and percentages. • Solve problems and show examples
8.0	OPERATIONAL SIGNS	8.1 Understand the addition, multiplication division and subtraction of fractions.	8.2.1 Areas and volumes (concrete floors, foundations, lintel etc). 8.2.2 Metric system (Length, mass, capacity 8.2.3 S.I. Units	Show all types of concrete floors and foundations, lintel etc. Demonstrate with sketches and show examples of calculating areas and volumes, and distinguish between metric system, imperial units and S.I. units and show examples (length, mass, capacity) etc.
9.0	OPERATIONAL SIGNS	9.1 Understand the addition, multiplication, division and subtraction of fractions.	9.2.1 Quantities of materials 9.2.2 Cost of materials 9.2.3 Workmanship and overheads	• Solve and demonstrate problems on quantities of materials • Differentiate between quantities and estimation cost of materials, workmanship and overheads.

CERTIFICATE ONE - TRADE SCIENCE AND CALCULATION

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
10.0	WASTAGE	10.1.1 Understand the importance of minimizing waste in calculating quantity of materials and practical activities to reduce cost.	10.2.1 Define wastage 10.2.2 State types of waste e.g. transit waste • Double handling • Stock pile etc. 10.2.4 Know the importance of waste management 10.2.3 State the advantages and disadvantages in waste management.	• Solve and demonstrate problems on quantities of materials • Differentiate between quantities and estimation cost of materials, workmanship and overheads.
11.0	WASTAGE	11.1.1 Understand the waste in calculating quantity of materials and practical activities to reduce cost.	11.2.1 Define wastage 11.2.2 State types of waste e.g. transits waste • Double handling • Stock pile etc. 11.2.3 State the advantages and disadvantages in waste management.	• Solve and demonstrate problems on quantities of materials • Differentiate between quantities and estimation cost of materials, workmanship and overheads.
12.0	VECTOR AND SCALAR QUANTITIES	12.1.1 Understand the principles of applying vector and scalar quantities in the design of structures	12.2.1 Define vector and scalar quantities (Force, mass, density) Moments etc. 12.2.2 Understand calculations relating to a) Force b) Mass c) Density	• Demonstrate and identify with various examples how to define and solve problems on vector and scalar quantities, force, mass, density, moments and other calculations
13.0	VECTOR AND SCALAR QUANTITIES	13.1.1 Understand the principles of applying vector and scalar quantities in the design of structures	12.2.1 Define vector and scalar quantities (Force, mass, density) Moments etc. 12.2.2 Understand calculations relating to a) Force b) Mass c) Density	• Demonstrate and identify with various examples how to define and solve problems on vector and scalar quantities, force, mass, density, moments and other calculations

CERTIFICATE ONE - TRADE SCIENCE AND CALCULATION

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
14.0	VECTOR AND SCALAR QUANTITIES	14.1.1 Understand the principles of applying vector and scalar quantities in the design of structures	14.2.1 Principles of moment 14.2.2 Relationship between mass and weight	• Identify and define, show the principles of moments relationship between mass and weight
15.0	BUSINESS MATHEMATICS	15.1 Understand basic principles in business related subjects	15.2.1 Solve problems on the following: 15.2.2 Simple Interest 15.2.3 Profit and Loss 15.2.4 Compound Interest etc.	• Identify, demonstrate and show examples to simple interest, profit and loss, compound interest etc.
16.0	BUSINESS MATHEMATICS	16.1 Understand basic principles in business related subjects	16.2.1 Solve problems on the following: 16.2.2 Simple Interest 16.2.3 Profit and Loss 16.2.4 Compound Interest etc.	• Identify, demonstrate and show examples to simple interest, profit and loss, compound interest etc.
17.0	BUSINESS MATHEMATICS	17.1 Understand basic principles in business related subjects	17.2.1 Solve problems on the following: 17.2.2 Simple Interest 17.2.3 Profit and Loss 17 2.4 Compound Interest etc.	• Identify, demonstrate and show examples to simple interest, profit and loss, compound interest etc.
18.0	MATTER	18.1 Understand the basic blocks of matter	18.2.1 Define matter 18.2.2 State the three forms of matter 18.2.3 Define Atom 18.2.4 Illustrate with sketches the atomic structure 18.2.5 Define the components of the Atomic structure. (E.g. Electrons, neutrons protons and nucleus). 18.2.8 Define molecules	• Differentiate by showing clearly the definition of matter, molecules, atom, electrons, neutrons, protons and nucleus) etc.

CERTIFICATE ONE - TRADE SCIENCE AND CALCULATION

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
19.0	MATTER	19.1 Understand the basic blocks of matter	19.2.1 Define matter 19.2.2 State the three forms of matter 19.2.3 Define Atom 19.2.4 Illustrate with sketches the atomic structure 19.2.5 Define the components of the Atomic structure. (E.g. Electrons, neutrons protons and nucleus). 19.2.8 Define molecules	• Differentiate by showing clearly the definition of matter, molecules, atom, electrons, neutrons, protons and nucleus) etc.
20.0	ELECTRICITY	20.1 Understand the basic terms in Electricity	20.2.1 Define Electricity 20.2.2 Define the following terms in Electricity a) Current b) Voltage c) Resistance d) Power • Define cells • State the types of cells • Explain the following terms: a) Socket outlet b) Switch outlet c) Plugs d) Cables (Positive, neutral) e) Ceiling rose f) Electric meter g) Distribution board	• Identify what is electricity. Show and demonstrate at workshops and solve examples etc.
21.0	MATERIAL TEST	21.1 Understand the basic test applied to selected materials	21.2.1 Define silt test 21.2.2 Solve simple calculations on percentages of silt in fine aggregates 21.2.3 Define compacting factor test 21.2.4 Define cube test	• Demonstrate at laboratory what is silt test and solve problems to show examples in calculations.

CERTIFICATE ONE - TRADE SCIENCE AND CALCULATION

TASK		CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
22.0	MATERIAL TEST	22.1 Understand the basic test applied to selected materials	22.2.1 Define workability 22.2.2 Define water cement and aggregate ratios 22.2.3 Solve simple calculations on water cement and cement aggregate ratios	• Demonstrate at the laboratories and show how it means. • Solve various calculations on water, cement, aggregates ratios.

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
1.0	INTRODUCTION TO TRADE DRAWING (DRAWING EQUIPMENT AND MATERIALS	1.1 Know the uses of drawing equipment and materials	1.2.1 List the equipment and materials used in Trade Drawing. 1.2.2 Outline the uses of various equipment and materials 1.2.3 Explain how to care and maintain the equipment and materials 1.2.4 Practice good working habits 1.2.5 Use drawing equipment and materials correctly	• Outline the tools and equipment, materials used in Trade Drawing • Explain how to care and maintain the tools, equipment and materials • Illustrate and show how they are used.
2.0	INTRODUCTION TO TRADE DRAWING (DRAWING EQUIPMENT AND MATERIALS	2.1 Know the uses of drawing equipment and materials	2.2.1 List the equipment and materials used in Trade Drawing. 2.2.2 Outline the uses of various equipment and materials 2.2.3 Explain how to care and maintain the equipment and materials 2.2.4 Practice good working habits 2.2.5 Use drawing equipment and materials correctly	• Outline the tools and equipment, materials used in Trade Drawing • Explain how to care and maintain the tools, equipment and materials • Illustrate and show how they are used.
3.0	TYPES OF LINES LETTERING AND NUMBERING	3.1. Know various lines used in drawing and apply them effectively	3.2.1 Define lines. 3.2.2 Identify and define the various types 3.2.3 State the application of each line 3.2.4 Draw types of lines correctly	• Define and illustrate lines. Identify and state the application of each line. • Distinguish between perpendicular and parallel lines

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
			3.2.5 Differentiate between perpendicular and parallel lines 3.2.6 Construct perpendicular and parallel lines. 3.2.7 Distinguish between lower and upper case letters in lettering	
4.0.	TYPES OF LINES LETTERING AND NUMBERING	4.1. Know various lines used in drawing and apply them effectively	4.2.1 Define lines. 4.2.2 Identify and define the various types 4.2.3 State the application of each line 4.2.4 Draw types of lines correctly 4.2.5 Differentiate between perpendicular and parallel lines 4.2.6 Construct perpendicular and parallel lines. 4.2.7 Distinguish between lower and upper case letters in lettering	• Define angles • Explain and identify different types of angles
5.0	DIVISION OF LINES	5.1. Understand the principles of dividing lines	5.2.1 Demonstrate the method of: • Bisecting a given line or lines • Trisecting a given line • Dividing lines into a number of equal parts • Dividing a line into proportion and ratio	• Demonstrate the method of bisecting lines, trisecting line etc. dividing lines into a number of equal parts. • Show a line into proportion and ratio

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
6.0	DIVISION OF LINES	6.1. Understand the principles of dividing lines	6.2.1 Demonstrate the method of: • Bisecting a given line or lines • Trisecting a given line • Dividing lines into a number of equal parts Dividing a line into proportion and ratio	• Demonstrate the method of bisecting lines, trisecting line etc. dividing lines into a number of equal parts. • Show a line into proportion and ratio
7.0	PLAIN AND DIAGONAL SCALES	7.1 Understand the need and the principles of drawing scales	7.2.1 State reasons for using scales in drawing 7.2.2 Express a scale as a representative fraction (R.F) 7.2.3 Demonstrate the construction of plain and diagonal scales constructed correctly.	• State, identify and show how scales are used.
8.0.	ANGLES	8.1 Understand the principles of measuring and constructing angles	8.2.1 Define angles 8.2.2 Identify different types of angles 8.2.3 Construct given angles 8.2.4 Bisect given angles 8.2.5 Trisect given angles 8.2.6 Construct various angles using scales and chord 8.2.7 Measure angles with protractor	• Define angles • Explain and identify different types of angles

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
9.0	ANGLES	9.1 Understand the principles of measuring and constructing angles	9.2.1 Define angles 9.2.2 Identify different types of angles 9.2.3 Construct given angles 9.2.4 Bisect given angles 9.2.5 Trisect given angles 9.2.6 Construct various angles using scales and chord 9.2.7 Measure angles with protractor	Define angles Explain and identify different types of angles
10.0	TRIANGLES	10.1 Understand the principles of constructing triangles	10.2.1 Define triangle 10.2.2 List t he various types 10.2.3 State the necessary information for constructing triangles. 10.2.4 Demonstrate the method of constructing various types	▪ Define triangles • Outline the various types • Identify and demonstrate the methods of constructing various types
11.0	TRIANGLES	11.1 Understand the principles of constructing triangles	11.2.1 Define triangle 11.2.2 List the various types 11.2.3 State the necessary information for constructing triangles. 11.2.4 Demonstrate the method of constructing various types of triangles	• Define triangles • Outline the various types • Identify and demonstrate the methods of constructing various types

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
12.0	12.1 QUADRILATERALS	12.1 Know various types of quadrilaterals and be able to draw them correctly	12.2.1 Define quadrilateral 12.2.2 Name the various types viz. • Square • Rectangle • Parallelogram • Rhobus • Rhomboid • Trapezium • Trapezoid • Kite 12.2.3 Draw the various types of parallelogram	• Define quadrilateral • Identify the various types as: square, rectangle, parallelograms, rhobus, rhomboid, trapezium, trapezoid, kite
13.0	BONDING SOLUTIONS	13.1 Understand and appreciate the importance and principles of bonding various walls	13.2.1 Define the term bonding 13.2.2 Identify various types 13.2.3 Distinguish between: • A quoin • Stopped end • Racking • Racking back • Toothing • Straight wall • Return-angled walls • Double return-angled walls • Plant • Elevation • Section • End view etc.	• Define the term bonding • Identify various types • Distinguish between the items stated
14.0	STRETCHER BOND	14.1 Understand the bonding principles in stretcher bond	14.2.1 Draw the alternate plan courses, six bricks in length 14.2.2 Draw the elevation up to 5 courses high	• Illustrate with drawings and demonstrate with drawings and show all the views.

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
15.0	HEADER BOND	15.1 Understand the bonding principles in header bond	15.2.1 Draw the plan of the alternate courses, 6 bricks in length and 1 brick in thickness 15.2.2 Draw the elevation up to 5 courses high.	• Draw the plan and all the courses with all elevations
16.0	ENGLISH BOND	16.1 Understand the bonding principle in English bond	16.2.1 Draw the plan of the first and the second courses, 6 bricks in length and 1 brick in thickness 16.2.2 Draw the elevation up to 5 courses high	• Demonstrate with drawings and the outline of the plan, elevations etc.
17.0	FLEMISH BOND	17.1 Understand the building principles in Flemish bond	17.2.1 Draw the plans of the alternative courses, 7 bricks in length and 1 brick in thickness 17.2.2 Draw the elevation up to 5 courses high	• Demonstrate with drawings to show the alternative courses of the bond type
18.0	ENGLISH GARDEN WALL BOND	18.1 Understand the bonding principles in English Garden Wall Bond	18.2.1 Draw the plans of the alternative courses, 7 bricks in length and 1 brick in thickness 18.2.2 Draw the elevation up to 5 courses high	• Demonstrate with drawings the alternative courses of t he bricks
19.0	FLEMISH GARDEN WALL BOND	19.1 Understand the bonding principles in Flemish Garden Wall Bond	19.2.1 Draw the plans of the alternative courses, 7 bricks in length and 1 brick in thickness 19.2.2 Draw the elevation up to 5 courses high	• Demonstrate with drawings, plans of the alternative courses, of t he bond type
20.0	DRAW 1 – 1 ½ BRICK THICK RETURN-ANGLED WALL IN ENGLISH BOND	20.1 Understand the principles of bonding	20.2.1 Draw plans of alternate courses 20.2. Draw the elevation and the end view of the said bond	• Demonstrate with drawings, plans of the alternative courses, of t he bond type

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
21.0.	DRAW 1 – 1 ½ BRICK THICK RETURN-ANGLED WALL IN ENGLISH BOND	21.1 Understand the principles of bonding	21.2.1 Draw plans of alternate courses 21.2. Draw the elevation and the end view of the said bond	• Demonstrate with drawings, plans of the alternative courses, of t he bond type
22.0	DRAW 1-1½ BRICK THICK RETURN-ANGLED WALL IN FLEMISH BOND	22.1 Understand the principles of bonding	22.2.1 Draw plans of alternate courses 22.2.2 Draw the elevation and the end view of the said bond	• Demonstrate with drawings, plans of the alternative courses, of t he bond type
23.0	DRAW 1-1½ BRICK THICK RETURN-ANGLED WALL IN FLEMISH BOND	23.1 Understand the principles of bonding	23.2.1 Draw plans of alternate courses 23.2.2 Draw the elevation and the end view	• Demonstrate with drawings, plans of the alternative courses, of t he bond type
24.0	ISOMETRIC, OBLIQUE AND ORTHOGRAPHIC PROJECTION	24.1 Understand the principles in producing drawings in isometric oblique and orthographic projections	24.2.1 Explain Is (Isometric) drawing and its principles 24.2.2 Use isometric axis to draw given objects 24.2.3 Explain oblique drawing and its principles 24.2.4 Use oblique axis to draw given objects 24.2.5 Explain orthographic projection(single plane and multiple plane) 24.2.6 Distinguish between first and third angle projections	• Identify type of drawings and its principles • Demonstrate with drawings all the types of the projections. • Differentiate between first and third angle projections

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
25.0	ISOMETRIC, OBLIQUE AND ORTHOGRAPHIC PROJECTION	25.1 Understand the principles in producing drawings in isometric oblique and orthographic projections	25.2.1 Explain Isometric drawing and its principles 25.2.2 Use isometric axis to draw given objects 25.2.3 Explain oblique drawing and its principles 25.2.4 Use oblique axis to draw given objects 25.2.5 Explain orthographic projection(single plane and multiple plane) 25.2.6 Distinguish between first and third angle projections	• Identify type of drawings and its principles • Demonstrate with drawings all the types of the projections. • Differentiate between first and third angle projections
26.0	ISOMETRIC, OBLIQUE AND ORTHOGRAPHIC PROJECTION	26.1 Understand the principles in producing drawings in isometric oblique and orthographic projections	26.2.1 Explain Isometric drawing and its principles 26.2.2 Use isometric axis to draw given objects 26.2.3 Explain oblique drawing and its principles 26.2.4 Use oblique axis to draw given objects 26.2.5 Explain orthographic projection(single plane and multiple plane) 26.2.6 Distinguish between first and third angle projections	• Identify type of drawings and its principles • Demonstrate with drawings all the types of the projections. • Differentiate between first and third angle projections
27.0	ISOMETRIC, OBLIQUE AND ORTHOGRAPHIC PROJECTION	27.1 Understand the principles in producing drawings in isometric oblique and orthographic projections	27.2.1 Explain Isometric drawing and its principles 27.2.2 Use isometric axis to draw given objects 27.2.3 Explain oblique drawing and its principles	• Identify type of drawings and its principles • Demonstrate with drawings all the types of the projections.

				• Differentiate between first and third angle projections
			27.2.4 Use oblique axis to draw given objects 27.2.5 Explain orthographic projection(single plane and multiple plane) 27.2.6 Distinguish between first and third angle projections	
28.0	ISOMETRIC, OBLIQUE AND ORTHOGRAPHIC PROJECTION	28.1 Understand the principles in producing drawings in isometric oblique and orthographic projections	28.2.1 Explain Isometric drawing and its principles 28.2.2 Use isometric axis to draw given objects 28.2.3 Explain oblique drawing and its principles 28.2.4 Use oblique axis to draw given objects 28.2.5 Explain orthographic projection(single plane and multiple plane) 28.2.6 Distinguish between first and third angle projections	• Identify type of drawings and its principles • Demonstrate with drawings all the types of the projections. • Differentiate between first and third angle projections
29.0	PERSPECTIVE DRAWING OR PROJECTIONS	29.1 Understand the knowledge of perspective drawings or projections and apply it correctly	29.2.1 Explain the principles of one and two points perspectives 29.2.2 Draw given objects in both one and two points perspective	• Explain and draw the given objects and perspective
30.0	AUXILIARY PROJECTIONS	30.1 Understand the principles of auxiliary projections and be able to differentiate between auxiliary and principal planes	30.2.1 Distinguish between auxiliary and principal planes 30.2.2 Explain principles of auxiliary projections 30.2.3 Project first and second auxiliary views	• Distinguish between auxiliary and principal planes, projections

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
31.0	CROSS AND LONGITUDINAL SECTIONS	31.1 Know the concept and importance of sectioning	31.2.1 Explain the concept and importance of sections 32.2.2 Give reasons to show the importance of sectioning 31.2.3 Give reasons to show the importance of sectioning 31.2.3 Explain the true shape of cut surfaces of various geometrical objects 31.2.4 Explain the principles for drawing the true shape of a cut surface 31.2.5 Construct true shape of cut surfaces 31.2.6 Explain the rules for hatching true shape of a cut surface 31.2.7 Apply principles of sectioning to draw conic sections	Explain concept of sections

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
32.0	INTRODUCTION TO BUILDING DRAWING	32.1 Know various Architectural draughting materials and equipment and use them effectively in making building drawing	32.2.1 Recognize various standard sizes of drawing papers and boards and explain their uses. 32.2.2 Explain the various metric scales on architect's triangular or flat scales and demonstrate their use in the making of building drawing. 32.2.3 Describe the character and state the use of- i) Cartridge drawing paper ii) Natural tracing paper iii) Tracing film (acetate paper) 32.2.4 Select appropriate instruments and use them effectively in the production of building drawings NOTE: Essential instruments to be used should include: Scales, drawing pens, lettering templates, adjustable set-squares, instrument set, irregular (French) curves, T-square/parallel ruling straight edge	• Outline importance of sections
33.0	SYMBOLS AND CONVENTIONS IN BUILDING DRAWING	33.1 Interpret and apply symbols and conventions and other standard practices in Building Drawing	33.2.1 State the purpose and functions of symbols and in building drawing 33.2.2 Recognize and draw commonly used graphical symbols and representation in building drawing NOTE: Symbols and representation should be as	• Draw and explain, construct the true shape • Do more drawings

			contained in B,S 1192 or similar Ghanaian Standard 33.2.3 Recognize various lettering styles 33.2.4 Apply appropriate lettering styles in producing building drawings. Introduce the title block and indicate its importance. 33.2.5 List essential information required in the title block and indicate them in standard layout as recommended in B.S. 1192 or similar Ghanaian Standard 33.2.6 Use sketches to describe dimensioning methods in building. NOTE: Dimensioning methods should be those commonly used. Introduce scales and its interpretation. 33.2.7 State factors which govern choice of scale e.g. i) Need to achieve economy of effort and time in drawing preparation ii) Nature of drawing 33.2.8 State range of standard scales for the following:	
			a) Site and plot plans b) Floor and foundation plans c) Elevation sections d) Component details	
34.0	SYMBOLS AND CONVENTIONS IN BUILDING DRAWING	34.1 Interpret and apply symbols and conventions and other standard practices in Building Drawing	34.2.1 State the purpose and functions of symbols used in building drawing 34.2.2 Recognize and draw commonly used graphical symbols and representation in building drawing	• Draw and explain, construct the true shape

			NOTE: Symbols and representation should be as contained in B,S 1192 or similar Ghanaian Standard 34.2.3 Recognize various lettering styles 34.2.4 Apply appropriate lettering styles in producing building drawings. Introduce the title block and indicate its importance. 34.2.5 List essential information required in the title block and indicate them in standard layout as recommended in B.S. 1192 or similar Ghanaian Standard 34.2.6 Use sketches to describe dimensioning methods in building. NOTE: Dimensioning methods should be those commonly used. Introduce scales and its interpretation	
			34.2.7 State factors which govern choice of scale e.g. i) Need to achieve economy of effort and time in drawing preparation ii) Nature of drawing 34.2.8 State range of standard scales for the following: a) Site and plot plans foundation b) Floor plans c) Elevation section d) Component details	
35.0	DESIGN OF BUILDINGS	35.1 Demonstrate knowledge of the basic principles of design of buildings in warm climate	35.2.1 Explain the concept of form, function and beauty as applied in building design 35.2.2 Identify the basic parts of a typical modern residential bungalow. 35.2.3 Explain the functional	• Demonstrate principles of the sections of conic types

			relationship of above and state its designs relating to warm climate condition. NOTE: Basic parts should include: dinning/ sitting room, bed room, kitchen, garage (internal and annexed), bath/toilet, stores etc. 35.2.4 Identify typical water and sanitary services in modern flat and use sketches to illustrate their installation standards, e.g. shower, WC, sink, bath, water heater, wash hand basin etc.	
			35.2.5 Name common types of exterior and interior finishes (both floor and wall) for domestic buildings and explain their application 35.2.6 Explain the purpose of building regulations 35.2.7 Explain how site characteristics may influence the design of residential building 35.2.8 Enumerate the characteristic of good floor plan e.g. adequate and properly located openings, good functional relationships, etc. 35.2.9 Enumerate the factors which influence the design of residential building in Ghana e.g. site, town and country planning development, regulations, materials and labour availability, client's taste/culture, financial ability.	

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
36.0	DESIGN OF BUILDINGS	36.1 Demonstrate knowledge of the basic principles of design of buildings in warm climate	36.2.1 Explain the concept of form, function and beauty as applied in building design 36.2.2 Identify the basic parts of a typical modern residential bungalow. 36.2.3 Explain the functional relationship of above and state its designs relating to warm climate condition NOTE: Basic parts should include: dinning/sitting room, bed room, kitchen, garage (internal and annexed), bath/toilet, stores etc. 36.2.4 Identify typical water and sanitary services in modern flat and use sketches to illustrate their installation standards, e.g. shower, WC, sink, bath, water heater, wash hand basin etc. 36.2.5 Name common types of exterior and interior finishes (both floor and wall) for domestic buildings and explain their application 36.2.6 Explain the purpose of building Regulations 36.2.7 Explain how site characteristics may influence the design of residential building 36.2.8 Enumerate the characteristic of good floor plan e.g. adequate and properly	• Illustrate with drawings by scale. • Indicate all the various parts required in the building • Show complete drawing components, sections, elevations and plans with all amenities. e.g. A three –bed room suite

			located openings, good functional relationship, etc.	

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
			36.2.9 Enumerate the factors which influence the design of residential building in Ghana e.g. site, town and country planning development, regulations, materials and labour availability, client's taste/culture, financial ability. Distinguish between design and plan as built plan. Describe the essential elements of good site plan.	
37.0	DESIGN OF BUILDINGS	37.1 Demonstrate knowledge of the basic principles of design of buildings in warm climate	37.2.1 Explain the concept of form, function and beauty as applied in building design Identify the basic parts of a typical modern residential bungalow. 37.2.3 Explain the functional relationship of above and state its designs relating to warm climate condition NOTE: Basic parts should include: dinning/ sitting room, bed room, kitchen, garage (internal and annexed), bath/toilet, stores etc. 37.2.4 Identify typical water and sanitary services in modern flat and use sketches to illustrate their installation standards, e.g.	• Produce more drawings with various types of designs. • Introduce site visit and explain the various regulations.

			shower, WC, sink, bath, water heater, wash hand basin etc.	

CERTIFICATE ONE – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
			37.2.5 Name common types of exterior and interior finishes (both floor and wall) for domestic buildings and explain their application 37.2.6 Explain the purpose of building regulations 37.2.7 Explain how site characteristics may influence the design of residential building 37.2.8 Enumerate the characteristic of good floor plan e.g. adequate and properly located openings, good functional relationships, etc. 37.2.9 Enumerate the factors which influence the design of residential building in Ghana e.g. site, town and country planning development, regulations, materials and labour availability, client's taste/culture, financial ability. Distinguish between design and plan as a built plan. Describe the essential elements of good site plan.	

CERTIFICATE ONE – TRADE PRACTICALS – MASONRY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
1.0	SAFETY	1.1. Understand basic workshop and site safety rules and precautions	Identify: 1.2.1 Causes of accidents at workplaces 1.2.2 Personal safety rules and precautions 1.2.3 Workshop safety rules and precautions 1.2.4 Machine safety rules and precautions	• Identify and demonstrate by showing safety and precaution methods
2.0.	INTRODUCTION TO TOOLS AND EQUIPMENT	2.1.1 know the various tools and equipment in the bricklaying industry	2.2.1 Identify basic laying tools 2.2.2 Identify the equipment available in brick/blocklaying viz: pan mixer, mortar mixer, concrete mixer of various types and dumpers. 2.2.3 Differentiate between common tools and heavy equipment/machines in brick/ blocklaying and concreting trade	• Identify and show various tools and equipments for brick/block laying
3.0	MEASUREMENT (METRIFICATION)	3.1.1. Understand and explain metrification process 3.1.2 Know the batching system on the site	3.2.1 Demonstrate the correct use of measuring device to take measurement at workplaces. 3.2.2. Demonstrate the types of batching system using the correct device e.g. batching by weight and by volume	• Demonstrate and show the correct tool or device
4.0.	INTRODUCTION TO TOOLS AND EQUIPMENT	4.1.1 Understand the correct and safe use and handling of tools and equipment	4.2.1. Identify the correct and safe use of tools and equipment 4.2.2. Demonstrate and practice the correct handling of tools and equipment	• Identify and show the correct method of safe use of tools and equipments. • Demonstrate the correct use of tools and

				equipment
5.0.	INTRODUCTION TO TOOLS AND EQUIPMENT	5.1.1 Understand the correct and safe use and handling of tools and equipment	5.2.1. Identify the correct and safe use of tools and equipment 5.2.2. Demonstrate and practice the correct handling of tools and equipment	• Identify and distinguish between the safe use of tools and equipments. • Demonstrate how they are use and its handling
6.0.	INTRODUCTION TO BUILDING MATERIALS	6.1.1. Know various building materials used in the construction industry	6.2.1. Identify various building materials used in the building trade. 6.2.2. State the uses of the materials	• Identify and show the various building materials used in the industry. • Demonstrate and show the uses of the materials
7.0	PREPARATION OF MORTAR	7.1.1 Understand the Principles and methods of preparing mortar for building works	7.2.1 Identify the four types of mortar viz: cement, lime, clay and cement-lime or compo or gauge mortar. 7.2.2 State method of selection and batching of the materials 7.2.3 State manual and mechanical methods of mixing the materials	• Identify and show all types of mortar. • Distinguish between them • Demonstrate in practice how the mortar is use.
8.0	PREPARATION OF MORTAR	8.1.1 Understand the Principles and methods of preparing mortar for building works	8.2.1 Identify the four types of mortar viz: cement, lime, clay and cement-lime or compo or gauge mortar. 8.2.2. State method of selection and batching of the materials 8.2.3 State manual and mechanical methods of mixing the materials.	• Identify , show the types of all the mortar. • Differentiate them by showing in practice. • Demonstrate in practice manual and mechanical methods

CERTIFICATE ONE – TRADE PRACTICALS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
9.0	MANUFACTURE OF SANDCRETE BRICKS/BLOCKS	9.1.1 Know the processes involved in the production of sandcrete blocks/bricks	9.2.1 State the mix ratio or ratios depending upon the purpose or where the brick/block is to be used 9.2.2 Display various batching methods 9.2.3 Demonstrate mixing techniques either by hand or by machine. 9.2.4 Demonstrate moulding and drying techniques 9.2.5 Demonstrate the correct and safe use of manual and mechanical equipment/machines for moulding	• Identify and show the mix ratios. • Demonstrate at workshop how manufacturing of sandcrete, bricks and blocks are made.
10.0	MANUFACTURE OF SANDCRETE BRICKS/BLOCKS	10.1.1 Know the processes involved in the production of sandcrete blocks/bricks	10.2.1 State the mix ratio or ratios depending upon the purpose or where the brick/block is to be used. 10.2.2. Display various batching methods 10.2.3 Demonstrate mixing techniques either by hand or by machine. 10.2.4 Explain and demonstrate various curing methods 10.2.5 Demonstrate the correct and safe use of manual and mechanical equipment/ machines for moulding 10.2.6 Demonstrate moulding and drying techniques	• Identify and show the mix ratios. • Demonstrate at workshop how manufacturing of sandcrete, bricks and blocks are made.

CERTIFICATE ONE – TRADE PRACTICALS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
11.0	PRODUCTION OF CONCRETE	11.1 Understand the principles and methods of preparing concrete for building works and be able to carry out the operation	11.2.1 Explain the methods used in selecting the materials 11.2.2. Demonstrate the volume method of batching materials for concrete 11.2.3 Demonstrate the manual and mechanical methods of mixing the materials	• Identify, show how the methods are used. • Demonstrate and produce various methods of concrete
12.0	INTRODUCTION TO LAYING OF BRICKS/BLOCKS	12.1.1 Understand the principles of setting out a simple straight wall	12.2.1 Demonstrate the method of positioning tools and materials within a working area in workshop 12.2.2 Show the procedure for setting out a simple straight wall	• Identify, show how the methods are used. • Demonstrate and produce various methods of concrete
13.0	INTRODUCTION TO LAYING OF BRICKS/BLOCKS	13.1 Know the technique for picking and spreading mortar	13.2.1 Show the skill of gauging thickness of bed joints	• Demonstrate, show the skills of gauging thickness of bed joints.
14.0	INTRODUCTION TO LAYING OF BRICKS/BLOCKS (SPREAD MORTAR OVER FOUR BLOCKS)	14.1 Know the technique for picking and spreading mortar	14.1.1 Display correct handling of trowel, and know correct method of picking and spreading of mortar 14.2 Display the skill of gauging thickness of bed joints and height of bricks	• Demonstrate, show the skills of gauging thickness of bed joints.
15.0	LAYING A STRAIGHT WALL, FOUR BLOCKS IN LENGTH	15.1.1 Understand the correct sequence of laying bricks or blocks	15.2.1. Demonstrate the correct sequence viz. setting out, laying, gauging, leveling, plumbing and aligning	Demonstrate, show the correct sequence

CERTIFICATE ONE – TRADE PRACTICALS - MASONRY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
16.0.	LAYING OF STRAIGHT WALL – FOUR BLOCKS IN LENGTH AND THREE COURSES HIGH	16.1.1 Understand the correct sequence of laying bricks or blocks	16.2.1. Demonstrate the correct sequence viz. picking and spreading, setting out, laying, gauging, leveling, plumbing and aligning	• Demonstrate, show the correct sequence
17.0	LAYING STRAIGHT WALL IN STRETCHER BOND WITH BLOCKS	17.1.1 Understand the principles of bonding	17.2.1 Demonstrate the skills involved in laying as earlier on stated. 17.2.2 Identify the stretcher bond pattern	• Demonstrate, show the correct sequence
18.0	BUILDING JUNCTION WALLS AND SQUARE CORNERS IN BLOCK WORK IN STRETCHER BOND	18.1.1 Understand the principles of bonding	18.2.1 Demonstrate the skills involved in laying as earlier on stated. 18.2.2 Identify the stretcher bond pattern. Know the correct procedure of filling joints of the perpends.	• Identify, show and demonstrate at workshops the skills in laying various bricks and blocks
19.0	BUILDING STRAIGHTWALLS WITH PRACTICE IN PLASTERING/RENDERING	19.1.1 Know the method of application of mortar to a background	19.2.1 Demonstrate the correct sequence of plastering/rendering a wall e.g. preparing the background to receive the mortar • fixing of dots or gauge laths • wetting the background • dubbing of mortar (pick and throw) • straightening the surface by rodding off the excess mortar • finishing off by floating • trowelling (if necessary)	• Demonstrate and show the sequence of operations

CERTIFICATE ONE – TRADE PRACTICALS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
20.0	BUILDING JUNCTION WALLS AND SQUARE CORNERS WITH PRACTICE IN PLASTERING OR RENDERING	20.1.1Know the method of application of mortar to a background	20.2.1 Demonstrate the correct sequence of plastering/rendering a wall e.g. preparing the background to receive the mortar:- • fixing of dots or gauge laths • wetting the background • dubbing of mortar (pick and throw) • straightening the surface by rodding off the excess mortar • finishing off by floating trowelling (if necessary) (with emphasis on straightening the material corners).	• Demonstrate and produce the correct sequence of plastering/rendering
21.0	FIXING OF FRAMES (DOORS OR WINDOWS)	21.1.1 Know the methods or principles of fixing frames	21.2.1 Identify various parts of a frame e.g. jamb, head etc. 21.2.2 Demonstrate method of fixing and anchoring as the work is in progress 21.2.3 Demonstrate the method of building in after the completion of building 21.2.4 Differentiate between fixing and anchoring/securing	• Produce, identify and demonstrate. • Distinguish between fixing, anchoring and securing
22.0	Laying of solid blocks with stopped ends and return corner	22.1.1 know the procedure for setting out blocks or wall with stopped ends and returned corner	22.2.1 Demonstrate squaring and other laying techniques.	• Demonstrate, identify and show the other laying techniques

CERTIFICATE ONE – TRADE PRACTICALS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
23.0	LAYING OF SOLID BLOCKS WITH STOPPED ENDS AND RETURN CORNER WITH PRACTICE IN PLASTERING/RENDERING	23.1.1 Know the method of dressing the internal angles and corners of a wall during plastering	23.2.2 Demonstrate laying and plastering or rendering techniques at internal angles.	• Identify and demonstrate laying, plastering, rendering technique
24.0.	PLASTERING/RENDERING WALLS WITH OPENINGS	24.1 Know the techniques of dressing out openings	24.2.2 Demonstrate laying and plastering or rendering techniques of internal angles	• Produce, demonstrate and show laying, plastering and rendering technique in all internal angles
25.0	LAYING BLOCK WALLS IN RETURN AND JUNCTIONS	25.1.1 Know the techniques of squaring internal and external corners.	25.2.1 Demonstrate laying skills earlier discussed	• Identify, produce and demonstrate laying skills
26.0	LAYING BLOCK WALLS IN RETURN AND JUNCTIONS	26.1.1 Know the techniques of squaring internal and external corners.	26.2.1 Demonstrate laying and plastering skills earlier discussed	• Identify, produce and demonstrate laying skills
27.0	BUTTERING OF BRICKS	27.1.1 Know the skills involved in buttering bricks.	27.2.1 Demonstrate the techniques of; -holding the brick -applying mortar to the brick - correct placing or laying of the brick etc.	• Show and demonstrate the techniques of holding the brick, mortar and laying
28.0	LAYING FOUR BRICKS LENGTH WALL IN STRETCHER BOND	28.1.1 Understand the principles of bonding in stretcher bond	28.2.1 Demonstrate the method of buttering, placing and other laying skills.	• Demonstrate and show the methods of buttering, placing and other laying skills
29.0	LAYING FOUR BRICK WALL	29.1.1 Understand the principles of bonding in English	29.2.1 Demonstrate the method of buttering, bricks,	• Demonstrate at the workshops the

	5 BRICKS LENGTH AND FOUR COURSES HIGH IN ENGLISH BOND	bond.	placing and other laying skills.	various methods of buttering, bricks, placing and other laying skills
30.0	LAYING FOUR BRICK WALL 5 BRICKS LENGTH AND FOUR COURSES HIGH IN ENGLISH BOND	30.1.1 Understand the principles of bonding in English bond.	30.2.1 Demonstrate the method of buttering bricks, placing and other laying skills.	• Demonstrate the various • Methods of buttering bricks, placing and other laying skills.
31.0	LAYING OF BRICK WALLS IN ENGLISH BOND IN RETURN AND JUNCTION	31.1.1 Understand the principles of bonding at junctions	31.2.1 Demonstrate the method of buttering bricks, placing and other laying skills.	• Demonstrate the various • Methods of buttering bricks, placing and other laying skills
32.0	LAYING OF BRICK WALLS IN FLEMISH	32.1.1 Understand the principles of bonding in Flemish bond.	32.2.1 .1.1 Understand the principles of bonding in Flemish bond.	• Produce and show, demonstrate the bonding of Flemish bond.
33.0.	LAYING FLEMISH BOND WALL IN 6 BRICKS LENGTH AND 3 COURSE HIGH	33.1.1 Understand the principles of bonding in Flemish bond.	33.2.1 Understand the principles of bonding in Flemish bond.	• Produce and show, demonstrate the bonding of Flemish bond.
34.0	LAYING FLEMISH BOND WALL IN 6 BRICKS LENGTH AND 3 COURSE HIGH	34.1.1 Understand the principles of bonding in Flemish bond.	34.2.1 Understand the principles of bonding in Flemish bond.	• Produce, demonstrate and show the Flemish bond.
35.0	LAYING OF ONE BRICK THICK WALL IN ENGLISH AND FLEMISH BOND IN RETURN CORNER (DO AS PRACTICE	35.1.1 Understand the principles of blending different bonds together to achieve an architectural (pleasing) effect.	35.2.1 Understand the principles of bonding in Flemish bond.	• Produce, demonstrate and show the Flemish bond.
36.0	LAYING OF ONE BRICK THICK WALL IN ENGLISH AND FLEMISH BOND IN	36.1.1 Understand the principles of blending different bonds together to	36.2.1 Understand the principles of bonding in Flemish bond.	• Produce, demonstrate and show the Flemish

	RETURN CORNER (DO AS PRACTICE	achieve an architectural (pleasing) effect.		bond.
37.0	LAYING OF ISOLATED PIER, ONE BRICK THICK SIX COURSES HIGH	37.1.1 Know the method of bonding and squaring	37.2.1 Demonstrate laying techniques earlier on discussed	• Demonstrate and show the laying technique
38.0	LAYING ONE BRICK THICK ISOLATED PIER 8 COURSES HIGH.	38.1.1 Know the method of bonding and squaring	38.2.1 Demonstrate laying techniques earlier on discussed	• Demonstrate and show the laying technique
39.0	LAYING 1 ½ BRICK THICK ATTACHED PIER TO BRICK WALLS	39.1.1 Know the method of bonding the pier into the wall	39.2.1 Demonstrate squaring, buttering and other laying techniques	• Demonstrate and show the squaring buttering and other laying techniques.
40.0	LAYING 1 ½ BRICK THICK ATTACHED PIER TO BRICK WALLS	40.1.1 Know the method of bonding the pier into the wall	40.2.1 Demonstrate squaring, buttering and other laying techniques	• Demonstrate and show the squaring buttering and other laying techniques.
41.0	LAYING 2 BRICK THICK ATTACHED PIER TO BRICK WALLS	41.1.1 Know the method of bonding the pier into the wall	41.2.1 Demonstrate squaring, buttering and other laying techniques	• Demonstrate and show the squaring buttering and other laying techniques.
42.0	LAYING 2 BRICK THICK ATTACHED PIER TO BRICK WALLS	42.1.1 Know the method of bonding the pier into the wall	42.2.1 Demonstrate squaring, buttering and other laying techniques	• Demonstrate and show the squaring buttering and other laying techniques.
43.0	LAYING 2 BRICK THICK ATTACHED PIER TO BRICK WALLS	43.1.1 Know the method of bonding the pier into the wall	43.2.1 Demonstrate squaring, buttering and other laying techniques	• Demonstrate and show the squaring buttering and other laying techniques.
44.0	POINTING AND JOINTING	44.1.1. Understand the principles of jointing a wall and pointing	44.2.1 Demonstrate the use of the pointing and jointing tools e.g. jointer, hawk, Frenchman etc.	• Demonstrate and show the use of pointing and jointing tools.
45.0	POINTING AND JOINTING	45.1.1. Understand the principles of jointing a wall and	45.2.1 Demonstrate the use of the pointing and jointing tools e.g jointer, hawk, Frenchman etc.	• Demonstrate and show the use of pointing and jointing tools.

46.0	POINTING AND JOINTING	46.1.1 Understand the principles of pointing a wall	46.2.1 Demonstrate the use of the pointing and jointing tools e.g jointer, hawk, Frenchman etc.	• Demonstrate and show the use of pointing and jointing tools.
47.0	POINTING AND JOINTING	47.1.1 Understand the principles of pointing a wall	47.2.1 Demonstrate the use of the pointing and jointing tools e.g. jointer, hawk, Frenchman etc.	• Demonstrate and show the use of pointing and jointing tools.
48.0	POINTING AND JOINTING	48.1.1 Understand the principles and pointing and jointing	48.2.1 Demonstrate the use of the pointing and jointing tools e.g. jointer, hawk, Frenchman etc.	• Demonstrate and show the use of pointing and jointing tools.
49.0	PLASTERING AND RENDERING OF WALLS	49.1.1 Know the process or techniques of plastering or rendering a wall	49.2.1 Demonstrate the following skills: • dubbing (pick and throw) • straightening • floating • trowelling	• Demonstrate and show, identify how they are done.
50.0	PLASTERING AND RENDERING OF WALLS	50.1.1 Know the process or techniques of plastering or rendering a wall	50.2.1 Demonstrate the following skills: • dubbing (pick and throw) • straightening • floating • trowelling	• Demonstrate and show, identify how they are done.

LEVEL – CERTIFICATE ONE – TEST SPECIFICATION TABLE
TRADE THEORY

NO	TOPIC	COGNITIVE KNOWLEDGE	AFFECTIVE UNDERSTANDING	PSYCHOMOTOR APPLICATION	TOTAL
1.	Safety	1	1	1	3
2.	Tools and Equipment	1	1	1	3
3.	Materials	1	1	-	2
4.	Aggregates	1	1	-	2
5.	Mortar and Counselling	1	1	-	2
6.	Foundation	1	1	-	2
7.	Setting out	1	1	-	2
8.	Site Preparation	1	1	-	2
9.	Excavation	1	-	-	1
10.	Bonding, Bending, Walling	1	1	-	2
11	Opening	1	1	-	2
12.	Site Personnel	1	1	-	2
					25

CERTIFICATE ONE – TEST SPECIFICATION TABLE
TRADE SCIENCE AND CALCULATION

NO	TOPIC	COGNITIVE KNOWLEDGE	AFFECTIVE UNDERSTANDING	PSYCHOMOTOR APPLICATION	TOTAL
1.	Operational Signs	2	1	1	4
2.	Wastage	1	1	1	3
3.	Vector And Scalar Quantities	2	1	1	4
4.	Business Mathematics	1	1	1	3
5.	Matter	2	1	1	4
6.	Electricity	1	1	1	3
7.	Material Test	2	1	1	4
					25

CERTIFICATE ONE – TEST SPECIFICATION TABLE
TRADE DRAWING

NO	TOPIC	COGNITIVE KNOWLEDGE	AFFECTIVE UNDERSTANDING	PSYCHOMOTOR APPLICATION	TOTAL
1.	Simple Building in Orthographic Projections	1	1	1	3
2.	Simple Buildings in Orthographic Projections Including Sections	1	1	1	3
3.	Working Drawings	1	1	1	3
4.	Drawing Sections Through Foundations	1	1	1	3
5.	Timbering to Trenches	1	1	1	2
6.	Parapet Walls with Copings	1	1	1	3
7.	Section Through Super Structure	1	1	1	3
8.	Construction of Arches	1	1	1	3
9.	Drainage Construction and Systems	1	1	1	2
					25

CERTIFICATE ONE – TEST SPECIFICATION TABLE
(TRADE PRACTICAL)

NO	TOPIC	COGNITIVE KNOWLEDGE	AFFECTIVE UNDERSTANDING	PSYCHOMOTOR APPLICATION	TOTAL
1.	Safety	1	1	1	3
2.	Introduction to tools and equipment	1	1	1	3
3.	Measurement (metrification	1	1	1	3
4.	Introduction to building materials	2	1	1	4
5.	Preparation of mortar	2	1	1	4
6.	Manufacture of sandcrete bricks/blocks	2	1	1	4
7.	Production of concrete	2	1	1	4
					25
1.	Introduction to Laying of Bricks/Blocks	2	2	1	5
2.	Laying Straight Wall	2	1	1	4
3.	Fixing of Frames (Door And Window)	2	1	1	4
4.	Laying of Blocks/Bricks	2	1	1	4
5.	Pointing and Jointing	2	1	1	4
6.	Plastering and Rendering	2	1	1	4
					25

NATIONAL VOCATIONAL TRAINING INSTITUTE

TESTING DIVISION

TRADE TESTING REGULATIONS AND SYLLABUS

TRADE: MASONRY

LEVEL: CERTIFICATE TWO

A. INTRODUCTION:

i. The review of this syllabus has been generally influenced by the demands of industries due to its continuous change as a result of technological advancement and the changing needs of society.

It was also influenced by the TVET reforms under the directions of the new educational reforms with the view to opening up further education and training opportunities to TVET graduates.

The certificate TWO syllabus is designed to respond to the following level descriptors:

QUALIFICATION	KNOWLEDGE LEVEL	SKILLS AND ATTITUDE:
Certificate II	1. To demonstrate broad knowledge base with substantial depth in area(s) of study. 2. To demonstrate a command of analytical interpretation of range of data. 3. To present results of study accurately and reliably.	1. Needs varied skills and competencies in different tasks under various contexts. 2. Require a wide range of technical and supervisory skills. 3. Would be employed in different contexts.

ii. The rational for this programme is to train students, apprentices and other categories of trainees as craftsmen and women. Its purpose is to provide sound understanding of the skills processes and techniques of the craft and appreciation of the trade technology, trade science and calculation, trade drawing, relevant to the work of the brick and blockwork industry. It will also enhance the capabilities of trainees to work under minimum supervision.

B. GENERAL OBJECTIVE

The prime objective of the programme is to provide and sharpen the knowledge and skill competence of a trainee in a broad range of varied work activities in a variety of contexts in a manner that will best meet the needs of the global challenges in the construction industry.

This qualification provides an advance skill for the technician in the construction industry.

C. THE COURSE COMPONENT

The course comprises of:
a. Trade Theory
b. Trade Science and Calculation
c. Trade Drawing
d. General Paper
e. Trade Practical

EXAMINATION: The candidates would be examined in the FIVE components listed in 'C' above.

Practical work must be carefully planned to illustrate the application of trade Technology, Science and Calculations, and Drawing; so as to provide maximum opportunity for craft practice. It is recommended that not less than 60% of the course time should be allowed for craft practice.

D. KNOWLEDGE AND SKILLS REQUIREMENT

The prime objective of the programme is to provide knowledge and skills of the trade in a manner that will best meet the needs of the trade as well as industries using professional equipments

E. ENTRY TO THE COURSE

Minimum education: Must have passed JHS or SHS examination/Foundation Certificate. However, the selection of the students for the course is within the discretion of the head of the institution.

F. ELIGIBILITY FOR ENTRY TO EXAMINATION

Candidates may enter for examination when he/she has passed the Certificate One (I).

G. EXTERNAL EXAMINERS

The practical work of candidates will be assessed by an external examiner appointed by the Trade Testing Commissioner.

H. EXAMINATION RESULTS AND CERTIFICATES

Each candidate will receive record of performance given the grade of performance for the components Taken. These are:

v) Distinction
vi) Credit
vii) Pass
viii) Referred/Fail

Certificates would be issued to candidates who pass in all the components.

NOTE:

All Technical and Vocational trainees who aspire to take advantage of the opportunities opened to them in the educational reforms should NOTE that, for a trainee to progress to certificate Two (2) a pass in Certificate One (1) is compulsory.

I. ACKNOWLEDGEMENT

NVTI wishes to acknowledge the team of experts, for preparing the materials which have been incorporated into this syllabus.

Mr. Amos Ayi – ATTC
Mr. Adu Bandoh – Cape-Coast Polytechnic
Mr. Christian Agordah, Manager, New Ayomah VTI
Rev. E.O. Ankrah (Dip.-Civil Eng; Dip-Mangt.)

Government's desire to improve the lot of Technical/Vocational Training, which led to the preparation of this syllabus, is hereby acknowledged.

J. LIST OF RECOMMENDED TEXT BOOKS

1. Brickwork – By W.G. Nash Vol. 1,2,3
2. Construction Technology – By R. Chudley. Vol. 1,2,3,&4
3. Construction Technology – By J.T. Grundy. Vol.1.2 &3
4. Brickwork Associate – Vol. 1,2,& 3
5. Science And Building – By E.C. Adams Bk. 1&2
6. Engineering Science – By Hughs And Hughs
7. Metric Calculations – By F.L. Tabberer, Bk. 1&2
8. The Construction Of Buildings – By Barry, Bk 1,2,&3
9. Building Geometry And Drawing – By Frank Hilton
10. Technical Drawing For School Certificate and GCE (Metric Edition) By J.N. Green
11. Basic Civil Engineering – By Dr. B.C. Punmig, Ashok K. Jain, Arun K. Jain
12. Chudley Handbook
13. Building Construction – By W.B. Mackay, VOL. 1,2,3 & 4

K. TOOLS

1. Trowel (All types)
2. Spirit level
3. Plumb line
4. Straight edge
5. Mason line
6. Float
7. Shoves
8. Pickaxes
9. Chisel and Hammer
10. Morehammer
11. Head pans

EQUIPMENT

1. Dumpy level
2. Theodolite
3. Wheelbarrow
4. Hoist
5. Crane
6. Dumper

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
1.0	REVIEW OF LAST PHASE LESSON	1.1.1 Assess the understanding level of the previous lessons thought at last phase	1.2.1 Ask questions relating to topics treated at the last phase	• Identify and review by asking questions relating to topics at the level one
2.0	FORMWORK	2.1.1 Understand the principle in the design of formwork and the effect of hydrostatic pressure on formwork	2.2.1 Define formwork 2.2.2 State the functional requirement of formwork 2.2.3 List materials for formwork 2.2.4 State types of formwork 2.2.5 Explain the effect of hydrostatic pressure on formwork	• Identify formwork • Illustrate with drawings • Demonstrate at site etc.
3.0	FORMWORK	3.1.1 Understand the principle in the design of formwork and the effect of hydrostatic pressure on formwork	3.2.1. State factors influencing the choice of materials for formwork 3.2.2 State the principles of erecting of formwork i.e (plumbing, leveling, bracing) etc. 3.2..3 Explain the following terms in formwork: a) Spacers (Biscuit) b) Cover of concrete c) Easing d) Striking • List the members of formwork • State the functions of the members of formwork	• Identify factors that influence the choice of materials for formwork etc.

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
4.0	FORMWORK	4.1.1 Understand the principle in the design of formwork and the effect of hydrostatic pressure on formwork	4.2.1 Illustrate with sketches the cross section of the following formworks" a) Formwork for Beam b) Formwork for Column c) Formwork for Floor d) Wall 4.2.2 State the function of mould oil in formwork 4.2.3 State the thickness of cover into reinforcement in the following formwork: a) Beam formwork b) Column formwork c) Floor formwork d) Wall formwork	• Identify, indicate and illustrate with sketches the cross section of the formworks • For beam, columns, floors and walls.
5.0	FORMWORK	5.1 Understand the principle in the design of formwork and the effect of hydrostatic pressure on formwork	5.2.1 Explain the economic use of formwork 5.2.2 State the striking time of the following formwork: a) Beam sides b) Soffit boards c) Props d) Columns 5.2.3 State the methods of erecting and striking of formwork	• Identify and show to explain the economic use of formwork etc.
6.0	SCAFFOLDING	6.1 Understand the principle of erecting scaffolding and ensuring safety on scaffolds	6.2.1 Define scaffolding 6.2.2 State the classes of scaffolding (Independent and Dependent scaffolds) 6.2.3 State the function of a scaffold 6.2.4 State the types of scaffolds (Putlog, transom etc.).	• Identify and define scaffolding • Illustrate with sketches • Differentiate between the various types

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
7.0	SCAFFOLDING	7.1 Understand the principle of erecting scaffolding and ensuring safety on scaffolds	7.2.1 List the materials for scaffolding 7.2.2 List the members of scaffolding (brace, transom, ledger, putlog, standard, toe board, guardrail, base plate etc.	• Outline the materials required for scaffolding • Differentiate between the various members required.
8.0	SCAFFOLDING	8.1 Understand the principle of erecting scaffolding and ensuring safety on scaffolds	8.2.1 State the functions of the members in scaffolding. 8.2.2 List scaffolding fittings; (swivel coupler, double coupler, reveal pin, split joint pin, right angle coupler, putlog ends, joints, etc). 8.2.3 Define the term lift in scaffolding 8.2.4 Illustrate with sketches the details at the following: a) Connection between swivel couple and standard including base plate. b) Connection between transom, ledger, toeboard and guardrail.	• Demonstrate to show and indicate the various types and members of the various scaffolding
9.0	Scaffolding	9.1 Understand the principle of erecting scaffolding and ensuring safety on scaffolds	9.2.1 State faults in scaffolding 9.2.2 State the safety precautions regarding the following: a) Working plat form and gangways b) Guardrail and toeboards c) ladders and folding step ladders d) Loads on scaffolds e) Inspection of scaffolds f) Scaffolding tubes and fittings	• Identify and state faults in scaffolding • Distinguish between the various members of scaffolding

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
			9.2.3 State the requirements of scaffolding 9.2.4 State the advantages and disadvantages of timber and metal scaffolds	
10.0	Scaffolding	10.1 Understand the principle of erecting scaffolding and ensuring safety on scaffolds	10.2.1 List lifting equipment in scaffolding (hoist, elevator, crane, ginwheel 10.2.2 State the use of crawling board in roof work. 10.2.3 State the gradient of a ladder to a scaffolding (4 up, 1 out)	• Outline the equipment in scaffolding – hoist, elevator, crane, ginwheel. • Indicate the use of crawling board in roof work.
11.0	Scaffolding	11.1 Understand the principle of erecting scaffolding and ensuring safety on scaffolds	11.2.1 List lifting equipment in scaffolding (hoist, elevator, crane, ginwheel 11.2.2 State the use of crawling board in roof work. 11.2.3 State the gradient of a ladder to a scaffolding (4 up, 1 out)	• Outline and indicate the various equipment in scaffolding • Indicate its gradient (4 up, 1 out)
12.0	Wall Finishes	12.1 Understand the principle of providing finishing to wall surfaces to ensure durability and decorative finish	12.2.1 Define wall finish State the purpose of wall finishes State types of wall finishes (plastering, rendering, tiling, spatter dash, tyrolean finish, cladding terracotta, dry lining i.e. (Plaster of Paris POP) terrazzo finish, painting	• Identify and define the wall finish. • Show all types of wall finishes as stated

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
13.0	COPINGS	13.1 Understand the principle in the design of copings and prevention of dampness in coping	13.2.1 Define copings • State purpose of copings • State types of copings (saddle back, feather edge, parallel) etc. • Illustrate with sketches the following parts of copings: a) Weathering b) Drip c) Throating	• Identify what is copings • Differentiate between the various parts of coping • Illustrate with sketches, types of coping
14.0	COPINGS	14.1 Understand the principle in the design of copings and prevention of dampness in coping	State the functions of the following in copings: a) Weathering b) Drip c) Throating d) Damp proof course	• Identify what is copings • Differentiate between the various parts of coping Illustrate with sketches, types of coping
15.0	COPINGS	14.1 Understand the principle in the design of copings and prevention of dampness in coping	State the functions of the following in copings: a) Weathering b) Drip c) Throating d) Damp proof course	• Identify what is copings • Differentiate between the various parts of coping Illustrate with sketches, types of coping

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
16.0	DRAINAGE	16.1 Understand the principles in the design and the installation of drain pipes of domestic subsoil drainage	16.2.1. Define drainage 16.2.2 State classes or categories of drainage. (Domestic subsoil drainage). 16.2.3 State the systems of domestic drainage (combine system, separate system and partially combined system). 16.2.4 State the advantages and disadvantages of the systems of drainage 16.2.5 State the principles of drainage	• Indicate the types of drainages • Show its gradients • Distinguish between them, the types of drainages
17.0	DRAINAGE	17.1 Understand the principles in the design and the installation of drain pipes of domestic subsoil drainage	17.2.1 Define the following terms in drainage (ventilation, benching, effluent, foul air, seal, trap, gradient, back fall)	• Indicate the types of drainages • Show its gradients • Distinguish between them, the types of drainages
18.0	DRAINAGE	.18.1 Understand the principles in the design and the installation of drain pipes of domestic subsoil drainage	18.2.1 List materials for drainage 18.2.2 State the methods of obtaining falls in drainage (boning rod and sight rail methods, gauge board etc). 18.2.3 Advantages and disadvantages of the methods. 18.2.4 Illustrate with sketches the method of obtaining falls in drainage	• Indicate the types of drainages • Show its gradients Distinguish between them, the types of drainages

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
19.0	DRAINAGE	.19.1 Understand the principles in the design and the installation of drain pipes of domestic subsoil drainage	19.2.1 Illustrate with sketches the types of joints in drainage (flexible and rigid joints). 19.2.2 Illustrate with sketches the various types of joints under flexible and joints (hepseal, draw flex) etc. 19.2.3 Illustrate with sketches the various fittings in drainage (socket, taper pipe, junctions, branch junctions, saddle junctions, bends, channels, chutes, interceptors, gulleys, etc) 19.2.4 State the functions of fittings mentioned as above	• Illustrate with drawings the various fittings required in drainage • Outline its methods of obtaining good gradients
20.0	DRAINAGE	20.1 Understand the principles in the design and the installation of drain pipes of domestic subsoil drainage	20.2.1 State function of seal and traps in drainage 20.2.2 State the reason for ventilation in drainage 20.2.3 Differentiate between a seal and a trap 20.2.4 Sketch a cross-section through the following: Chambers: a) Inspecting chamber b) Intercepting chamber c) Drop manhole	• Demonstrate with sketches types of drainage. • Differentiate between a seal and a trap. • Identify all types of chambers.

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
21.0	DRAINAGE	21.1 Understand the principles in the design and the installation of drain pipes of domestic subsoil drainage	21.2.1 State function of seal and traps in drainage 21.2.2 State the reason for ventilation in drainage 21.2.3 Differentiate between a seal and a trap 21.2.4 Sketch a cross-section through the following: Chambers: a) Inspection chamber b) Intercepting chamber c) Drop manhole	• Identify and state its purpose of functions • Distinguish between the importance of all the chambers
22.0	DRAINAGE	22.1 Understand the principles underlining the testing of drain pipes to ensure air and water tightness of joints in drainage	22.2.1 Define testing of drains 22.2.2 State the purpose of testing 22.2.3 List the types of test applicable to drain pipes (hydraulic, ball, mirror, smoke, air tests) 22.2.4 State the methods used in connecting a newly constructed drain to an existing sewer. 22.2.5 State the provision made for future connection of drain to an existing drain or sewer	• Identify testing methods. • Outline the types of test applicable to drainpipes etc.
23.0	DRAINAGE	23.1 Understand the principles underlining the testing of drain pipes to ensure air and water tightness of joints in drainage	23.2.1 Differentiate between a public and a private sewer	• Identify testing methods. • Outline the types of test applicable to drainpipes etc.
24.0	DRAINAGE	24.1 Understand the principles underlining the testing of drain pipes to ensure air and water tightness of joints in drainage	24.2.1 Differentiate between a public and a private sewer	Differentiate between a public and private sewer

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
25.0	DRAINAGE	25.1 Understand the principles underlining the testing of drain pipes to ensure air and water tightness of joints in drainage	25.2.1 Differentiate between a public and a private sewer	• Differentiate between a public and private sewer
26.0	DRAINAGE	26.1 Understand the principles underlining the testing of drain pipes to ensure air and water tightness of joints in drainage	26.2.1 Differentiate between surface and foul water drainage. 26.2.2 State the purpose of subsoil drainage 26.2.3 State the principles of subsoil drainage 26.2.4 Illustrate with sketch a cross section through the trench of subsoil drainage	• Identify surface and foul water drainage • Illustrate with sketches
27.0	DRAINAGE	27.1 Understand the principles underlining the testing of drain pipes to ensure air and water tightness of joints in drainage	27.2.1 State the systems of subsoil drainage 27.2.2 Illustrate with sketches the following system of drainage a) Herringbone system b) Grid system c) Fan system d) Natural	• Identify the various systems of subsoil drainage • Illustrate with sketches the various types of systems
28.0	DRAINAGE	28.1.1 Understand the principles underlining the testing of drain pipes to ensure air and water tightness of joints in drainage	28.2.1 Illustrate with sketches the details of the outfall of a subsoil drainage 28.2.2 Illustrate with sketches the connection between a domestic drainage and a subsoil drainage.	• Illustrate with sketches the details of the outfall of a subsoil drainage
	DRAINAGE	28.1.2 Understand the principles underlining the	28.2.3 Illustrate with sketches the connection	• Differentiate

		testing of drain pipes to ensure air and water tightness of joints in drainage	between a domestic drainage and a subsoil drainage.	between domestic drainage and subsoil drainage
29.0	REINFORCEMENT BARS IN CONCRETE	29.1 Know the types of materials used for reinforcement bars and methods of ensuring anchorage of bars in concrete	29.2.1 State type of materials used for reinforcement bars (steel) 29.2.2 List the types of reinforcement bars (mild steel, high tensile steel, tendons) etc. 29.2.3 Illustrate with sketches to show the details at the end of reinforcement bars. (hook, bends) etc. a) State the method of forming	• Identify the various types of iron rods. • Show practically the type of iron rods. • Indicate where they are used, and necessary. • Visit construction site and explain to them.
			hooks using the mandrels. b) Know bending of hooks using various rod diameters and lengths of bends of hook 29.2.4 State ways of ensuring anchorage between the reinforcement rod and the concrete	• Site visitation on on-going project

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
30.0	REINFORCEMENT BARS IN CONCRETE	30.1 Know the types of materials used for reinforcement bars and methods of ensuring anchorage of bars in concrete	30.2.1 State type of materials used for reinforcement bars (steel) 30.2.2 List the types of reinforcement bars (mild steel, high tensile steel, tendons) etc. 30.2.3 Illustrate with sketches to show the details at the end of reinforcement bars. (hook, bends) etc. a) State the method of forming hooks using the mandrel b) Know bending of hooks using various rod diameter and length of bend of hook 30.2.4 State ways of ensuring anchorage between the reinforcement rod and the concrete.	• Identify the various types of iron rods. • Show practically the type of iron rods. • Indicate where they are used, and necessary. • Visit construction site and explain to them.
31.0	SITE ORGANISATION AND ITS MANAGEMENT	31.1 Understand the principle of planning site activities and ensuring proper layout of construction site.	31.2.1 Define site organization 31.2.2 State the purpose of site organization 31.2.3 Plan and organize a given site 31.2.4 State the purpose of site meetings 31.2.5 State the advantages and disadvantages of site meetings.	• State the purpose of site organization • Identify the various types of organization • Show a typical site organization. • Visit a site for site organization.

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
32.0	SITE ORGANISATION AND ITS MANAGEMENT	32.1 Understand the principle of planning site activities and ensuring proper layout of construction site.	32.2.1 Explain the ordering procedure 32.2.2 State the factors to be considered in ordering 32.2.3 State the methods of receiving and issuing materials on site 32.2.4 State the activities involve in planning out the activities in the preparation for construction of small building	State the purpose of site organization Identify the various types of organization Show a typical site organization. Visit a site for site organization
33.0	SITE ORGANISATION AND ITS MANAGEMENT	33.1 Understand the principle of planning site activities and ensuring proper layout of construction site.	33.2.1 State the advantages and disadvantages of a well layout site 33.2.2 Illustrate with sketches organizational structure of site personnel 33.2.3 Explain the term site layout 33.2.4 Illustrate with sketches organizational structure of a small company.	State the purpose of site organization Identify the various types of organization Show a typical site organization. Visit a site for site organization
34.0	SITE SURVEYING	34.1 Understand the principles of operations and functions of survey equipment	34.2.1 Define surveying 34.2.2 List the types of surveying 34.2.3 Define types of surveying 34.2.4 List the types of surveying instruments (Auto-level, tilting level, dumpy level, prismatic compass, surveys chain, (Gunters) Arrows, staff (metric), site optical square, tapes etc).	Demonstrate the nature of site survey. Outline the various types of instruments, equipments, Illustrate with sketches the various types of surveys

CERTIFICATE TWO – TRADE THEORY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
35.0	SITE SURVEYING	35.1 Understand the principles of operations and functions of survey equipment	35.2.1 Illustrate with sketches the design functions of the instruments/equipments as describe above. 35.2.2 State the methods of reducing levels. (Height of collimation, rise and fall). 35.2.3 Solve problems on methods of reducing levels and apply checks (height of collimation, rise and fall methods). 35.2.4 Illustrate with sketches methods of transferring levels from a reference point (datum) into foundation trenches. 35.2.5 Define flying level	• Demonstrate the nature of site survey. • Outline the various types of instruments, equipments, • Illustrate with sketches the various types of surveys
36.0	SITE SURVEYING	36.1 Understand the principles of operations and functions of survey equipment	36.2.1 Illustrate with sketches the design functions of the instruments/equipments as describe above. 36.2.2 State the methods of reducing levels. (Height of collimation, rise and fall) 36.2.3 Solve problems on methods of reducing levels and apply checks (height of collimation, rise and fall methods).	• Demonstrate the nature of site survey. • Outline the various types of instruments, equipments, • Illustrate with sketches the various types of surveys

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
1.0	REVIEW OF LAST PHASE LESSONS	1.1 Assessment of the previous thought principles and building on its understanding	1.2.1 General review on topics of the previous level	• Identify and solve problems of the previous level.
2.0.	LOGARITHMS	2.1 Understand the use and application of logarithmic tables to calculation	2.2.1 Solve problems on logarithms using the operational signs. (additions, subtraction, multiplication and division) 2.2.2 Application of indices in logarithm, using log table and calculator	• Show and solve more problems on logarithms, additions, subtraction, multiplication and division all indices
3.0	TRIGNOMETRY CALCULATIONS	3.1 Understand the principles governing the use of triangles in solving problems	3.2.1 State the principles of Pythagoras theorem, e.g. ($a^2+b^2 = c^2$) ($c= \sqrt{a^2 +b^2}$) 3.2.2 Solve problem using Pythagoras theorem to determine the sides of right angle triangles.	• Solve more questions on Pythagoras theorem
4.0	TRIGNOMETRY CALCULATIONS	4.1 Understand the principles governing the use of triangles in solving problems	4.2.1 Define trigonometry ratios using formulas e.g sine, cosine and tangent (SOH, CAH, TOA)	• Solve more questions to differentiate the formulars
5.0	TRIGNOMETRY CALCULATIONS	5.1 Understand the principles governing the use of triangles in solving problems	5.2.1 Define trigonometry ratios using formulas e.g sine, cosine and tangent (SOH, CAH, TOA)	• Solve more questions to distinguish the formulars
6.0.	FORCES AND MOMENTS	6.1 Understand the principles of mechanics of forces in relations to design of buildings	6.2.1 Define force 6.2.2 Define the following: a) Equilibrium b) Equilibrant force c) Resultant force d) Parallelogram of forces e) Resolution of forces	• Identify and solve to show the various definition

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
7.0	FORCES AND MOMENTS	7.1 Understand the principles of mechanics of forces in relations to design of buildings	7.2.1 State the relationship between the equilibrant and the resultant force 7.2.2. Solve problems relating to resultant force, equilibrant force and resolution of forces.	• Show and identify, differentiate between the forces. • Solve problems
8.0	FORCES AND MOMENTS	8.1 Understand the principles of mechanics of forces in relations to design of buildings	8.2.1 Define pulley 8.2.2 Illustrate with sketches block and tackle	• Explain definition and demonstrate with sketches to show the pulley system
9.0	FORCES AND MOMENTS	9.1 Understand the principles of mechanics of forces in relations to design of buildings	9.2.1 Define machine Define the following: a) Lever b) Load c) Effort d) Mechanical advantage (MA) e) Efficiency of machines f) Velocity ratio	• Explain and show the various items as stated
10.0	FORCES AND MOMENTS	10.1 Understand the principles of mechanics of forces in relations to design of buildings	10.2.1 Solve simple calculation on 9.2.1. above	• Solve more problems on above as stated
11.0	FORCES AND MOMENTS	11.1 Understand the principles of mechanics of forces in relations to design of buildings	11.2.1 Solve simple calculation on 9.2.1. above 11.2.2 Define Moments 11.2.3 Solve simple calculations on levers 11.2.4 List types of levers (1st, 2nd and 3rd class of levers)	• Solve and show more questions and examples

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
12.0	FORCES AND MOMENTS	12.1 Understand the principles of mechanics of forces in relations to design of buildings	12.2.1 Define Action and Reaction of Forces 12.2.2 Solve simple calculations on actions and reaction of forces on simple beam 12.2.3 Define friction 12.2.4 State the effect of friction	• Explain the terms action and reactions and illustrate with sketches
13.0	FORCES AND MOMENTS	13.1 Understand the principles of mechanics of forces in relations to design of buildings	13.2.1 Define the co-efficient of friction 13.2.2 Differentiate between sliding and static friction	• Explain and identify the co-efficient of friction • Distinguish between sliding and static friction
14.0	PRESSURE AND STRESS	14.1 Understand the effect of pressure and stress on building components	14.2.1 Define pressure 14.2.2 Define stress 14.2.3 Differentiate between pressure and stress 14.2.4 State types of pressure 14.2.5 Define various types of pressure 14.2.6 Pressures (Hydrostatic)	• Define and explain the various forces stated
15.0	PRESSURE AND STRESS	15.1 Understand the effect of pressure and stress on building components	15.2.1 Atmospheric bearing 15.2.2 Pressure and bearing 15.2.3 Capacity etc. 15.2.4 Define the following stresses 15.2.5 Tension stress 15.2.6 Compression stress	• Identify and explain the various items as stated
16.0	PRESSURE AND STRESS	16.1 Understand the effect of pressure and stress on building components	16.2.1 Shear stress/force 16.2.2 Lateral stress/force 16.2.3 Ultimate stress 16.2.4 Working stress 16.2.5 Factor of safety	• Identify and explain the stated forces
17.0	PRESSURE AND STRESS	17.1 Understand the effect of pressure and stress on building components	17.2.1 Solve simple problems on the above As Before Described (ABD)	• Demonstrate and solve problems as stated

18.0	PRESSURE AND STRESS	18.1 Understand the effect of pressure and stress on building components	18.2.1 Solve simple problems on the above As Before Describe (ABD)	• Demonstrate and solve problems as stated
19.0	PRESSURE AND STRESS	19.1 Understand the effect of pressure and stress on building components	19.2.1 Solve simple problems on the above As Before Describe (ABD)	• Solve problems as stated
20.0	PRESSURE AND STRESS	20.1 Understand the effect of pressure and stress on building components	20.2.1 Solve simple calculation on Bearing Pressure and Bearing Capacity of Foundations.	• Explain and solve problems on bearing pressure and bearing capacity of foundation
21.0	PRESSURE AND STRESS	21.1 Understand the effect of pressure and stress on building components	21.2.1 Solve simple calculation on Bearing Pressure and Bearing Capacity of Foundations.	• Solve simple problems on various calculations
22.0	DAMPNESS IN BUILDING	22.1 Understand the effect of dampness on building materials and components	22.2.1 Define the following terms: a) Bulking b) Surface tension c) Capillarity d) Permeability e) Porosity f) Suction g) Absorption 22.2.2 Solve problems relating to the above as described in relation to building materials and components, (e.g. sand, blocks, bricks, concrete, timber, tiles etc).	• Explain, indicate and show various items as stated

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
23.0	DAMPNESS IN BUILDING	23.1 Understand the effect of dampness on building materials and components	23.2.1 Define the following terms: a) Bulking b) Surface tension c) Capillarity d) Permeability e) Porosity f) Suction g) Absorption 23.2.2 Solve problems relating to the above as described in relation to building materials and components, (e.g. sand, blocks, bricks, concrete, timber, tiles etc). 23.2.2 Define Damp Proof Course (DPC) and Damp Proof Membrane (DMP) 23.2.3 Differentiate between Damp Proof Membrane and Damp Proof Course 23.2.4 List materials used as Damp Proof Course and Damp Proof Membrane	• Explain, indicate and show the various items as stated • Distinguish between the DPC and DPM and where they are used .
24.0	DAMPNESS IN BUILDING	24.2 Understand the effect of dampness on building materials and components	24.2.1 Explain means of preventing the vertical and horizontal movement of moisture through building components 24.2.2 Illustrate with sketches how Hardcore filling prevents vertical transmission of moisture in ground floor. 24.2.3 Explain the effects of dampness in hollow timber floors on timber components.	• Explain, indicate and show the various items as stated.

25.0	REINFORCED CONCRETE	25.1 Understand the principles in design of reinforce concrete and the effect of reinforcement bars on concrete products.	25.2.1 Define reinforced concrete 25.2.2 Explain the purpose of introducing reinforcement bars into concrete 25.2.3 Illustrate with sketches a simply supported beam and indicate the positions where the following stresses occur a) Compression b) Tension c) Shear 25.2.4 Illustrate with sketches the reinforcement arrangements in the following members: a) Simply supported beams b) Continuous beam c) Cantilever beam d) Secret beam	• Explain, indicate and show the various items as stated.

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
27.0	REINFORCED CONCRETE	26.1 Understand the principles in design of reinforce concrete and the effect of reinforcement bars on concrete products.	27.2.1 Define slenderness ratio 27.2.2 Solve simple calculations 27.2.3 Illustrate with sketches the position of reinforcement bars in columns 27.2.4 Define retaining walls 27.2.5 Illustrate with sketches the effect of earth pressure on retaining walls as a result of angle of repose of the soil. 27.2.6 Illustrate with sketches the arrangement of reinforcement in retaining walls (cantilever Etc.).	• Explain and define • Solve problems on them
28.0	ALGEBRAIC EQUATIONS	28.1 Understand the application of algebra in solving building related problems	28.2.1 Solve simple algebraic problems (e.g, y= mx+c) 28.2.2 Solve simple quadratic equations (e.g. $a^2=b^2+c^2$) 28.1.3 Solve simple simultaneous equations	• Explain, identify and solve problems • Solve more simple calculations
29.0	GRAPHS	29.1 Understand the graphical representation of figures and plotting of graphs	29.2.1 Use outcome of experimental figures to plot graphs (e.g. Sieve analysis test,) Crushing test etc. Tensile strength Draw straight line graphs using equation (e.g. y= x+3)	• Demonstrate, with illustrations various test. • Define and explain. • Solve simple calculations on graphs

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
30.0	PROPERTIES OF MATERIALS	30.1 Understand the behaviour of materials under varying weather conditions and loading	30.2.1 Define the following terms: a) Rusting b) Corrosion c) Ductibility d) Malleability e) Brittle f) Plasticity g) Elasticity h) Limit of proportionality i) Elastic limit j) Efflorescence 30.2.2 Explain the behaviour and properties of the following materials under wet and dry conditions a) Timber b) Ferrous and Non ferrous materials c) Painted surfaces d) Roof space (condensation and pattern staining)	• Define and explain the various terms as stated

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
31.1	Properties of Materials	31.1 Understand the behaviour of materials under varying weather conditions and loading	31.2.1 Define the following terms: a) Rusting b) Corrosion c) Ductibility d) Malleability e) Brittle f) Plasticity g) Elasticity h) Limit of proportionality i) Elastic limit j) Efflorescence 31.2.2 Explain the behaviour and properties of the following materials under wet and dry conditions a) Timber b) Ferrous and Non ferrous materials c) Painted surfaces d) Roof space (condensation and pattern staining)	• Define and explain the items as stated

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
32.0	Heat Sound	32.1 Understand the effect of heat and sound on building components, materials and how to insulate building against them	32.2.1 Define heat 32.2.2 Explain the effect of heat on building components (cracks, expansion and contraction) etc. 32.2.3 State methods of heat flow (convection, conduction, radiation). 32.2.4 Explain the effect of heat on polish, shining and white surfaces (iron sheets, ceiling) and dull surfaces. 32.2.5 List, heat insulation materials (e.g. dry wood plastics, glass etc.)	• Define and explain the various items as stated above
33.0	Heat Sound	33.1 Understand the effect of heat and sound on building components, materials and how to insulate building against them	33.2.1 Define sound 33.2.2 Explain the effect of sound on building components 33.2.3 List materials needed for sound insulations	Define and explain Outline the needed materials
34.0	Volumes and areas of Prisms, Cylinders, Cones and Circular Figures	34.1 Understand the application of the knowledge of determining areas and volumes to the calculation of surface areas and volumes of solids	342.1 Solve problems relating to surface areas of bricks, blocks, tiles floors, walls, roof pavements etc. 34.2.2 Solve problems relating to circular surfaces (cylinder, sphere and cones) etc. 34.2.3 State the formulas for the following: a) Sphere b) Cone c) Prisms d) Cylinder e) Circles f) Ellipse g) Trapezium h) Perimeter of plain figures (circle, ellipse, trapezium etc) i. Cube	Solve, problems relating to the various topics etc.

CERTIFICATE TWO – TRADE SCIENCE AND CALCULATIONS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
35.0	Volumes and areas of Prisms, Cylinders, Cones and Circular Figures	35.1 Understand the application of the knowledge of determining areas and volumes to the calculation of surface areas and volumes of solids	35.2.1 Solve problems relating to surface areas of bricks, blocks, floor tiles, walls, roof pavements etc. 35.2.2 Solve problems relating to circular surfaces (cylinder, sphere and cones) etc. 35.2.3 State the formulas of the following: a) Sphere b) Cone c) Prisms d) Cylinder e) Circles f) Ellipse g) Trapezium h) Perimeter of plain figures (circle, ellipse, trapezium etc) i) Cube	• Explain and solve problems relating to surface areas of the bricks, landcrete etc.

CERTIFICATE TWO – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
1.0	REVIEW OF PREVIOUS PHASE LESSON			• Identify and show the outline
2.0	SIMPLE BUILDINGS IN ORTHOGRAPHIC PROJECTIONS	2.1. Understand the principles of representing buildings in orthographic views	2.2.1 Explain orthographic projection 2.2.2 Position graph between first and third angle projections 2.2.3 Explain the principles for both first and third angles projections 2.2.4 Draw the symbols for first and third angle projections 2.2.5 Draw simple buildings in first angle projections NOTE: Emphasis on positioning of views (Front elevation, plan and end views)	• Produce, to scale and show by demonstrating the various projections. • Demonstrate by drawing and show the various angle projections.
3.0	SIMPLE BUILDINGS IN ORTHOGRAPHIC PROJECTIONS	3.1. Understand the principles of representing buildings in orthographic views	3.2.1 Draw simple buildings in first angle projections	• Produce and draw simple buildings in first angle projections
4.0	SIMPLE BUILDINGS IN ORTHOGRAPHIC PROJECTIONS	4.1. Understand the principles of representing buildings in orthographic views	4.2.1 Draw simple buildings in third angle projections.	• Produce and draw simple buildings in third angle projections
5.0	SIMPLE BUILDINGS IN ORTHOGRAPHIC PROJECTIONS	5.1. Understand the principles of representing buildings in orthographic projections	5.2.1 Draw simple buildings in third angle projections	• Produce and draw simple buildings in third angle projections

CERTIFICATE TWO – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
6.0	SIMPLE BUILDINGS IN ORTHOGRAPHIC PROJECTIONS INCLUDING SECTIONS.	6.1 Understand the principles of drawing sections to simple buildings in orthographic form	6.2.1 Draw sectional elevations up to two floors	• Produce and demonstrate with drawings sectional elevations up to two floors
7.0	SIMPLE BUILDINGS IN ORTHOGRAPHIC PROJECTIONS INCLUDING SECTIONS.	7.1 Understand the principles of drawing sections to simple buildings in orthographic form	7.2.1 Draw sectional elevations up to two floors. Know the definition and function of the parts of the working drawings i.e. plan, sections elevation etc.	• Demonstrate with drawings sectional elevations up to two floors
8.0	WORKING DRAWINGS	8.1 Understand the importance and the principles of preparing working drawings	8.2.1 Prepare building plans of small dwellings, garages, and sheds up to two floors 8.2.2 Demonstrate requisite skills in draughtsmanship 8.2.3 Show dimensions on building plans 8.2.4 Label building plans	• Demonstrate and show how to prepare building plans of small dwellings, etc. • Demonstrate, show skills in draughtsmanship • Identify and show indications on the drawings
9.0	DRAWING SECTIONS THROUGH FOUNDATION	9.1 Know types of Foundations and be able to draw cross-section through each of them	9.2.1 Define foundation and list various types e.g strip, pad, raft, pile and beam etc. Draw section through each type and indicate various parts e.g • Ground level • Earth • Hardcore • D.p.c. • Oversite concrete • Blockwork	• Show, identify and draw the various types of foundations. • Demonstrate with drawings, sections through each type and indicate various parts.

			• Foundation bed or concrete • Arms or projections etc.	
10.0	DRAWING SECTIONS THROUGH FOUNDATION	10.1 Know types of Foundations and be able to draw cross-section through each of them	10.2.1 Define foundation and list various types e.g strip, pad, raft, pile and beam etc. 10.2.2 Draw section through each type and indicate various parts e.g • Ground level • Earth • Hardcore • D.p.c. • Oversite concrete • Blockwork • Foundation bed or concrete • Arms or projections etc.	• Show, identify and draw the various types of foundations. • Demonstrate with drawings, sections through each type and indicate various parts.
11.0	TIMBERING TO TRENCHES	11.1 Understand the principles of drawing the isometric and oblique projections of trenches of various depth and on different grounds	11.2.1 Define timbering and state the methods used in timbering to protect sides of trenches 11.2.2 List timbering members 11.2.3 Demonstrate the methods of timbering to: i) shallow trenches ii) deep trenches 11.2.4 Show how timbering is done in the following soils or grounds: i) moderately firm ground ii) compact soil/ground iii) loose soil/ground 11.2.5 Draw to show: i) Open timbering ii) Close timbering 11.2.6 Draw section through trench and show the following timbering members E.g: Poling board Walling Lipblock	• Identify, show and demonstrate the types of timbering to trenches and draw indicating the various details.

			11.2.7 Show with a sketch the following: i) Buttering the sides of a trench ii) Angle of repose of trench or earth	
12.0	TIMBERING TO TRENCHES	12.1 Understand the principles of drawing the isometric and oblique projections of trenches of various depth and so different grounds	12.2.1 Draw timbering to different types of soils/ground	• Identify, show and demonstrate the types of timbering to trenches and draw indicating the various details.
13.0	TIMBERING TO TRENCHES	13.1 Understand the principles of drawing the isometric and oblique projections of trenches of various depth and so different grounds	13.2.1 Draw timbering to different types of soils/ground	• Identify, show and demonstrate all types of timbering to various soils/ground.
14.0	PARAPET WALLS WITH COPINGS	15.1 Understand the importance and the method of protecting the parapet	14.2.1 Draw section through a trench and show members in 11.2.6	• Identify and draw to demonstrate through trenches and its members.
15.0	PARAPET WALLS WITH COPINGS	15.1 Understand the importance and the method of protecting the parapet	15.2.1 Define and state the purpose of parapet wall 15.2.2 Draw the parapet wall 15.2.3 Show the method of protecting the parapet (i.e. by use of copings such as brick-on-edge, feather edge, saddle back segmental etc). 15.2.4 Draw the various copings 15.2.5 Draw section through the parapet and the coping to show how water can be prevented from entering the structure below it.	• Identify, show and demonstrate by drawings the types of parapet walls
16.0	PARAPET WALLS WITH COPINGS	16.1 Understand the importance and the method of protecting the parapet	16.2.1 Define and state the purpose of parapet wall 16.2.2 Draw the parapet wall 16.2.3 Show the method of protecting	• Identify, show and demonstrate by drawings the

			the parapet (i.e. by use of copings such s brick-on-edge, feather edge, saddle back segmental etc). 16.2.4 Draw the various copings 16.2.5 Draw section through the parapet and the coping to show how water can be prevented from entering the structure below it.	types of parapet walls
17.0	SECTION THROUGH A SUPER STRUCTURE	17.1 Understand the principles of drawing a section through a super structure	17.2.1 Draw the elevation of the super structure 17.2.2 Indicate the sectional line 17.2.3 Draw the section using the imaginary cut 17.2.4 Indicate various members up to a building course	• Produce drawings showing elevations of super structure. • Indicate and show the sectional line. • Draw and show the various members up to a building course
18.0	SECTION THROUGH A SUPER STRUCTURE	18.1 Understand the principles of drawing a section through a super structure	18.2.1 Draw the elevation of the super structure 18.2.2 Indicate the sectional line 18.2.3 Draw the section using the imaginary cut 18.2.4 Indicate various members up to a binding course	• Produce drawings • Show the sectional line. • Indicate and draw to show members and a binding course
19.0	SECTION THROUGH SUPER STRUCTURE SHOWING ROOF AND ROOFING MEMBERS	19.1 Know the various parts of a roof	19.2.1 Draw the super structure in elevation 19.2.2 Indicate the sectional line 19.2.3 Draw the section using the imaginary cut 19.2.4 Show the various members of the roof e.g purlins • rafters • facia board • ridge cap	• Produce, drawing Show and demonstrate the various members of the roof etc.

			• wall plate • ridge • sprocket • hangers • roofing sheet etc.	
20.0	SECTION THROUGH SUPER STRUCTURE SHOWING ROOF AND ROOFING MEMBERS	19.1 Know the various parts of a roof	20.2.1 Draw the super structure in elevation 20.2.2 Indicate the sectional line 20.2.3 Draw the section using the imaginary cut 20.2.4 Show the various members of the roof. e.g purlins • rafters • facia board • ridge cap • wall plate • ridge • sprocket • hangers • roofing sheet etc.	• Produce, drawing • Show and demonstrate the various members of the roof etc.
21.0	SECTION THROUGH A BUILDING SHOWING THE PARAPET WALL	21.1.1 Understand the principle of drawing parapet wall in section	21.2.1 Draw the elevation of the building 21.2.2 Indicate the sectional line 21.2.3 Draw the imaginary section using the imaginary cut through the parapet 21.2.4 Label the parapet	• Identify, show and draw the elevation of the building • Indicate, show the sectional lines • Draw and demonstrate the parapet wall.
22.0	DRAWING, 1 ½ AND 2 BRICKS THICK ISOLATED PIERS IN ENGLISH AND FLEMISH BONDS	22.1.1 Understand the principle of drawing isolated piers isometric	22.2.1 draw the isolated pier (1 to 2bricks thick) 22.2.2 Establish the isometric axis and 22.2.3 Complete the isometric view up to 8 courses high	• Draw and show the isolated pier. • Demonstrate, draw to show isometric axis and its course. •

23.0	ISOLATED PIERS (ENGLISH/FLEMISH BONDS)	23.1.1 Understand the principles of bonding piers	23.2.1 Draw the piers in their respective patterns or bonds. 23.2.2 Draw the isometric view up to the required height or courses.	• Demonstrate and show by drawing pier, and isometric view up to the required height
24.0	CONSTRUCTION OF ARCHES	24.1.1. Understand the principles of constructing arches with given information	24.2.1 Define the term arches 24.2.2. List various types of arches: E.g Semi circular, segmental, flat or carriber, semi elliptical, soldier or brick arches. Etc. 24.2.3 Draw a semi-circular and label	• Identify arches • Show various types of arches • Demonstrate by drawing types of arches.

CERTIFICATE TWO – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
25.0	i. SEMI-CIRCULAR WITH A LABEL COURSE ii. BONDED AND UNBONDED ARCHES iii. SEGMENTAL ARCH	25.1.1. Understand the principles of constructing arches with given information	25.2.1 Define the term arches 25.2.2. List various types of arches: E.g Semi-circular, segmental, flat or carriber, semi-elliptical, soldier or brick arches. Etc. 25.2.3 Draw a semi-circular and label	• Identify arches • Show various types of arches • Demonstrate by drawing types of arches.
26.0	DRAWING OF : i. ARCH CENTRE ii. ARCH TEMPLATE iii. DEADMAN	26.1.1. Understand the principles of constructing arches with given information	26.2.1 Draw: i. An arch centre ii. arch template iii to show the method of aligning arches with the aid of a deadman	• Identify an arch centre. • Show how an arch centre is, template • Show the methods and demonstrate
27.0	FLAT, SOLDIER, SEMI ELLIPTICAL ARCHES ETC.	27.1.1. Understand the principles of constructing arches with given information	27.2.1 Draw the remaining arches with given information	• Demonstrate and draw arches
28.0	DRAINAGE CONSTRUCTION	28.1.1 Understand the basic principles in the design of simple drainage system	28.2.1 Define drainage/drainage system 28.2.2. Draw the structural details of the following: • Septic tank • Soak away • Inspection chamber/manhole • Cesspool • Intercepting chamber	• Identify and show drainage by drawing, and others. • Demonstrate by showing them

CERTIFICATE TWO – TRADE DRAWING

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
29.0	DRAINAGE SYSTEMS	29.1.1 Understand the basic principles in the design of simple drainage system	29.2.1 Draw the following drainage systems i. Separate system ii. Combined system	• Identify and show • Draw the drainage system, separate, combined system of sewage
30.0	DRAINAGE SYSTEMS	30.1.1 Understand the basic principles in the design of simple drainage system	30.2.1. Describe with sketches the following methods of determining fall of underground drain: i. Gauge board method ii. Boning method	• Differentiate the methods by showing with drawings to demonstrate the fall of underground drain
31.0	DRAINAGE FITTINGS AND JOINTS	31.1.1 Understand the Principles of drawing Drainage Joints and Fittings	31.2.1 Identify joints and fittings used in drainage work 31.2.2 Draw each of the joints and the fittings	• Identify joints and fittings used in drainage work. • Draw and produce each joint and the fittings

CERTIFICATE TWO – TRADE PRACTICALS - MASONRY

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
1.0	REVIEW OF LAST PHASE LESSONS	1.1 Assessment of the understanding of lessons thought at the previous levels	1.2.1 Practical lessons of previous level	• Identify and repeat the practical at workshop
2.0	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	2.1. Practice the laying and bonding of walls and pier up to 2 brick thickness	2.2.1 Lay one brick thick wall in English Bon bonded to 1 brick thick pier. 2.2.2 Lay 2m length wall 1 brick thick in English bond. 2.2.3 Lay 2.5m length wall 1 brick thick in English Bond bonded to 1 brick thick pier	• Demonstrate at the workshop how one brick thick wall of English bond is laid
3.0	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	3.1. Practice the laying and bonding of walls and pier up to 2 brick thickness	3.2.1 Lay 2 brick thick wall in English bond of 2m length bonded to 1 brick thick pier. 3.2.2 Lay 2.5m length of 2 bricks thick wall in English Bond bonded to1 brick thick pier to 4 courses high.	• Identify and demonstrate, 2-brick thick wall in English Bond
4.0	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	4.1. Practice the laying and bonding of walls and pier up to 2 brick thickness	4.2.1 Lay 1 brick thick wall 2m length in Flemish bond to 4 courses high. 4.2.2 Lay 2.5m length of 1-brick thick wall to 4 courses high 4.2.3 Lay 2m length Flemish bond in 1 ½ brick thick to 4 courses high	• Identify, and indicate, show and lay one-brick thick wall of 2mm length in Flemish bond
5.0	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	5.1 Practice the laying and bonding of walls and pier up to 2 brick length		• Identify, and indicate, show and lay one-brick thick wall of 2mm length in Flemish bond

6.0.	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	6.1. Practice the laying and bonding of walls and pier up to brick thickness	6.2.1 Lay 2 brick thick wall in Flemish Bond 2m length to 4 courses high 6.2.2 Lay 2.5m length of Flemish Bond to 2 bricks thick to 4 courses high	• Identify, and indicate, show and lay one-brick thick wall of 2mm length in Flemish bond
7.0	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	7.1. Practice the laying and bonding of walls and pier up to 2 brick thickness	7.2.1 Lay isolated pier up to 1 to 2 brick thick to 6 courses high 7.2.2 Build 1 ½ brick thick isolated pier up to 6 courses high. 7.2.3 Build 2 bricks thick isolated pier up to courses high	• Identify and show • Demonstrate how to lay isolated pier up to 1 to 2-brick thick
8.0	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	8.1. Practice the laying and bonding of walls and pier up to brick thickness	8.2.1 Lay isolated pier up to 1 to 2 brick thick to 6 courses high 8.2.2 Build 1 ½ brick thick isolated pier up to 6 courses high. 8.2.3 Build 2 bricks thick isolated pier up to courses high	• Identify and show • Demonstrate how to lay isolated pier up to 1 to 2-brick thick
9.0	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	9.1 Practice the laying of jambs and reveals of openings in English and Flemish Bond up to 2 bricks thick.	9.2.1 Build a 2m length 1 brick thick wall with a square jamb at the end 9.2.2 Build 2.5m length wall 1½ brick thick with a square jamb at the end. 9.2.3 Build 2m length 1 ½ brick thick wall with a recess jamb at the end	• Demonstrate and build a 2m-length 1-brick thick wall to jambs, square ends and recess jambs.
10.0	BONDING SOLUTIONS IN ENGLISH AND FLEMISH BOND	10.1.1 Practice the laying of jambs and reveals of openings in English and Flemish Bond up to 2 bricks thick. 10.1.2 Practice the laying of jambs and reveals of openings in English and Flemish Bond up to 2 bricks thick.	10.2.1 Build a 2.5m length wall 1 ½ brick thick with a recess jamb at the end 10.2.2 Build a 2.5m length wall 1 ½ brick thick with a recess jamb at the end.	• Demonstrate and build a 2m-length 1-brick thick wall to jambs, square ends and recess jambs.

CERTIFICATE TWO – TRADE PRACTICALS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
11.0	BRIDGING OF OPENINGS	11.1 Practice bridging of opening by the use of arch centres, lintel formwork and practice the laying of arches and casting of lintels over openings by the use of bricks.	11.2.1 Practice cutting of templates for voussiors 11.2.2 Build a soldier arch over an opening of 1m length. 11.2.3 Building a soldier arch over an opening of 1½m length	• Demonstrate the practice of cutting templates for voussiors
12.0	BRIDGING OF OPENINGS	12.1 Practice bridging of opening by the use of arch centres, lintel formwork and practice the laying of arches and casting of lintels over openings by the use of bricks.	12.2.1 Build a semi-circular arch over an opening of 1m length 12.2.2 Build a semi-circular arch over an opening of 1 ½ m length	• Demonstrate the practice of cutting templates for voussiors
13.0	BRIDGING OF OPENINGS	13.1 Practice bridging of opening by the use of arch centres, lintel formwork and practice the laying of arches and casting of lintels over openings by the use of bricks.	13.2.1 Build a semi-elliptical arch over an opening of 1m length 13.2.2 Build a semi-elliptical arch over an opening of 1 ½ m length	• Demonstrate and build a semi-elliptical arch over an opening of 1m-length
14.0	LAYING OF HOLLOW AND SOLID BLOCK	14.1 Practice the laying of hollow and solid blocks with attached block piers.	14.2.1 Lay hollow blocks in straight walls of 2.5m length 4 courses high 14.2.2 Lay hollow blocks in returned angle walls of 2.5m x 2m lengths, 4 courses high.	• Demonstrate and lay hollow blocks in straight walls of 2.5m length 4 courses high
15.0	LAYING OF HOLLOW AND SOLID BLOCK	15.1 Practice the laying of hollow and solid blocks with attached block piers.	15.2.1 Lay solid blocks in straight wall of 2.5m length, 4 courses high. 15.2.2 Lay solid blocks in returned angle walls of 2.5m x 2m length 4 courses high	• Demonstrate and lay solid blocks in straight wall of 2.5m length, 4course high

CERTIFICATE TWO – TRADE PRACTICALS

NO	TASK	CRITICAL POINTS	SUB-POINTS	INSTRUCTIONAL TECHNIQUES
16.0	LAYING OF HOLLOW AND SOLID BLOCK	16.1 Practice the laying of hollow and solid blocks with attached block piers.	16.2.1 Lay a junction wall of 6 blocks length and 4 block length junction	• Identify and demonstrate to lay a junction wall of 6 blocks length etc.
17.0	LAYING OF HOLLOW AND SOLID BLOCK	17.1 Practice the laying of hollow and solid blocks with attached block piers.	17.2.2 Lay a junction wall of 6 blocks length and 4 block length junction	• Identify and demonstrate to lay a junction wall of 6 blocks length etc.
18.0	LAYING OF HOLLOW AND SOLID BLOCK	18.1 Practice the use of different building units to form composite wall	18.2.1 Lay 2m length of ½ brick thick wall to 1m length of a block wall at a returned angle and a junction 18.2.2 Lay 2.5m length of ½ block thick as above	• Demonstrate and lay 2m length of ½ brick thick wall to 1m length of a block wall at a returned angle and a junction
19.0	LAYING OF HOLLOW AND SOLID BLOCK	19.1 Practice the use of different building units to form composite wall	19.2.1 Lay 2m length of ½ brick thick wall to 1m length of a block wall at a returned angle and a junction 19.2.2 Lay 2.5m length of ½ block thick as above	• Demonstrate and lay 2m length of ½ brick thick wall to 1m length of a block wall at a returned angle and a junction
20.0	LAYING OF COPINGS, SILLS AND THRESHOLD	20.1 Know the principles in the laying of copings, sills and thresholds.	20.2.1 Practice the laying of parallel copings in brickwork on 2m length wall 20.2.2 Practice the laying of parallel copings in blockwork on 2m length wall. 20.2.3 Practice the laying of featheredge and saddle back copings in concrete on 3m length walls.	• Demonstrate and practice the laying of parallel copings in brickwork on 2m length wall.
21.0	LAYING OF COPINGS, SILLS AND THRESHOLD	21.1 Know the principles in the design and laying of copings, sills and thresholds.	21.2.1 Practice the laying of parallel copings in brickwork on 2m length wall 21.2.2 Practice the laying of parallel copings in blockwork on	• Demonstrate and practice the laying of parallel copings in blockwork on 2m-length wall.

			2m length wall. 21.2.3 Practice the laying of featheredge and saddle back copings using concrete on 3m length walls.	
22.0	LAYING OF COPINGS, SILLS AND THRESHOLD	22.1 Know the principles in the design and laying of copings, sills and thresholds.	22.2.1 Practice the laying of sills at window levels in brick and block work. 22.2.2 Practice the laying of thresholds at door openings.	• Demonstrate the laying of sills at window levels in brick and block work
23.0	LAYING OF COPINGS, SILLS AND THRESHOLD	23.1 Know the principles in the design and laying of copings, sills and thresholds.	23.2.1 Practice the laying of sills at window levels in brick and block work. 23.2.2 Practice the laying of thresholds at door openings.	• Demonstrate the laying of sills at window levels in brick and block work
24.0	WALL AND FLOOR FINISHES WALL AND FLOOR FINISHES	24.1.1 Know the application of wall and floor finishes in brick, tiles, carpet tyrolean and other finishes. 24.1.2 Know the application of wall and floor finishes in brick, tiles, carpet tyrolean and other finishes.	24.2.1 Practice the laying of decorative brickwork in herringbone and basket weave patterns to a floor area of 1.5m x 1.5m 24.2.2 Practice the application of mortar to wall surfaces as rendering and plastering	• Demonstrate the laying of sills at window levels in brick and block work
25.0	WALL AND FLOOR FINISHES DITTO	25.1.1 Know the application of wall and floor finishes in brick, tiles, carpet tyrolean and other finishes. Ditto	25.2.1 Practice the application of 3 coat work in plastering. (Scratch coat, browning coat and putty coat) 25.2.2 Practice the laying of screed to an area of 1.5m x 1.5m applying all the principles 25.2.3 Practice the laying of screed to an area of 3.5m x 3.5m applying all the principles	• Demonstrate and practice the application of 3-coat work in plastering etc.
26.0	WALL AND FLOOR FINISHES	26.1.1 Know the application of wall and floor finishes in brick, tiles, carpet tyrolean and other finishes.	26.2.1 Practice the application of 3 coats work in plastering. (Scratch coat, browning coat and putty coat)	• Demonstrate and practice the application of 3-coat work in

	DITTO	Ditto	26.2.2 Practice the laying of screed to an area of 1.5m x 1.5m. (Scratch coat, browning coat and putty coat) 26.2.3 Practice the laying of screed to an area of 3.5m x 3.5m. (Scratch coat, browning coat and putty coat)	plastering etc.
27.0	WALL AND FLOOR FINISHES DITTO	27.1.1 Know the application of wall and floor finishes in brick, tiles, carpet tyrolean and other finishes. Ditto	27.2.1 Practice the laying of 0.15m x ,15m wall tiles to 2m x 2m area of wall applying all principles. 27.2.2 Practice the laying of 0.30m x 0.30m floor tiles to a floor area of 2m x 2m. (use PVC or linoleum or quarry tiles) 27.2.3. Practice the use of wooden blocks in straight basket weave, herringbone patterns as floor finish.	• Demonstrate and practice the laying of 0.15m x 15m wall tiles to 2m x 2m area
28.0	WALL AND FLOOR FINISHES DITTO	28.1.1 Know the application of wall and floor finishes in brick, tiles, carpet tyrolean and other finishes. Ditto	28.2.1 Practice the laying of 0.15m x ,15m wall tiles to 2m x 2m area of wall using mortar. 28.2.2 Practice the laying of 0.30m x 0.30m floor tiles to a floor area of 2m x 2m. (use PVC or linoleum or quarry tiles) 28.2.3. Practice the use of wooden blocks in straight, basket weave and herringbone patterns as floor finish.	• Demonstrate and practice the laying of 0.15m x 15m wall tiles to 2m x 2m area
29.0	WALL AND FLOOR FINISHES	29.1.1 Know the application of wall and floor finishes in brick, tiles, carpet tyrolean and other finishes.	29.2.1 Practice the use of both polished and washed terrazzo for wall and floor finishes. 29.2.2 Practice the use of tyrolean as a wall finish. 29.2.3 Practice the use of pebble and spatter dash as in wall finishes.	• Demonstrate and practice the use of both polished and washed terrazzo for wall and floor finishes
	DITTO	Using peddle and spatter dash		
30.0	WALL AND FLOOR FINISHES	30.1.1 Know the application of wall and floor finishes in	30.2.1 Practice the use of both polished and washed terrazzo for	• Demonstrate and practice the use of

		brick, tiles, carpet tyrolean and other finishes. t	wall and floor finishes. 30.2.2 Practice the use of tyrolean as a wall finish. 30.2.3 Practice the use of pebble and spatter dash as wall finishes.	both polished and washed terrazzo for wall and floor finishes
31.0	WALL AND FLOOR FINISHES DITTO	31.1.1 Know the application of wall and floor finishes in brick, tiles, carpet tyrolean and other finishes. Ditto	31.2.1 Practice the use of both polished and washed terrazzo for wall and floor finishes. 31.2.2 Practice the use of tyrolean as a wall finish. 31.2.3 Practice the use of pebble and spatter dash as wall finishes.	• Demonstrate and practice the use of both polished and washed terrazzo for wall and floor finishes
32.0	CONSTRUCTION OF CHAMBERS IN DOMESTIC DRAINAGE	32.1.1 Know the practice in design and construction of septic tanks, inspection chambers, interception chambers, cesspools etc.	32.2.1 Practice the construction of the following chambers: a) Septic tank b) Inspection chamber c) Interception chambers d) Cesspools e) Drop manhole	• Demonstrate and practice the construction of the various chambers
33.0	CONSTRUCTION OF CHAMBERS IN DOMESTIC DRAINAGE	33.1.1 Know the practice in design and construction of septic tanks, inspection chambers, interception chambers, cesspools etc.	33.2.1 Practice the construction of the following chambers: a) Septic tank b) Inspection chamber c) Interception chambers d) Cesspools e) Drop manhole	• Demonstrate and practice the construction of the various chambers
34.0	HANDLING OF SURVEY INSTRUMENTS Ditto	34.1.1 Know the mounting process and handling of surveying instruments Ditto	34.2.1 Practice the process of mounting and setting up the survey instrument on its tripod. 34.2.2 Practice taking of levels using survey instruments (dumpy quick set levels etc. 34.2.3 Practice the excavation of drain trench and laying of drain pipes using the sight rails and boning rod. 34.2.4 Practice the laying of drain pipes using the gauge board.	• Demonstrate and practice the process of mounting and setting up the survey instrument on its tripod. • Demonstrate and practice taking of levels using survey instruments etc.

35.0	HANDLING OF SURVEY INSTRUMENTS DITTO	35.1.1 Know the mounting process and handling of surveying instruments Ditto	35.2.1 Practice the process of mounting and setting up the survey instrument on its tripod. 35.2.2 Practice taking of levels using survey instruments (dumpy quick set levels etc. 35.2.3 Practice the excavation of drain trench and laying of drain pipes using the sight rails and boning rod. 35.2.4 Practice the laying of drain pipes using the gauge board.	Demonstrate and practice the process of mounting and setting up the survey instrument on its tripod. Demonstrate and practice taking of levels using survey instruments etc.