NATIONAL BOARD FOR TECHNICAL EDUCATION

Plot B, Bida Road, P.M.B. 2239, Kaduna Nigeria

CURRICULUM AND COURSE SPECIFICATIONS FOR

NATIONAL DIPLOMA (ND)

IN

BUILDING TECHNOLOGY

Table of contents

General Information

1.0 CERTIFICATION AND TITLE OF PROGRAMME:

The certificate to be awarded and programme title shall read:

“NATIONAL DIPLOMA IN BUILDING TECHNOLOGY”.

2.0 GOAL ANDOBJECTIVES:

2.1 Goal

The National Diploma programme in Building Technology is aimed at producing technicians that are capable of performing basic functions in Building Technology Practice both in private and public sectors.

2.2 Objectives

At the end of this programme, the diplomates of building Technology should be able to assist the professional builders to:

1. Produce buildings and infrastructure
2. Maintain buildings
3. Manage projects.
4. Cost construction works.
5. Control cost of construction and engineering works.
6. Select materials and construction techniques for building projects

3.0 ENTRYREQUIREMENTS:

The entry requirements for the national diploma in building technology programme includes: at least minimum score in the Universal Tertiary Matriculation Examination (UTME) examination, five credit passes at not more than two sittings in Senior School Certificate Examination (SSCE) or its equivalent - West African

(GCE O /L) or West African School Certificate (WASC) in relevant subjects. The relevant subjects are: English Language, Mathematics, Physics and any other two subjects from the following: Chemistry, Metal Work, Wood Work, Technical Drawing, Basic Electricity, Economics, Statistics, Further Mathematics, Building Construction, Block laying, Agricultural Science/Biology, Geography and Fine Arts, Computer Studies and Painting and Decoration (Details of admission requirement are obtainable of accredited programme. in the NBTE annual directory of accredited programme)

4.0 CURRICULUM

4.1 The curriculum of the ND Building Technology programme consists of four main components:

(i) General Studies/Education.
(ii) Foundation Courses.
(iii) Professional Courses
(iv) Supervised Industrial Work Experience Scheme (SIWES).

4.2 The General Education component should include courses in - English language and communication, Economics, Citizenship Education and Entrepreneurship studies. Others may include History, Political Science, Sociology, Geography, Philosophy etc. The General Education component should be between 10 - 15% of total contact hours for the programme.

4.3 Foundation Courses include in Mathematics, Pure Science, Economics Technical Drawing, Descriptive Geometry, Statistics etc. The number of hours should be between 10 - 15% of the total contact hours.

4.4 Professional Courses are courses which give the students theory and practical skills needed to practice the profession at the technician/technologist level. These may account for 70-80% of the total contact hours.

4.5 Supervised Industrial Work Experience Scheme (SIWES) shall be taken during the long vacation

followingtheendofthesecondsemesterofthefirstyear.SeedetailsofSIWESatparagraph9.0

5.0 CURRICULUM STRUCTURE

The structure of the ND programme consists of four semesters of classroom, laboratory and workshop/field activities in the college - and a semester (3-4 months) of supervised industrial work experience scheme (SIWES). Each semester shall be 17 weeks of duration made up as follows:

- 15 contact weeks of registration, teaching (lecture, recitation, practical exercises/field work, and quiz)
- 2 weeks of examination.

SIWES shall take place at the end of the second semester of the first year.

6.0 PROJECT

Project shall be submitted at the end of second semester of final year

7.0 ACCREDITATION

Each programme offered either at the ND/HND level shall be accredited by the NBTE before the diplomates can be awarded the diploma certificates. Details about the process of accrediting a programme for the award of the ND/HND are available from the Executive Secretary, National Board for Technical Education, at Plot B, Bida Road, P.M.B. 2239, Kaduna – Nigeria.

7.1 CONDITIONS FOR THE AWARD OF THENATIONAL DIPLOMA (ND)

Institutions offering accredited programmes will award the National Diploma in Building Technology to candidate who successfully completed the programme after passing prescribed course - work, examination, diploma project and supervised stude3nt experienced scheme (SIWES). Such candidate should have completed 90-100 credit unit. National Diploma certificate shall be awarded based on the as following:

1. **Grading of courses shall be awarded as follows**:

Marked	**Letter Grade**	**Weighting**
75% and above	**A**	**4.0**
70% - 74%	**AB**	**3.50**
65% - 69%	**B**	**3.25**

60% - 64%	**BC**	**3.00**

55% - 59%	**C**	**2.75**
50% - 54%	**CD**	**2.50**
45% - 49%	**D**	**2.25**
40% - 44%	**E**	**2.00**
Below 40%	**F**	**0.0**

ii. **Classification of Diploma:** Diploma Certificates shall be awarded based on the following Classifications:

- **Distinction - CGPA 3.50-4.00**
- **Upper Credit - CGPA 3.00-3.49**
- **Lower Credit - CGPA 2.50-3.00**
- **Pass - CGPA 2.00-2.49**

8.0 GUIDANCE NOTES FOR TEACHERS OF THE PROGRAMME

8.1 The new curriculum is drawn in unit courses. This is in keeping with the provisions of the National Policy on Education which stress the need to introduce the semester credit units which will enable a student, who so wish, to transfer the units already completed in an institution of similar standard from which he is transferring.

8.2 In designing the units, the principle of the modular system by product has been adopted, thus making each of the professional modules, when completed provides the student with technician operative skills, which can be used for employment purposes

8.3 As the success of the credit unit system depends on the articulation of programmes between the institution and industry, the Curriculum content has been written in behavioral objectives, so that it is clear to all the expected performance of the student who successfully completed some of the courses or the diplomates of the programme. There is a slight departure in the presentation of the performance based curriculum which requires the conditions under which the performance is expected to be carried out and the criteria for the acceptable levels of performance. It is a deliberate attempt to further involve the staff of the department teaching the programme to write their own curriculum stating the conditions existing in their institution under which the performance can take place and follow that with the criteria for determining an acceptable level of performance. Departmental submission on the final curriculum may be vetted by the Academic Board of the institution. Our aim is to continue to see to it that a solid internal Evaluation system exist in each institution for ensuring minimum standard and quality of education in the programmes offered throughout the polytechnic system.

8.4 The teaching of the theory and practical work should, as much as possible, be integrated. Practical exercises, especially those in professional courses and laboratory work should not be taught in isolation from the theory. For each course, there should be a balance of theory to practice in the ratio of 50:50 or 60:40 or the reverse

9.0 GUIDELINE OF SIWESPROGRAMME

For the smooth operation of the SIWES, the following guidelines shall apply:

9.1 Responsibility for placement of students

a) Institutions offering the ND programme shall arrange to place the students in industry by April 30 of each year, six copies of the list showing where each student has been placed shall be submitted to the Executive Secretary, NBTE which shall in turn, authenticate the list and forward it to the industrial training fund, Jos
b) The placement Officer should discuss and agree with industry on the following:
    i. A task inventory of what the students should be expected to experience during the period of attachment. It may be wise to adopt the one already approved for each field
    ii. The industry-based supervisor of the students during the period, likewise the institution based supervisor

The evaluation of the student during the period. It should be noted that the final grading of the student during the period of the attachment should be weighted more on the evaluation by his industry-based supervisor

9.2 Evaluation of students during the SIWES

In the evaluation of the student, cognizance should be taken of the following items:

a) Punctuality
b) Attendance
c) General Attitude to Work
d) Respect for Authority
e) Interest in the Field/Technical area
f) Technical competence as a potential technician in his field

9.3 Grading of SIWES

To ensure uniformity of grading scales, the institution should ensure that the uniform grading of student‟s work which has been agreed to by polytechnics is adopted.

9.4 The Institution Based Supervisor

The Institution-based supervisor should initiate the log book during each visit. This will enable him to check and determine to what extent the objective of

the scheme are being met and to assist students having any problems regarding the specific assignments given to them by their industry-based supervisor

9.5 Frequency of Visit

Institution should ensure that students placed on attachment are visited within one month of their placement. Other visits shall be arranged so that:

1) There is another visit six weeks after the first; and
2) A final visit in the last month of the attachment

9.6 Stipends for Students in SIWES

The rate of stipend payable shall be determined from time to time by the Federal Government after due consultation with the Federal Ministry of Education, the Industrial Training Fund and the NBTE

9.7 SIWES as a Component of the Curriculum

The completion of SIWES is important in the final determination of whether the student is successful in the programme or not. Failure in the SIWES is an indication that the student has not shown sufficient interest in the field or has no potential to become a skilled technician in his field. The SIWES should be graded on a fail or pass basis. Where a student has satisfied all other requirements but failed SIWES, he may only be allowed to repeat another four months SIWES at his own expense.

Curriculum Table

ND I SEMESTER I

Course Code	Course Title	L	T	P	CU	CH	Prerequisite
BLD 111	Building Science & Properties of Materials 1	1	-	2	2	3	-
BLD 112	Building Construction I	2	-	3	3	5	-
BLD 113	Workshop Practice & Technology I	-	-	2	3	2	-
BLD 114	Technical Drawing	1	-	2	3	3	-
SUG 101	Basic Principles in Surveying I	1	-	2	2	3	-.
MTH 111	Logic and Linear Algebra	1	-	-	2	1	-
GNS 101	Use of English I	2	-	-	2	2	-
GNS 111	Citizenship Education I	2	-	-	2	2	-
GNS 222	Principles of Economics	2	-	-	2	2	-
EED 126	Entrepreneurship Development I	2	-	-	2	2	-
	Total	**14**	**-**	**11**	**23**	**25**	-

ND I SEMESTER II

Course Code	Course Title	L	T	P	CU	CH	Prerequisite
BLD 121	Building Science Properties of Materials II	1	-	2	2	3	BLD 111
BLD 122	Building Construction II	2	-	2	3	4	BLD 112
BLD 123	Workshop Practice and Technology II	0	-	4	2	4	BLD 113
BLD 124	Introduction to Structural Mechanics	1	-	-	2	1	-
BLD 125	Principles of Accounts	1	-	1	2	2	-
BLD 126	Basic Principles of Arch Design & Drawing	1	-	1	2	1	-
CEC 108	Engineering Geology & Basic Soil Mechanics	1	-	2	2	1	-
SUG 102	Basic Principles in Surveying II	1	-	3	2	4	-
MTH 112	Algebra and Elementary Trigonometry	1	-	-	2	1	-
GNS 102	Communication in English I	2	-	-	2	2	-
GNS 121	Citizenship Education II	2	-	-	2	2	-
	Total	**13**	**-**	**15**	**23**	**28**	-

ND II SEMESTER I

Course Code	Course Title	L	T	P	CU	CH	Prerequisite
BLD 211	Introduction to Theory of Structures	2	-	-	2	2	-BLD 124
BLD 212	Building Construction III	2	-	2	3	4	-BLD 112 & 122
BLD 213	Workshop Practice and Technology III	-	-	4	2	4	BLD 123
BLD 214	Building Services	1	-	-	2	1	-
QUS 209	Tendering and Estimating I	1	-	-	2	1	-
QUS 102	Measurement of Building works	2	-	-	2	2	-
BLD 215	Site Management I	1	-	-	2	1	-
BLD 216	Principles of Law and Building Contracts	2	-	-	2	2	-
	SIWES						
MTH 211	Calculus	1	-	-	2	2	-
BLD 217	Research Method	2	-	-	2	2	-
COM 101	Introduction to Computer using Packages	2	-	2	3	4	-
	Total	**16**	**-**	**8**	**25**	**24**	

ND II SEMESTER II

Course Code	Course Title	L	T	P	CU	CH	Pre-require
BLD 221	Introduction to Structural Design & Detailing	1	-	3	2	4	-
BLD 222	Building Construction IV	1	-	2	3	3	BLD 212
BLD 223	Workshop Practice & Technology IV	-	-	3	2	3	BLD 213
ICT 102	Introduction to Programming using Visual Basic	1	-	2	3	3	-
QUS 210	Tendering and Estimating	1	-	-	2	1	-
QUS 201	Building Measurement II and Specification	2	-	2	3	4	-
BLD 224	Maintenance Technology	2	-	-	2	2	-
BLD 225	Site Management II	2	-	-	2	2	-
BLD 226	Project	1	-	3	4	4	-
EED 211	Entrepreneurship Development II	2	-	-	2	2	-
	Total	**13**	**-**	**15**	**24**	**28**	-

ROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY		
COURSE TITLE: Building Science and Properties of Material 1	**COURSE CODE: BLD 111**	**CONTACT HOURS: 2- HRS/WEEK**
COURSE SPECIFICATION: **Theory 1hour**		**Practical Content**: 1h
Goal: This course is designed to provide students with knowledge of properties of materials.		
General Objectives:		
On completion of this course the student should be able to:		
1.0	Understanding Dynamics of heat	
2.0	Understand the basic principles of sound insulation and Acoustics	
3.0	Understand the principles of illumination	
4.0	Understand the Properties and different types of timber	
5.0	Understand the composition and properties of ferrous and non-ferrous metals.	
6.0	Understand the composition and properties of paints and varnishes	
7.0	Understand the characteristics of glass	
8.0	Know the derivation, properties and uses of asphalt and bitumen.	
9.0	Understand the properties and uses of adhesives	
10.0	Understand the manufacture and uses of roofing and ceiling materials	
11.0	Understand the different types of corrosion and their prevention.	

COURSE: Building Science & Properties of Materials 1		Course Code: BLD 111	Contact Hours: 2			
COURSE SPECIFICATION: Theoretical Content :1				Practical content:1		
	General Objective 1.0: Understand dynamics of heat transmission.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1	1.1 Explain types of heat. 1.2 Describe the modes of heat transmission 1.3 Explain thermal conductivity 1.4 Explain convective heat transfer coefficient. 1.5 Determine heat transmission coefficient	Explain sensible and latent heat. Explain thermal conductivity and convective heat transfer coefficient. Explain how to determine overall heat transfer coefficient.	• White board& marker		•	•
	General Objective 2.0: Understand the basic principles of sound insulation and Acoustics					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
2	2.1 Explain the principles of sound transmission 2.2 Describe the properties of sound e.g. frequency, Pitch, reflection, Intensity etc. 2.3 Derive Sabine‟s formula	• Discribe the principles of sound transmission Use the tuning fork to explain the properties of sound. Formulate Sabine's formula.	• White board & marker. • Tuning Fork			

	General Objective 3.0: Understand the principles of illumination					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
3 - 4	3.1 Explain the properties of light e.g. frequency, wave-length and spectrum. 3.2 Explain the principles of illumination.	Discribe the lighting of a space naturally and artificially. Illustrate light spectrum using prisms.	• White board and marker • Prisms	• Demonstrate light spectrum Using prisms.	• Guide students to demonstrate light spectrum on prisms. • Students to list out the other characteristics.	What are the properties of light? What are the characteristics of light spectrum
	General Objective 4.0: Understand the Properties and different types of timber					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5 - 6	4.1 List the different types of plywood and particle board. 4.2 Explain the defects in timber e.g Knot.	• Explain the properties of soft wood and hardwood. • Explain the possible defects in timber, plywood and particleboard	Whiteboard, maker, projector Samples of timber, Plywood and particle boards.	• Identify defective timber, plywood and particle board.	• Display samples of timber, Plywood and particle board. Guide students to identify detective samples of wood.	• What are the defects of timber, plywood and particle boards.

	General Objective 5.0: Understand the composition and properties of ferrous and non-ferrous metals					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
7	5.1 Explain ferrous and non-ferrous metals. 5.2 Explain the properties and uses of ferrous and non- ferrous metals. 5.3 Compare Pig iron, wrought Iron and steel 5.4Describe manufacturing of types of iron and steel mentioned in 5.3 5.5 Explain how to determine hardness and tensile strength of ferrous and non-ferrous metals.	• Explain the properties of iron and steel. • Explain manufacturing processes, types, and uses of iron and steel. • Explain manufacturing processes, types , and uses of aluminum, copper etc. • Explain how to determine hardness and tensile strength of ferrous and non-ferrous metals.	White marker board Samples of iron and steel. Samples of non-ferrous e.g aluminum, copper, etc. Universal Tensile Machine (UTM) or alternatives.	• Perform the tensile and hardness test for ferrous and non-ferrous metals	• Guide students in Performing the experiment on ferrous and non-ferrous metals	Calculate the tensile strength of materials. Explain the properties and uses of ferrous and non- ferrous metals.
	General Objective 6.0: Understand the composition and properties of paints and varnishes					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
8	6.1 State types of Paint. 6.2 State the composition of paints and varnishes. 6.3 Describe their characteristics and defects.	• Explain the types, composition, characteristics and defects of paints and vanishes.	White board & marker. Projector. Samples of paints and vanishes.			What are defects in paints
	General Objective 7.0: Understand the characteristics of glass					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

9	7.1 Explain the various types of glass. 7.2 Explain the function of glass in building. 7.3 Describe the manufacturing processes of glass.	Explain the types, functions, and manufacturing processes of glass.	White board & marker, Projector. Samples of glass	Identify types of glass.	Display samples of various types of glass. Guide students in industrial visit to glass manufacturing companies.	What are the types and functions of glass in building.
	General Objective 8.0: Know the derivation, properties and uses of asphalt and bitumen.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
10 & 11	8.1 Describe the derivation process for asphalt and bitumen. 8.2 Differentiate between asphalt and bitumen in terms of their characteristics and properties. 8.3 Explain the uses of asphalt and bitumen in building construction.	• Explain the derivation, characteristics and properties of Asphalt and Bitumen.	White board & marker, projector. Samples of asphalt &bitumen	Identify asphalt and bitumen.	Show samples of asphalt and bitumen	Explain the characteristics, properties, and applications of asphalt and bitumen
	General Objective 9.0: Understand the properties and uses of adhesives					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
12	9.1 List the properties of adhesives. 9.2 Explain the uses of adhesives.	Explain the properties and uses of adhesives	White board & marker, projector. Samples of adhesives	Identify samples of adhesives	Show samples of adhesives	What are the properties and uses of adhesives

COURSE: Building Science & Properties of Materials 1		Course Code: BLD 111	Contact Hours: 1-0-2			
COURSE SPECIFICATION: Theoretical Content						
	General Objective 10.0: Understand the manufacture and uses of roofing and ceiling materials					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
13	10.1 Describe the manufacturing processes of asbestos, PVC, slates etc. 10.2 List the properties of the materials in 10.1 10.3 Explain the uses of the materials.	• Describe the manufacturing processes and properties of asbestos, PVC, slates etc. • Explain the uses of the materials in 10.1	Samples of asbestos, PVC, slates etc	Identify asbestos, PVC, slates etc.	Show samples of asbestos, PVC, slates etc	State the uses and properties of asbestos, PVC and slates
	General Objective 11.0: Understand the different types of corrosion and their prevention					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
15	11.1 Explain corrosion 11.2 Describe the different types of corrosion and their prevention. 11.3 Describe fungal attack on building and its prevention. 11.4 Describe termites attack on building and its prevention.	• Explain corrosion, types, effects and its prevention. • Explain fungal attack on building and its prevention. • Explain termite's attack and its prevention.	White board & marker, Projector.	• Apply methods of prevention against termites and fungal attacks in buildings.	Guide students through the application of methods of prevention against termites and fungal attacks on building.	How can we prevent termites and fungi attack on building.
	Assessment: Coursework: Course Test %, Practical: %, Examination: % Competency:					

PROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY		
COURSE TITLE: Building Construction 1	**COURSE CODE: BLD 112**	**CONTACT HOURS: 3- HRS/WEEK** **CREDIT UNIT: 2**
COURSE SPECIFICATION: Theory 1hour		**Practical Content**: 2hour
Goal : This course is designed to acquaint students with knowledge of building construction.		
General Objectives:		
On completion of this course the student should be able to:		
1.0	Know the various building components and their functional requirements	
2.0	Understand the preliminaries involved in the Construction of a building	
3.0	Understand the general principles of selecting sites and preparing them to receive various types of foundations	
4.0	Understand the principle of damp proofing in building.	

COURSE: Building Construction 1		Course Code: BLD 112	Contact Hours: 2			
COURSE SPECIFICATION: Theoretical Content					Practical content	
	General Objective 1.0: Know the various building elements and their functional requirements					
Week	**Specific Learning Outcomes**	**Teacher Activities**	**Resources**	**Specific Learning Outcomes**	**Teacher Activities**	**Evaluation**
1	1.1 Explain the term building 1.2 List building elements. 1.3 Explain building elements such as: foundation, floor, wall, ceiling, roof, fenestrations, doors, windows, etc. 1.4 Explain different functional requirements of building elements.	• Define the term building. • List various building elements: • List the different requirements of building elements.	• White board& Marker. • Drawing Studio& Projector.	Illustrate with sketches the various building elements.	Show students different elements in the lecture hall.	What are the various building element and their functional requirements?
	General Objective 2.0: Understand the preliminaries involved in the Construction of a building					
Week	**Specific Learning Outcomes**	**Teacher Activities**	**Resources**	**Specific Learning Outcomes**	**Teacher Activities**	**Evaluation**
2	2.1 List the site activities that precede the actual building construction e.g. site location, clearance, setting out, provision of temporary services etc. 2.2 Explain the importance of the provision of the following temporary facilities and services on site: roads, water, electricity, materials storage, accommodation, Site shed, offices etc.	• Explain the site activities/ services which precede the actual building.	White Board and Marker, Measuring tape, Builders square, theodolite, pegs, line & pins, plumb, etc.	Identify activities/ services that precede the actual building construction. Sketch a good site Layout.	Guide students to identify activities/ services that precede the actual building construction. • Illustrate with appropriate sketches the features of a good site Layout	• What are the preliminary site activities? • What is the importance of preliminary site activities?

3 4	2.3 Analyze factors to be considered in site organization and layout. 2.4 Describe the process of setting out a building using the following: 3,4, 5 method, builder"s square method, theodolite method	• Explain factors to be considered in site organization and layout.	White Board & Marker, Measuring tape, Builders square, theodolite, pegs and trade line, sledge hammer.		Demonstrate the process of setting out a building using the following: 3,4,5 method, builder"s square method, theodolite method.	

COURSE: Building Construction 1	Course Code: BLD 112	Contact Hours: 2-0-3			
COURSE SPECIFICATION: Theoretical Content					
	General Objective 3.0: Understand the general principles of selecting and preparing sites to receive various types of foundations.				
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5	3.1 Explain the methods of excavation; 3.2 List the tools used in manual method of excavation. 3.3 Describe the plants and equipment used i n excavation.	• Explain the methods of excavation.	White Board and Marker, shovel, spade, etc.	Identify various manual excavation tools.	Display the various manual excavation tools.	List various manual excavation tools and explain their uses.
6	3.4 Explain the different methods of earthwork support to trenches in different types of soils. 3.5 Define the term foundation.	• Explain earthwork support to trenches in different types of soils. • Explain the term foundation.	White Board and Marker, spade, timber plank, plywood, struts, choker plate, Nail, etc.	Differentiate types of soils. Illustrate foundation of a building	Display charts that show earthwork support to trenches. Guide students to sketch various earthwork supports.	List and explain types of soil.
7 - 9	3.6 Explain the importance of foundation to building structure. 3.7 List types of soil and how they affect choice of foundation 3.8 Illustrate by simple calculation the area of concrete foundation. 3.9 Describe the different types of foundation and their application.	• List the importance of foundation to building structure. • Explain types of soil and how they affect choice of foundation. • Describe the different types of foundation and their application.	White Board and Marker.			Calculate the area of given concrete foundation of a building.

10 - 11	3.10 Explain simple methods of reinforcement in foundations ground beams, sheet piles, bearing piles. etc. 3.11 Explain the methods of construction of the various types of foundation.	Describe methods of reinforcement in foundations ground beams, sheet piles, bearing piles, etc. and construction of the various types of foundation.	Charts, Video Clips, Computers, Projector, Card Board, Pencils, Eraser, etc.	3.12 Apply simple methods of reinforcement in foundation"s ground beams, sheet piles, bearing piles, etc.	Guide Students to apply simple methods of reinforcement in foundation"s ground beams, sheet piles, bearing piles, etc.	Explain the methods of construction of Types of foundation.
	General Objective 4.0: Understand the principle of damp proofing in building.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
12 - 13	4.1 Explain damp proofing course (DPC) and damp proof membranes (DPM) in building. 4.2 Describe the processes of the rising and seepage of ground and underground water. 4.3 Explain the importance of DPC and DPM in sub-structural works. 4.4 State the functions of DPC and DPM.	• Explain DPC and DPM in building. • Describe the processes of the rising and seepage of ground and underground water and their effects on building. • Explain the importance of damp proofing in sub-structural works. • List the functions of damp-proof course.	Building foundation Classroom. Building equipment and tools	Demonstrate with existing building/or Classroom how seepage of ground occur	Guide students in the demonstrate seepage of water in a soil using existing building/or Classroom.	Explain the processes of the rising and seepage of ground and underground water.
14	4.4 Explain the principle of tanking in basement works. 4.5 Explain the process of laying damp-proof materials in use. 4.6 Identify the various damp-proof materials in use. 4.7 Explain anti-termite treatment and its uses in foundation works. 4.8 Explain blinding and its uses. 4.9 Explain hardcore and its importance. 4.10 Explain the process of de-watering and its importance in foundation works.	• Explain the principle of tanking in basement work, processes of damp-proofing materials in use. • List the various damp-proof materials in use. • Explain the importance of hard-core, blinding, and anti-termite treatment in foundation works	• White Board & Marker, Projector, Video Clips, Different types of Building foundations Classroom. • Building equipment and tools	• Demonstrate with existing building and sketches the importance of damp-proofing, tanking, blinding, and anti-termite treatment.	Show students different types of damp-proof foundations, blinding and anti-termite treatment and tanking.	Explain types of foundations with examples, blinding, damp-proofing, tanking and anti-termite treatment and the relevant materials.

ASSESSMENT COURSE 20%, PRACTICAL 20%, EXAMINATION 40%
PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY

COURSE: WORKSHOP PRACTICE AND TECHNOLOGY 1	**COURSE CODE:** BLD 113	**CREDIT HOURS: 2 HR/WEEK** **CREDIT UNIT: 3**

GOAL:. Equip the students with the basic skills in woodworking craft and the application of wood joints in various wooden components.

COURSE SPECIFICATION: THEORETICAL CONTENT		**COURSE SPECIFICATION:** PRACTICAL CONTENT		
SEMEATER:	**Pre-requisite**			

	GENERAL OBJECTIVE: On completion of this course the student will be able to:
1.0	Know block laying and Concreting Tools, equipment and their uses and maintenance Procedure
2.0	Understand Factory Acts and Safety regulations Applicable in the block laying and concreting workshop
3.0	Know blocks and concrete materials.
4.0	Understand the various methods of block & Bricklaying and concreting
5.0	Know different types of brick and block walls and their types of bonds

PROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY						
COURSE:WORKSHOP PRACTICE & TECH 1 BLD 113				**CONTACT HOURS** : **0-0-4**		
GOAL: This course is designed to equip students with the knowledge and practice in workshop practice.						
Course Specification; Theoretical Content				Practical Content		
General Objective:				General Objective		
				General Objective 1.0: Know block laying and Concreting Tools, equipment and their uses and maintenance Procedure		
Week	Specific Learning Objectives	Teachers Activities	Learning Resources	Specific Learning Objectives	Teachers Activities	Learning Resources
1	WORKSHOP PRACTICE & TECH 1			1.1 Select bricklaying and concreting tools and equipment such as block laying trowel, pointing trowel, spirit level, builders square, straight edge (range), wooden float, concrete mixers, vibrators, concrete forms, and block moulding machines for specific job requirements. 1.2 Use the tools and equipment in 1.1 above. Maintain the tools and equipment in 1.1 above select, cutting and plastering tools such as club hammer, bolster chisel, cold chisel, brick saw; and hark saw for specific job requirements	Demonstrate the use of various bricklaying and concreting tools. Demonstrate the use of cutting and plastering tools. Demonstrate maintenance of the tools	Workshop tools and equipment. Different trowels, spirit level, builders square, straight edge (range), wooden float, concrete mixers, vibrators, concrete forms, block moulding machine and consumables, Cutting and plastering tools.
2				1.1 Select bricklaying and concreting tools and equipment such as block laying trowel, pointing trowel, spirit level, builders square, straight edge (range), wooden float, concrete mixers, vibrators, concrete forms, and block moulding machines for specific job requirements. 1.2 Use the tools and equipment in 1.1 above. Maintain the tools and equipment in 1.1 above select, cutting and plastering tools such as club hammer, bolster chisel, cold chisel, brick saw; and hark saw for specific	Demonstrate the use of various bricklaying and concreting tools. Demonstrate the use of cutting and plastering tools. Demonstrate maintenance of the tools	Workshop tools and equipment. Different trowels, spirit level, builders square, straight edge (range), wooden float, concrete mixers, vibrators, concrete forms, block moulding machine and consumables, Cutting and plastering tools.

				job requirements		
3				1.1 Select bricklaying and concreting tools and equipment such as block laying trowel, pointing trowel, spirit level, builders square, straight edge (range), wooden float, concrete mixers, vibrators, concrete forms, and block moulding machines for specific job requirements. 1.2 Use the tools and equipment in 1.1 above. Maintain the tools and equipment in 1.1 above select, cutting and plastering tools such as club hammer, bolster chisel, cold chisel, brick saw; and hark saw for specific job requirements	Demonstrate the use of various bricklaying and concreting tools. Demonstrate the use of cutting and plastering tools. Demonstrate maintenance of the tools	Workshop tools and equipment. Different trowels, spirit level, builders square, straight edge (range), wooden float, concrete mixers, vibrators, concrete forms, block moulding machine and consumables, Cutting and plastering tools.
				General Objective 2.0: Understand Factory Acts and Safety regulations Applicable in the block laying and concreting workshop		
Week				Specific Learning Objectives	Teachers Activities	Learning Resources
4				2.1 Choose adequate ventilation for the workshop 2.2 Create safe storage of tools and first aid equipment 2.3 Demonstrate general safety habits with respect to the equipment 2.4 Demonstrate the layout of an ideal block laying and concreting workshop	Demonstrate how to create safe storage of tools and first aid equipment. Demonstrate how to layout block laying and concreting workshop.	Workshop and consumables
5				2.1 Choose adequate ventilation for the workshop 2.2 Create safe storage of tools and first aid equipment 2.3 Demonstrate general safety habits with respect to the equipment 2.4 Demonstrate the layout of an ideal block laying and concreting workshop	Demonstrate how to create safe storage of tools and first aid equipment. Demonstrate how to layout block laying and concreting workshop.	Workshop and consumables
6				2.1 Choose adequate ventilation for the workshop 2.2 Create safe storage of tools and first aid equipment	Demonstrate how to create safe storage of tools and first aid equipment.	Workshop and consumables

				2.3 Demonstrate general safety habits with respect to the equipment 2.4 Demonstrate the layout of an ideal block laying and concreting workshop	Demonstrate how to layout block laying and concreting workshop.	
				General Objective 3.0: Know blocks and concrete materials.		
Week				Specific Learning Objectives	Teachers Activities	Learning Resources
7				3.1 Differentiate between various types of fine aggregates, coarse aggregate, blocks, concrete and additives. 3.2 Illustrate types of concrete products 3.3 Select suitable aggregates for different kinds of construction works. 3.4 Carry out various tests on blocks and concrete material.	Show different types of fine and coarse aggregates, blocks, concrete and additives. Show how to carry out tests on blocks and concrete	Workshop and consumables e.g. sand, gravel, cement and additives
8				3.1 Differentiate between various types of fine aggregates, coarse aggregate, blocks, concrete and additives. 3.2 Illustrate types of concrete products 3.3 Select suitable aggregates for different kinds of construction works. 3.4 Carry out various tests on blocks and concrete material.	Show different types of fine and coarse aggregates, blocks, concrete and additives. Show how to carry out tests on blocks and concrete	Workshop and consumables e.g. sand, gravel, cement and additives
9				3.1 Differentiate between various types of fine aggregates, coarse aggregate, blocks, concrete and additives. 3.2 Illustrate types of concrete products 3.3 Select suitable aggregates for different kinds of construction works. 3.4 Carry out various tests on blocks and concrete material.	Show different types of fine and coarse aggregates, blocks, concrete and additives. Show how to carry out tests on blocks and concrete	Workshop and consumables e.g. sand, gravel, cement and additives
10				3.1 Differentiate between various types of fine aggregates, coarse aggregate, blocks, concrete and additives. 3.2 Illustrate types of concrete	Show different types of fine and coarse aggregates, blocks, concrete and additives. Show how to carry out tests on	Workshop and consumables e.g. sand, gravel, cement and additives

				products 3.3 Select suitable aggregates for different kinds of construction works. 3.4 Carry out various tests on blocks and concrete material.	blocks and concrete	
				General Objective 4.0: Understand the various methods of block & Bricklaying and concreting		
Week				Specific Learning Objectives	Teachers Activities	Learning Resources
11				4.1 Lay blocks of various types and sizes 4.2 Lay wet concrete for simple slabs, beams and lintels. 4.3 Carry out various ways of vibrating, finishing and curing concrete	• Demonstrate how to lay blocks of various types and sizes. • Demonstrate how to cast concrete slabs beams and lintels • Demonstrate various ways of vibrating, finishing and curing concrete	• Workshop and consumables e.g. blocks, cement, gravel sand etc.
12				4.1 Lay blocks of various types and sizes 4.2 Lay wet concrete for simple slabs, beams and lintels. 4.3 Carry out various ways of vibrating, finishing and curing concrete	• Demonstrate how to lay blocks of various types and sizes. • Demonstrate how to cast concrete slabs beams and lintels • Demonstrate various ways of vibrating, finishing and curing concrete	• Workshop and consumables e.g. blocks, cement, gravel sand etc.
13				4.1 Lay blocks of various types and sizes 4.2 Lay wet concrete for simple slabs, beams and lintels. 4.3 Carry out various ways of vibrating, finishing and curing concrete	• Demonstrate how to lay blocks of various types and sizes. • Demonstrate how to cast concrete slabs beams and lintels • Demonstrate various ways of vibrating, finishing and curing concrete	• Workshop and consumables e.g. blocks, cement, gravel sand etc.
				General Objective 5.0: Know different types of brick and block walls and their types of bonds		
Week				Specific Learning Objectives	Teachers Activities	Learning Resources
14				5.1 Construct various types of bonds in a block work and brickwork. 5.2 Construct block walls of different thickness.	• Demonstrate how to construct various types of bonds in a block work and brick work. • Engage students to construct	• Workshop and consumables e.g. blocks, bricks etc.
15				5.1 Construct various types of bonds in a block work and brickwork. 5.2 Construct block walls of different	• Demonstrate how to construct various types of bonds in a block work and brick work.	• Workshop and consumables e.g. blocks, bricks etc.

				thickness.	• Engage students to construct	
	References: 1. Obande “Bricklaying and Concreting” Longman 2. Kienlighter, C. E. “modern masory brick, block, store”					

ASSESSMENT STRUCTURE

TYPE OF ASSESSMENT	***PURPOSE AND NATURE OF ASSESSMENT (ITD)***	***WEIGHING***
Examination	*Final Examination (written) to assess knowledge and understanding*	*40%*
Coursework	*Continuous assessment At least 5 home works to be assessed by the teacher*	*20%*
Test	*At least 2 progress tests for feedback.*	*20%*
Practical	*Works to be assessed by the teacher*	*20%*
TOTAL WEIGHT		***100***

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY					
COURSE: Technical Drawing Course Specification		**COURSE CODE:** BLD 114	**CREDIT HOURS:** 3 **CREDDIT UNIT: 3**		
GOAL:. This course is designed to provide the student with skills and knowledge in technical drawings					
COURSE SPECIFICATION: THEORETICAL CONTENT 1			**COURSE SPECIFICATION:** PRACTICAL CONTENT 2		
SEMEATER:	**Pre-requisite**				
1.0 2.0 3.0 4.0 5.0 6.0	**GENERAL OBJECTIVE:** On completion of this course the student will be able to: Know the use and care of the different drawing instruments, equipments and materials. Understand the essentials in graphical communication Know the Construction of simple geometric figures and shapes Know the Construction of isometric and oblique drawings and projections Understand the Principles of orthographic projections Understand the Intersections of regular solids				

Course: Building Technology ND	Course Code: BLD 114	Contact Hours: 1-0-3				
Course Technical Drawing Course Specification: Theoretical Content						
	General Objective 1.0: Know the use and care of the different drawing instruments, equipments and materials.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1	1.1 Identify the different types of drawing instruments, equipment and materials. 1.2 Outline the various instruments, equipment and materials. 1.3 State the precautions necessary to preserve the items in 1.1 above. 1.4 Use each of the item in 1.1 above 1.5 Maintain the various instrument and equipment.	• Explain the uses of various drawing instruments, equipment and materials. • *Explain how they should be maintained.	• Drawing instruments, equipments and materials such as Ruler, Set squares, T- squares, pencils drawing paper etc. • White board.	• Demonstration the use of drawing instruments. •	• Introduce students to the studio to demonstration the use of drawing instruments. •	• List various types of drawing instruments •
	General Objective 2.0: Understand the essentials in graphical communication					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

2	2.1 Describe graphics and the different types of graphical presentations. 2.2 Explain the various conventional representations in graphical production of construction lines, finished lines, hidden and overhead details, projects, center lines, break lines, dimensioning of plans, elevations and sections of objects.	• Explain graphics and graphical representation .by illustration.	• White board and Marker. • Drawing studio	• Produce graphical representations. • Illustrate the various conventional representations in graphical production of construction lines, finished lines, hidden and overhead details, projects, center lines, break lines, dimensioning of plans, elevations and sections of objects.	2.3 Guide students to Illustrate the various conventional representations in graphical production of construction lines, finished lines, hidden and overhead details, projects, center lines, break lines, dimensioning of plans, elevations and • sections of objects.	• Explain different lines and their application.
	2.3 Layout drawing sheets with the following. a. Margin b. Title block etc. 2.4 State the various standards of drawing sheets. 2.5 Print letters and figures of various forms and characters. 2.6 Explain conventional signs and symbols.	Explain with Illustration the layout of drawing sheet	• White Board • Drawing sheets of various standards. • Drawing studio	Carry out practically the layout of drawing sheet. • Layout a given set of drawings on a given sheet using the conventional signs, symbols and appropriate lettering of characters	Guide to Carry out the practical in laying out of drawing sheet. • drawings on a given sheet using the conventional signs, symbols and • appropriate lettering of characters	• State the standard sizes of drawing sheets.
3 - 5	2.7 Layout a given set of drawings on a given sheet using the conventional signs, symbols and appropriate lettering characters.	Explain with Illustration the layout of drawing sheet	• White Board • Drawing sheets of various standards • Drawing studio	Illustrate conventional signs and symbols.		

	General Objective 3.0: Know the Construction of simple geometric figures and shapes.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
6	3.1 Explain the purpose of geometrical construction in drawing. 3.2 Construct parallel and perpendicular lines. 3.3 Construct and bisect lines, angles and areas. 3.4 Divide a straight line into given number of equal parts.	• Explain students how to construct simple geometrical figures and shapes.	White board Marker Drawing instruments Drawing studio	Draw simple geometric figures and shapes.	Guide student to draw simple figures and shapes.	Explain different types of lines.
7	3.5 Describe polygons (regular and irregular) 3.6 Identify polygons (regular and irregular).	• Explain how to construct polygons.	White board Marker Drawing instruments Drawing studio	Construct regular polygons with: a. N sides in a given circle. b. A given side length and of N sides on a straight line.	Guide them to construct polygons.	What is polygon?
8	3.7 Define a circle. 3.8 Explain the properties of a circle, e.g. radius, diameter, normal tangent, circumference etc.	• Explain the different geometrical constructions of circles.	White board marker Drawing Instruments	3.9 Carry out simple geometrical constructions on circles e.g. a. The diameter of a circle given the circumference. b. The circumference of a circle of a given diameter. c. A circle to pass through 3 points. d. A circle compass through 2 points and touch a given line e. A circle to touch a given smaller circle and a given line. f. Tangents to circles at various points.	Guide students on carrying this out.	Define a circle List the properties of a circle.

				g. An arc of know radius, tangent to two lines at an angle of less than and more than 90°. h. An arc externally tangent to two circles. i. Inscribing and ex-scribing circles.		

	General Objective 3.0: Know the Construction of simple geometric figures and shapes.					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation
9	3.9 Describe an ellipse.	Explain the construction of an ellipse using the methods listed: • Trammel method. • Concentric circle method.	• White board • Drawing studio.	Construct an ellipse by using: • Trammel method. • Concentric circle method.	• Guide students how to construct ellipse.	• What are the methods of constructing an ellipse?
	General Objective 4.0: Know the Construction of isometric and oblique drawings and projections.					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation
11-12	4.1 Explain isometric and oblique projections. 4.2 Use appropriate conventional symbols and abbreviations.	Explain the construction of isometric and oblique projections.	White board Drawing Instrument Studio Projector	• Draw a square in isometric and oblique forms. • Draw a circle in isometric and oblique forms • Draw an ellipse in isometric and oblique forms • Draw a polygon with a minimum of eight sides in isometric and oblique forms. • Dimension holes, circles, circs and angles correctly in isometric and oblique drawings	Lead students in the : • Draw a square in isometric and oblique forms. • Draw a circle in isometric and oblique forms • Draw an ellipse in isometric and oblique forms • Draw a polygon with a minimum of eight sides in isometric and oblique forms. Dimension holes, circles, circs and angles correctly in isometric and oblique drawings	Draw a square in isometric and oblique forms of dimension holes, circles, circs and angles correctly in isometric and oblique drawings

	General Objective 5.0: Understand the Principles of orthographic projections					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation
13 14	5.1 Describe the principles of orthographic projections 5.2 Describe the principle planes of projection: a. Vertical plane b. Horizontal l plane 5.3 Define the first, second, third and fourth angles..	Explain the orthographic projection, Explain the first, second, third and fourth angles	White board Drawing Instrument Studio Projector	• Carry out the construction of orthographic projection. • Project three-dimensional objects on to the basic planes of projection in both first and third angle to obtain: a. the front view or elevation b. the top view orplan	Show the orthographic projection Guide students to produce orthographic projection.	Differentiate between vertical and horizontal planes of projection.

	General Objective 6.0: Understand the Intersections of regular solids.					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation
15	6.1 Describe interpenetration or intersections of solids Explain the lines of intersections of the following regular solids and planes in both first and third angles: a. Two dissimilar square prisons meeting at right angles. b. Two dissimilar square prisons meeting at an angle. c. A hexagonal prison meeting square prison at right angles. d. Two dissimilar cylinders meeting at right angles. e. Two dissimilar cylinders meeting at an angle.	Explain interpenetration or intersection of solids.	White board Drawing Instrument Studio Projector	Draw the lines of intersections of the following regular solids and planes in both first and third angles: f. Two dissimilar square prisons meeting at right angles. g. Two dissimilar square prisons meeting at an angle. h. A hexagonal prison meeting square prison at right angles. i. Two dissimilar cylinders meeting at right angles. j. Two dissimilar cylinders meeting at an angle. k. Two dissimilar cylinders meeting at right angle, their centers not being in the same vertical plane.	Guide student to intersect solid plane.	Explain intersection of a solid plane.
	Assessment: Coursework: 20% Course test: 20% Practical: 20% Examination: 40% Competency: The students should be conversant with the fundamentals of technical drawing and their applications in engineering and technology. Reference: 1. M. G. Swahetal “Building Drawing” 2. Ceck Handisyee “Everyday Details”					

Course: Building Technology ND		Course Code: BLD 114	Contact Hours: 1-0-3			
Course Technical Drawing Course Specification: Practical Content						
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation
1-5	a. Layout drawing sheets with the following. b. Margin c. Title block etc. d. Print letters and figures of various forms and characters. e. Layout a given set of drawings on a given sheet using the conventional signs, symbols and appropriate lettering characters.	Illustrate on the White board using examples Layout drawing sheets with the following. f. Margin g. Title block etc. h. Print letters and figures of various forms and characters. i. Layout a given set of drawings on a given sheet using the conventional signs, symbols and appropriate lettering characters •	• White board • Drawing sheets of various standards. • White Board. • White board • Drawing sheets of various standards. White Board			j. Draw a layout of a given drawings using the conventional signs, symbols and appropriate lettering characters •

6	a. Construct parallel and perpendicular lines. b. Construct and bisect lines, angles and areas. c. Divide a straight line into given number of equal parts.	• Show students how to construct simple geometrical figures and shapes.	• White board • Drawing sheets of various standards. • White Board			
7	Construct regular polygons with: N sides in a given circle. A given side length and of N side on a straight line.	• Show students how to construct polygons.				
8	a. Carry out simple geometrical constructions on circles e.g. b. the diameter of a circle given the circumference. c. the circumference of a circle of a given diameter. d. a circle to pass through 3 points. e. a circle compass through 2 points and touch a given line f. a circle to touch a given smaller circle and a given line g. Tangents to circles at various points. h. An arc of know radius, tangent to two lines at an angle of less than and more than 90o. An arc externally tangent to two circles. j. Inscribing and ascribing circles.	• Show the different geometrical constructions on circles.				

Course: Building Technology ND		Course Code: BLD 114	Contact Hours: 1-0-3			
Course Technical Drawing Course Specification: Practical Content						
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation
9 11	Construct an ellipse by using: a. Trammel method. b. Concentric circle method. c. Construct plane scales, diagonal scales and scale cut using appropriate instruments.	• Construct and ellipse using the methods listed. • Demonstrate with examples	• White Board • Trammel. • Drawing instruments	•	•	•
12	a. Draw a square in isometric and oblique forms b. Draw a circle in isometric and oblique forms c. Draw an ellipse in isometric and oblique forms d. Draw a polygon with a minimum of eight sides in isometric and oblique forms. e. Dimension holes, circles, circs and angles Correctly in isometric and oblique‟s drawings.	• Construct and ellipse using the methods listed • .Demonstrate with examples • Construct and ellipse using the methods listed • .Demonstrate with examples	• White Board • Trammel. • Drawing Instruments • White Board • Trammel. • Drawing Instruments			

14	a. Project views of three-dimensional objects on to the basic planes of projection in both first and third angle to obtain: b. the front view or elevation c. the top view or plan		• White Board • Trammel. • Drawing Instruments			
15	a. Draw the lines of intersections of the following regular solids and planes in both first and third angles: b. Two dissimilar square prisons meeting at right angles. c. Two dissimilar square prisons meeting at an angle.	• Construct and ellipse using the methods listed • .Demonstrate with examples • Construct and ellipse using the methods listed • .Demonstrate with examples	• White Board • Trammel. • Drawing Instruments			
	a. a hexagonal prison meeting square prison at right angles. b. Two dissimilar cylinders meeting at right angles. c. Two dissimilar cylinders meeting at an angle. d. Two dissimilar cylinders meeting at right angle, their centers not being in the same vertical plane.					
	Assessment: Coursework: 10% Course test: 10% Practical: 40% Examination: 40%					

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY		
COURSE: Logic and Linear Algebra	**COURSE CODE** **(MTH 111)**	**CREDIT HOURS:** 1 CREDIT UNIT: 2
GOAL: 1.0: Equip students with knowledge and basic principles in Logic and Linear Algebra		
COURSE SPECIFICATION: THEORETICAL CONTENT 1		**COURSE SPECIFICATION:** PRACTICAL CONTENT 0
SEMEATER:	**Pre-requisite**	

	GENERAL OBJECTIVE : On completion of this course the student will be able to:
1.0	Understand the basic rules of mathematical logic and their application to mathematical proofs.
2.0	Know permutations and combinations
3.0	Compute the binomial expansion of algebraic expansions.
4.0	Understand the algebraic operations of matrices and determinants as well as solve simultaneous linear equations by the methods of matrices.

COURSE: LOGIC AND LINEAR ALGEBRA		COURSE CODE: MTH 111		CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL		
Course Specification: Theoretical Content						
	General Objective 1.0: On completion of this course, the students should be able to:					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

1 - 2	1.1 The essential connectives, negation, conjunction, disjunction, implication and bi- implication 1.2 State the essential connectives defined in 1.1above. 1.3 Explain grouping and parenthesis in logic, 1.4 Explain Truth Tables. 1.5 Define tautology 1.6 Give examples of types of tautology. e.g If P and Q are distinct atomic sentences, which of the following are tautologies? P B Q (b) PUQ B QUP (c) PV(P*Q) Let P = Jane Austen was a contemporary of Beethoven. Q = Beethoven was a contemporary of Gauss. R = Gauss was a contemporary of Napoleon S = >Napoleon was a contemporary of Julius Caesar =. (Thus P, Q and R and true, and S is false). Then find the truth values of sentences:- (a) (P *Q) =R (b) (P BQ) (c) P *Q B R BS	• Explain and illustrate 1.1 to 1.6 and ask the students to find the truth value of the logic statement • Assess the student	• Lecture notes, Recommended textbooks, charts, chalkboard	•	•	•

COURSE: LOGIC AND LINEAR ALGEBRA		COURSE CODE: MTH 111		CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL		
Course Specification: Theoretical Content						
	General Objective 1.0: On completion of this course, the students should be able to:					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
3 – 4	1.7 Define universal quantifier and existential quantifier. 1.8 Translate sentences into symbolic form using quantifiers. e.g. >some freshmen are intelligent = can be stated as for some x, x, is a freshman and x is intelligent = can translate in symbols as (/x) (Fx &Ix). 1.9 Define the scope of a quantifier 1.10 Define >bound = and >free =variables 1.11 Define >term = and formula= 1.12 Give simple examples of each of 1.9 to 1.11above. 1.13 Explain the validity of formulae	Explain and illustrate 1.7 to1.2 and asked the students to solve problems on 1.7 to1.11	• Recommended textbooks, lecture notes, chalkboard, chalk	•	•	•
	General Objective 2.0: Know permutation and combination					

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5 - 7	2.1 Define permutations and combinations 2.2 Give illustrative examples of each of 2.1 above 2.3 State and approve the fundamental principle of permutation. 2.4 Give illustrative examples of the fundamental principles of permutation.	• Explain and illustrate the activities in 2.1 to 2.15 and ask the student to: establish the formula NPr = n!/(n-r)! Prove that nPr = (n-r+1)(nP(r-1) Establish the formula Ncr = n!/[n-r!r! Prove that ^{n}Cr = nCn-r	• Recommended textbooks, lecture notes, white board,	•	•	•

COURSE: LOGIC AND LINEAR ALGEBRA	COURSE CODE: MTH 111	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL		
Course Specification: Theoretical Content				
	General Objective 2.0: Know permutation and combination			

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes		Teacher Activities Evaluation
5 – 7	2.5 Establish the formula $^{n}P_{r}$ = n!/ (n Br)! 2.6 Prove that nPr = (n B r + 1) x nP (r B1). 2.7 Solve problems of permutations with restrictions on some of the objects. 2.8 Solve problems of permutations in which the objects may be repeated. 2.9 Describe circular permutations. 2.10 Solve problems of permutation of N things not all different. 2.11 Establish the formula $^{n}C_{r}$ = n!/[(n B r)! r!] 2.12 Solve example2.11 2.13 State and prove the theorem $^{n}C_{r}$ =n Cn-r. 2.14 Solve problems of combinations with restrictions on some of the objects. 2.15 Solve problems of combinations of a	• Explain and illustrate the activities in 2.1 to 2.15 and ask the student to: establish the formula NPr = n!/(n-r)! Prove thatnPr = (n-r+1)(nP(r-1) Establish the formula Ncr = n!/[n-r!r! Prove that^{n}Cr = nCn-r	• Recommended textbooks, lecture notes, chalkboard, chalk	•	•	•

	different things taken any number at a time.					
	General Objective 3.0: Know binomial theorem					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

8 - 10	3.1 Explain with illustrative examples B the method of mathematical induction. 3.2 State and prove binomial theorem for positive integral index. 3.3 Explain the properties of binomial expansion.	• Explain and illustrate activities in 3.1 to 3.7 and ask the students to solve them	• Recommended textbooks, lecture notes, chalkboard, chalk, etc	•	•	•

COURSE: LOGIC AND LINEAR ALGEBRA		COURSE CODE: MTH 111	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL			
Course Specification: Theoretical Content						
	General Objective 3.0: Know binomial theorem					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
8 - 10	3.4 State at least seven (7) examples of 3.3 above. e.g.i. A $(x^2 - 1/x)$ ii. Find the constant term in the expansion of $(x + 1/x)^A$ iii. Find the co-efficientof xv in the expansion of (x $\pm k)^A$ where v is a number lying between Bn and	• Explain and illustrate activities in 3.1 to 3.7 and ask the students to solve them	• Recommended textbooks, lecture notes, chalkboard, chalk, etc	•	•	•

	n- 3.5 State the binomial theorem for a rational number 3.6 State the properties of binomial coefficients. 3.7 Apply binomial expansion in Approximations (simple examples only).					
	General Objective 4.0: Know matrices and determinants					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
11 - 15	4.1 Define Matrix 4.2 Define the special matrices B zero matrix, identify matrix B square matrix, triangular matrix, symmetric matrix, skero symmetric matrix. 4.3 State example for each of the matrices in 4-2above. 4.4 State the laws of addition and multiplication of matrices. 4.5 Illustrate the commutative, associative, and distributive nature of the laws states in 4.4 above. 4.6 Explain the transpose of a matrix. 4.7 Determine a determinant for 2by^2 and 3by^{2}matrices.	• Explain and illustrate the activities in 4.1 to 4.19. Ask the student to prove the theorems and solve problems on the illustrated activities. Assess the student	• Recommended textbooks, lecture notes, white board, ,etc	•	•	•

COURSE: LOGIC AND LINEAR ALGEBRA		COURSE CODE: MTH 111	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL			
Course Specification: Theoretical Content						
	General Objective 4.0: Know matrices and determinants					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

11 - 15	4.8 Define the minors and cofactors of a determinant. 4.9 Explain the method of evaluating determinants. 4.10 State and prove the theorem A Two rows or two columns of a matrix are identical, then the value of it's determinant is zero. 4.11 State and prove the theorem A If two rows or two columns of a matrix are interchanged, the sign of the value of its determinant is changed. 4.12 State and prove the theorem. A If any one row or one column of a matrix is multiplied by a constant, the determinant itself is multiplied by the constant. 4.13 State and prove the theorem A If a constant times the elements of a row or a column are added to the corresponding elements of any other row or column, the value of the determinant itself is multiplied by the constant. 4.14 State five examples of each of the theorems in 4. 10-4 13above. 4.15 Define the adjoint of a matrix 4.16 Explain the inverse of a matrix. 4.17 State the linear transformations on the rows and columns of a matrix. 4.18 Apply Crammer's rule in solving simultaneous linear equation. 4.19 Apply Linear transformation in solving simultaneous linear equations.	• Explain and illustrate the activities in 4.1 to 4.19. Ask the student to prove the theorems and solve problems on the illustrated activities. Assess the student	• Recommended textbooks, lecture notes, chalkboard, chalk, etc	•	•	•

	Assessment: The continuous assessment, tests and quizzes will be awarded 40% of the total score. The end of the Semester Examination will make up for the remaining 60% of the total score			

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Entrepreneurship Development I		**COURSE CODE:** EED 126	**CREDIT HOURS:** 2	
GOAL:. This course is designed to aquanaut students on how to be self reliance				
COURSE SPECIFICATION: THEORETICAL CONTENT 2		**COURSE SPECIFICATION:** PRACTICAL CONTENT 0		
SEMEATER:	**Pre-requisite**			
	GENERAL OBJECTIVE :			
1.0 2.0 3.0 4.0 5.0 6.0	On completion of this course the student will be able to: Understand the basic concept of entrepreneurship Understand the historical perspective of entrepreneurship Development Know how to plan a business enterprise/project Know how to operate simple stock keeping records Know how to prepare and operate cash flow on spreadsheets Understand employment issues			

Course: Entrepreneurship Development I		Course Code: **EED 126**	Contact Hours: 2 - 0 - 0			
Course Specification: Theoretical Content						
	General Objective 1.0: Understand the basic concept of entrepreneurship					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
1	1.1 Define Entrepreneurship, Entrepreneur, small business and self- employment. 1.2 State the entrepreneurship philosophy 1.3 Identify entrepreneurial characteristics. 1.4 Define development enterprise	• Explain Entrepreneurship • Explain an Entrepreneur, small business and self employment • Explain entrepreneurship philosophy • , State entrepreneurial characteristics • Explain development enterprise	• White Board, projector	•	•	• What are the difference between Entrepreneurship and Entrepreneur? • What are the characteristics of an Entrepreneurial?
	General Objective 2.0: Understand the historical perspective of entrepreneurship Development					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation

2	2.1 Describe Historical perspective. 2.2 Explain the origin of entrepreneurship. 2.3 Explain organizational structure. 2.4 Explain the role of an entrepreneur. 2.5 Explain the reasons for business failure.	• Explain the historical perspective of an Entrepreneurship development • .Explain the origin of entrepreneurship • Describe organizational structures • Explain the role of an entrepreneur • State the reasons for business failure	• White Board, projector	•	•	• What are the reasons for business failure • What bare the role of an entrepreneur
	General Objective 3.0: Know how to plan a business enterprise/project.					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
3 - 5	3.1 Explain the concepts: planning, business enterprise and project. 3.2 Explain the importance of planning to a business enterprise. 3.3 Analyse the skills and Techniques of starting and managing small business successfully.	• Explain the concept of planning as it relate to the business enterprise and project • Explain the importance of planning to a business enterprise • State the skill and techniques required in starting and managing small business successfully.	• White Board,projector	•	•	• What are the importance of planning to a business enterprise • State the skills and techniques for a successful business.
	3.4 Explain the preparation of project proposal. 3.5 Describe how to manage a small business profitably.	• Explain the preparation of project proposal • Explain how to manage small business profitably	• White Board, projector	•	•	• Prepare a project proposal • How do you manage small business profitably.

Course: Entrepreneurship Development I		Course Code: EED 126	Contact Hours: 2 - 0 - 0			
Course Specification: Theoretical Content						
	General Objective 4.0 Know how to operate simple stock keeping records					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
6	4.1 Explain Ordering spare parts/materials 4.2 Receipt of parts/materials 4.3 Storage of parts/materials 4.4 Issue of parts/materials	• Explain ordering spare parts/materials • Show copy of receipt of parts, materials. • Explain storage of parts/materials • Explain the issuance of parts/materials	• Store or any storage facility ,Record note-books, video clips, white board, projector	•	•	• What are ordering spare parts as it relates to the simple stock keeping?
	General Objective 5.0: Know how to prepare and operate cash flow on spreadsheets					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
7 - 8	5.1 Explain various Need for different records (capital, revenue, credit transaction, tax) 5.2 Describe Formatting spreadsheet. 5.3 Explain Operating spreadsheet.	• Explain capital, revenue, credit, transaction and tax • Differentiate between formatting and operating spreadsheets. .	• White Board and Computer	•	•	• What are the difference between formatting and operating spreadsheets.

	General Objective 6.0: Understand employment issues					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
9	6.1 Define the terms: education, training and development. 6.2 Relate education, training and development to employment. 6.3 Distinguish between skills and employment. 6.4 Explain the role of the private sector in employment generation.	• Explain education, training and development as its relate to employment. • Explain the difference between skills and employment • Explain the role of a private sector in employment generation	• White Board, projector.	•	•	• What are the roles of private sectors in employment generation?
	6.5 Identify the forms and informal sectors. 6.6 Explain the issues of: (i) Rural youth and employment (ii) Urban youth and employment.	-Explain forms and informal sector -Differentiate between rural youth employment and urban youth employment.	- White board, projector	-	-	-What are the difference between formal and informal sectors/

Course: Entrepreneurship Development I		Course Code: EED 126	Contact Hours: 2 - 0 - 0			
Course Specification: Theoretical Content						
	General Objective 7.0: Understand the Nigerian Legal System					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
10	7.1 Explain the nature of law. 7.2 Analyse the sources of Nigerian laws. 7.3 Evaluate the characteristics of Nigerian Legal System.	• Describe the nature of Law • Explain the sources of Nigerian Laws • State the characteristics of Nigerian Legal system	• White Board, projector	•	•	• What are the characteristics of Nigerian Legal System
	General Objective 8.0 Comprehend the nature of contract and tort					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
11-12	8.1 Define contract. and the various types of contracts 8.2 State the basic requirements for a valid contract. 8.3 Analyse contractual terms. 8.4 Examine vitiating terms. 8.5 Explain breach of contract and remedies. 8.6 Define Tort. 8.7 Explain types of Tort. 8.9 Discuss tortuous liabilities and remedies.	• Explain contract • List various types of contracts • Explain the basic requirement of a valid contracts • Describe contractual terms • Explain breach of contracts • List the remedies of breach of contracts • Explain Tort and its types • Explain Tortuous liabilities and remedies	• White Board, projector	•	•	• What is contract • What are the various types of contract • What are the requirement for a valid contracts • What is Tort
	General Objective 9.0 Understand Agency and Partnership					

Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
13	9.1 Define agency 9.2 Explain creation of Agency 9.3 Explain authority of the agent. 9.4 Analyse the rights and duties of principal agent and third parties. 9.5 Explain termination of agency and remedies. 9.6 Define partnership. 9.7 Examine creation of partnership. 9.8 Explain relations of partners to one another and to persons dealing with them.	• Explain Agency • Explain the creation of Agency • Describe authority of the Agent • Explain the rights and duties of principal agent and third parties • Explain termination of agency and the remedies • Explain partnership and its creation.	White Board, projector	-	-	• What is agency? • What is authority of agency • What are the termination and remedies for agency.

Course: Entrepreneurship Development I		Course Code: EED 126	Contact Hours: 2 - 0 - 0			
Course Specification: Theoretical Content						
	General Objective 9.0 Understand Agency and Partnership					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
13	9.9 Analyze dissolution of partnership and remedies.	Lecture	White Board			
	Assessment: Class Work 20; Test 20; Practical 20; Examination 40 Competency: The student will understand and have sufficient knowledge to plan the establishment of a small business and realize the pitfalls involved. Assessment: Coursework 20% Course tests 20% Practical 0% Examination 60%. References: 1. Wole Adewumi, "Business Management An Introduction", McMillan Nig. Ltd. Lagos.1988. 2. Soji Olokoyo, "Small Business Management Guide Entrepreneurs", Ola Jamon Printers and Publishers, Kaduna.					

ND 1 SECOND SEMESTER

PROGRAMME: NATIONAL DIPLOMA BUILDING TECHNOLOGY					
COURSE: Building Science & Properties of Materials II		**COURSE CODE:** BLD 121		**CREDIT HOURS:** 3 **CREDIT UNIT:** 2	
GOAL:. The course is designed to enable students understand the principles of Building Science and Properties of Materials					
COURSE SPECIFICATION: THEORETICAL CONTENT 1			**COURSE SPECIFICATION:** PRACTICAL CONTENT 2		
SEMEATER:	**Pre-requisite BLD 111**				
	GENERAL OBJECTIVE : On completion of this course the student will be able to:				
1.0 2.0 3.0 4.0	Understand Dynamics Using Newton;s Law of Motion Know macroscopic properties of solids and their relation to structures Know some basic building construction materials Ferous and Non-Ferous Metals				

COURSE: Building Science & Properties of Materials II	Course Code: BLD 121	Contact Hours: 3			
COURSE SPECIFICATION: Theoretical Content 1hr	**Pre-requisite BLD 111**		Practical 2hrs		
	General Objective 1.0: Understand Dynamics Using Newton;s Law of Motion				

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
	1.1 Explain Newton;s Law of Motion and their application.	• Explain the three law"s of motion. • Explain each of the application	White board marker	-		-What is Newton"s law of motion?
	1.2 Differentiate between impulse and momentum	• Explain the difference between impulse and momentum	White board marker	-		What are the different between impulse and momentum?
	1.3 Define Kinetic Energy	• Describe Kinetics Energy	White board			-What is Kinetic Energy?
	1.4 Identify Kinematics point	• Explain various Kinematics point	marker	-		-What are the Kinematics points known to you?
	1.5 Analyse the composition and resolution of velocities and acceleration	• Describe the composition and resolution of velocities and acceleration	White board marker			What are the different between velocity and acceleration?
	1.6 Differentiate relative velocity and acceleration	• Explain Relative velocity and acceleration • Differentiate between Velocity and acceleration in 1.6 above	White board marker	-		

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
	General Objectives 2.0: Know macroscopic properties of solids and their relation to structures					
	2.1 Differentiate conductor and semi- conductor 2.2 Describe di-electric, plazo-electric and magnetic properties of solids	• Explain conductor and semi-conductor • Diffentiate between conductor and semi-conductor • Explain di-electric, plazo-electric and their applications • Explain the properties of magnetic solids	White board Marker, projectors	-	-	-What are the different between conductor and semi-conductor? -What are the properties of magnetic solids?

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
	General Objectives 3.0: Know some basic building construction materials					
10-11	3.1 Classify good building stones and their characteristics 3.2 Describe quarry and dress stones 3.3 Discribe the use of stones 3.4 Explain types of clay products 3.5 Describe the manufacturing process in 1.4 above 3.6 Conducts tests on bricks listing their characteristics 3.7 Describe composition and the uses of lime and mortal 3.8 Explain different types of cement 3.9 Explain the manufacturing process of cement 3.10 Explain the uses of cement 3.11 Describe standard tests for fitness and setting time . 3.12 Explain the precaution in the storage of cement 3.13 Explain materials used in cement, concrete and lime	• Explain the classification building stones • .Describe the characteristics of building stone • Explain quarry and dress stone • Explain the use of different stone applicable to construction • Describe different types of clay products • Explain manufacturing process of each • Explain various tests on bricks and their characteristics • Explain composition of lime and mortal • Describe the uses of each • Describe the manufacturing process of cement • List the uses of cements and their applications Explain standard for fitness and setting time -Describe the	White board marker Projector • Laboratory White Board • marker	-Identify samples of sand and stones -Identify the various sizes of stones -Students to visit site where clay and bricks are being used -Student to visit cement factory - Carry out tests for fitness of cement	-Guide students in identify types of sand and stones -Guide students to know bricks and clay products. -Guide students in carry out fitness test on cement	-What are the classes of good stones? -What are the characteristics of a good stone? -What is quarry and dress stone? -What are the uses of stones? -What are the composition of mortal and lime stone?

	concrete.	precaution of cement storage - Describe the materials used in cement, concrete and lime stone				
12	3.14 Compare types of concrete such as lightweight concrete and no-fines concrete.	• Explain lightweight concrete and non-fines Concrete. • Produce samples of each type for better appreciation. • Identify the merits and demerits of each type. • Demonstrate batching by volume and by weight. .	• White board Marker • Projector	• Produce types of light weight and no-fines concrete	• Guide students in the production of light weight and no-fines concrete	• Differentiate between light weight and no fines concrete. Explain batching by volume and batching by weight.

13	3.15 Carry out workability slump test, field tests for concrete strength and impurities in fine aggregates.	• Explain workability • Explain the term: water/cement ratio andits important role in the workability of amix. Conduct sieve analysis test. • Conduct slump test to determine workability of a concrete mix. • Demonstrate to the students how Schmidt hammer is used to determine strength of concrete onsite. • Carry out percentage silt-content test of fine aggregates.	• White board marker • Projector	• Carry out slump test and field tests for determining strength of concrete.	• Guide students in carrying out the tests	• Analyze and interpret results of the various tests
	• General Objectives 4.0: Ferrous And Non-Ferrous Metal					
14-15	4.1 Compare Pig Iron, Wrought Iron and Steel 4.2 Explain the characteristics of Pig Iron, Wrought Iron and Steel 4.3 Describe manufacturing of types of Iron and Steel mentioned in 4.1	-Explain Pig Iron, Wrought Iron and Steel • Explain the characteristics of each in 4.1 above • Explain the manufacturing types of various Iron and Steel	• White board • marker	-	-	• Compare Pig Iron , Wrought Iron and Steel in a tabular form? • What are the characteristics of Pig Iron, Wrought Iron and Steel • What are the manufacturing process of steel and Iron.

PROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY		
COURSE TITLE: Building Construction II	**COURSE CODE: BLD 122**	**CONTACT HOURS: 4- HRS/WEEK** **CREDIT UNIT: 3**
COURSE SPECIFICATION: Theory 2 hour	Prerequisite BLD 112	**Practical Content**: 2 hour
Goal: This course is designed to provide students with knowledge of masonry work and roofing in construction of building.		
General Objectives:		
On completion of this module students should be able to :		
1.0	Know the different types of floor.	
2.0	Understand masonry wall construction.	
3.0	Understand Staircases.	
4.0	Know the types of roof, ceiling, and roof Covering.	

Course: Building Construction II		Course Code: BLD 122	Contact Hours: 4			
Course Specification: Theoretical Content 2hr/week				Practical content 2hrs/week		
	General Objective1.0: Know the different types of floor					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1-3	1.1 Explain floor and its functional requirements. 1.2 State the types of floor. 1.3 Explain the methods of constructing floors. 1.4 Explain with drawings the different types of floor. 1.5 Describe the types of suspended floor and the materials used in their construction. 1.6 State the methods of constructing suspended floor.	Explain types of floor, methods of constructing floor, types of suspended floor.	• White Board and Marker. • Video clip • Projector, computer.	• Draw the various types of floor. • Identify types of floor. • Demonstrate the construction of timber floors	• Guide students to draw different types of floor. • Guide students to construct a model floor. • Show students types of suspended floor.	• Use question and answer to discuss types of floor, Floor constructional methods, types of suspended floor, functional requirements of floor etc
4	1.7 Differentiate between ground floors and suspended floors.					
	General Objective 2.0: Understand masonry wall construction					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

5	2.1 State the functional requirements of walls. 2.2 List the types of wall based on functions, materials, construction, etc. 2.3 Explain with drawings the methods of constructing the walls in 2.2	Explain the functions of walls in building. List the various types of walls in use e.g. load bearing, non-load bearing etc.	• White Board and Marker	• Draw various types of walls.	• Use question and answer to discuss walls,the various type of walls, and thereafter • demonstrate with sketches	• Explain the functions of wall in a building
6	2.4 List the materials used in wall construction. 2.5 Illustrate with drawings the various types of wall Construction.	Explain the materials used in wall construction.	• White Board and Marker, • Drawing board, • Drawing instruments	• Illustrate with drawings the various types of wall Constructions.	• Guide students to draw neat sketches.	• Explain Various types of wall Construction.
7	2.6 Define partition walling 2.7 State the functions of partition wall. 2.8 List various types of partition wall. 2.9 Describe with sketches how partition walls are constructed.	• Explain partition walling ;the functions of partition wall; • Various types of partition wall.	• White board and marker, Drawing Studio, Projector.	• Demonstrate with sketches show partition walls are constructed.	• Demonstrate with sketches.	• Explain methods of construction of partition wall.

8	2.10 Explain the merits and demerits of partition wall. 2.11 Draw a typical timber partition wall.	Describe the merits and demerits of the different types of partition wall.	• White board& marker, Drawing Studio, Projector.	Draw a typical timber partition wall.	Show students a typical timber partition wall.	Explain the merits and demerits of the partition walls.
	General Objective 3.0: Understand Staircases					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
9	3.1 Explain stair and staircase. 3.2 List the various types of staircases. 3.3 Explain the terminologies used in staircase construction.	Explain stair and staircase and its terminologies used in staircase construction	• White board& marker. • Projector	illustrate stair and staircase construction.	• Guide the students to draw staircases in plans, elevations, and sections. • Guide students to construct staircase models.	• Explain the term staircase. • Use question and answer to discuss types of staircases.
10	3.4 Describe the various types of staircase in plan, elevations and sections 3.5 Describe risers, tread sizes, width of flight, width of mid-landing, etc. for the various types of staircase listed in 3.2	Explain with sketches the various types of staircase in plan, elevations and sections • etc. staircases listed in 3.2	• White board& marker, • Drawing Studio, projector.	• Draw the various types of staircase in plan, elevations and sections • Derive risers, tread sizes, width of flight, width of mid-landing, etc. for the various types of staircase listed in 3.2	• Show the various types of staircases in plan, elevations and sections • Derive risers, tread sizes, width of flight, width of mid-landing, etc. for the various types of staircase listed in 3.2	explain risers, tread sizes, width of flight, width of mid-landing, etc. for the various types of staircase.
11	3.6 Describe with the aid of sketches and according to building regulation requirements, the method of constructing various types of staircase in timber, steel and reinforced concrete.	Explain building regulation requirements in the method of constructing various types of staircase in timber, Steel and reinforced concrete.	White board& marker, Drawing Studio.			List the building regulations guiding the use of timber, steel, and reinforced concrete staircases.

	General Objective 4.0: Know the types of roof and ceiling structures and Coverings					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
12	4.1 Define roof and state the functional requirements. 4.2 Classify roof according to material, span, structure, etc. 4.3 Explain with illustration the methods of construction of various roof structures using timber, concrete and steel. 4.4 State the properties and fixing details of various roof-covering materials.	4.5 Explain methods of construction of various roofing structures in timber, concrete and steel. List the properties of various roof covering materials. List their properties.	• White board& marker, drawing studio.	Identify methods of construction of various roofing structures in timber, concrete and steel.	Show methods of construction of various roofing structures in timber, concrete and steel. Guide students in sorting out by properties the various roofing covering.	Explain methods of construction of various roofing structures in timber, concrete and steel.
13	4.3 Explain with illustration, the drainage systems of the various types of roof. 4.4 Describe with drawings the water proofing systems of the various types of roofs.	• Explain the drainage systems of the various types of roof. • Explain the water proofing systems of the various types of roof.	• White Board and Marker. • Drawing Studio	• Show the drainage systems of the various types of roof. • Show the water proofing systems of the various types of roof.	Guide students to view the drainage systems of the various types of roof. Show the waterproofing systems of the various types of roof.	What is drainage systems in roofs. Explain water proofing systems of roofs.
14 15	4.5 List various types of ceilings. 4.6 State the functional requirements of ceiling. 4.7 Explain the methods of constructing ceiling in4.5.	List the various types of ceilings. Explain the functions of types of ceilings. Explain the methods of constructing the ceilingsin4.5.	• White board& marker. • Drawing Studio.	Identify the various types of ceiling. State the functions of ceilings. Practice various methods of constructing the ceilings in4.5.	Show the various types of ceiling. Guide students to Practice various methods of constructing the ceilings in4.5.	List types of ceiling. Explain the functions of ceilings.

PROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY		**CONTACT HOURS: 4- HRS/WEEK**
COURSE TITLE: Workshop Practice and Technology II	**COURSE CODE: BLD 123**	**CREDIT UNITS: 3**
COURSE SPECIFICATION: Theory 1hrs/week	**PREREQUISITE**: BLD 113	**Practical Content**: 3 hrs/week
Goal: This course is designed to provide students with knowledge and skills in the use of wood workshop tools and equipment.		
General Objectives:		
On completion of this course, the student should be able to :		
1.0	Know Woodworking tools and Equipment.	
2.0	Understand Factory Acts and Safety Regulations applicable in the Wood Workshop.	
3.0	Know the types of timber used for various work purposes.	
4.0	Know the various types of wood joints.	
5.0	Know the different types of jointing materials.	
6.0	Know the various woodworking machines in use in the workshop.	

Course: Workshop Practice and Technology II	Course Code: BLD 123			Contact Hours: 4	
Course Specification: Theory 1		Practical Content 3			
	General Objective: Know woodworking tools and equipment				
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1	1.1 Explain the use of cramps, shooting boards and benches 1.2 Explain the use of geometrical tools such as marking gauge tape, pencil, caliper and wing compasses, tee square and sliding level.	• Explain the uses of the following: cramps, shooting boards and benches, Geometrical tools such as marking gauges, tapes, pencil, caliper and wing compasses, T-square and sliding level.	• White board and marker, Projector. • Cramps, shooting boards, benches, marking gauges, tapes, pencil, caliper & wing, compasses, tee square and sliding level.	• Identify the various tools and equipment mentioned in 1.1 to 1.2. • Demonstrate the use of the various tools mentioned above.	• Familiarize the student with the workshop. • Guide students to use the equipment and tools outlined in 1.1 to 1.2	What are the uses of the geometrical tools and equipment listed in 1.1 to 1.2?
2	1.3 Explain the use of cutting tools such as saws, chisels and planes. 1.4 List the differences among fixing tools such as hammer, mallets, nail punches, screw drivers and ratchet brace.	• Explain the uses of the cutting tools in 1.3 • Explain the differences among the fixing tools.	• Saws, chisels and planes, hammer, mallets nail punches, screw drivers, ratchet brace.	• Use cutting tools such as saws chisels and planes • Illustrate the differences between fixing tools such as hammer, mallets, nail punches, screw drivers and the ratchet brace.	• Demonstrate how each tool and equipment isused.	• List cutting tools and explain their uses.
	General Objective 2.0: Understand Factory Acts and Safety Regulations applicable in the Wood Workshop.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

3	2.1 Explain the provisions of the Factory Acts. 2.2 Explain the need for adequate ventilation in the workshop 2.3 Explain the need for proper storage facilities for tools and first aid materials. 2.4 Explain the general workshop safety habits. 2.5 Explain the layout of an ideal wood-workshop.	• Explain factory Acts. • Explain safety regulations in the workshop. • Explain the need for storage facility for tools and first aid materials.	• White board and marker. • Projector. • Factory Acts • Safety charts and regulations. • First aid equipment	• Demonstrate general safety habits in the workshop. • Illustrate the layout of an ideal wood-workshop.	• Guide students to apply general safety habits in the workshop. • Guide students to sketch an ideal layout of a wood workshop	• Demonstrate general safety habits in the workshop. • Sketch the layout of an ideal wood-workshop.

	General Objective 3.0: Know the types of timber used for various work purposes.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5	3.1 List types of wood used for various works and their characteristics. 3.2 Differentiate between hardwood and softwood. 3.3 Explain the formation processes of the wood in 3.2 3.4 Describe different timber conversion methods such as slab sawing, tangential sawing and quarter sawing. 3.5 Explain seasoning methods of Timber such as • Natural/air seasoning. • Kiln seasoning - compartment kilns, progressive kilns, combined air and kilns method, • Chemical seasoning and • Pre-steaming 3.6 State the advantages of kiln seasoning.	• Explain the differences between hard wood and Softwood • Explain formation processes of wood • Explain seasoning methods. • State advantages and disadvantages of kiln seasoning.	• Workshop/ Equipment • Samples of timber • Kiln • White board & marker • Relevant chemicals	Demonstrate seasoning/ treatment of timber. Demonstrate preservation of timber	Display samples of the hard wood and Softwood Show sizes of timber	Differentiate hardwood from softwood. Identify sizes of timber

9	Describe timber preservation methods: -wood preservatives oil method -waterborne preservation method 3.8 Describe other preservation methods like pressure process, open tank - hot Bath process, and brush, deep spray application. 3.9 Explain diffusion process. 3.10 Identify the various types and sizes of timber available for use in the market.	• Explain preservation methods with practical examples. Explain diffusion process List various sizes of timber available.				

	General Objective 4.0: Know the various types of wood joints.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
10	4.1 Describe: • widening joints • tongue & groove joints. 4.2 Explain the process of the construction of: a. Frame joint. b. Tee and cross halving joint. c. mortise and tenon d. Haunched mortise and tenon joint. e. Dovetail joint f. Housing joint g. Dowel joint	• Explain how to construct the various joints	• Workshop/ Equipment/ Tools • White board and marker. • Projector • Computer • Manuals. • Catalogues	• Construct various types of joint.	• Demonstrate how to construct the various types of joints • Guide students to construct the various types of joints.	• What are the processes involved in the construction of joints.
11	4.3 Construct angle joints such as dovetail joint, housing joint and dowel joint	• Explain processes involved in constructing angle joints such as dovetail joint, housing joint and dowel joint	• Workshop consumables (Planks).	• Construct angle joints such as dovetail joint, housing joint and dowel joint	• Demonstrate how to construct angle joints such as dovetail joint, housing joint and dowel joint	• State processes involved in construction of angle joints such as dovetail joint, housing joint and dowel joint
	General Objective 5.0: Know the different types of jointing materials.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
12	5.1 Explain different types, sizes and use of nails on given job types. 5.2 Explain various types of	• Explain how, when and where to use nails of different sizes. • Explain the use of various types of screws.	Workshop/ equipment/ tools Consumables (nails, screws, bolts &nuts, timber connectors, etc.	Identify types of nails, screws, bolts & nuts, connectors, adhesives and resin. Use nails, screws, bolts & nuts,	Show samples of various nails, screws, bolts & nuts, connectors, adhesives and resin.	What are different types of nails, screws, bolts & nuts, connectors, adhesives and resin.

13	screws such as raised head, round head, countersunk head and coach or square head on given job types. 5.3 Explain other materials such as bolts and nuts, timber connectors etc. 5.4 Classify wood adhesives, e.g. Thermo- setting and Thermoplastic. 5.5 Differentiate properties of animal and synthetic resin adhesives and their advantages and applications i.e. epoxy resin, polyvinyl acetate (P.V.A) and rubber based adhesives.	• Explain use of bolts & nuts and timber connectors. • Explain wood adhesives, their limitations and applications.	Wood adhesives and resins.	connectors, adhesives and resin on given job	• Guide students to carry out practical using nails, screw, bolts & nuts, connectors, adhesives and resin on timber.	

	General Objective 6.0: Know the various woodworking machines in use in the workshop.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
14-15	6.1 List woodworking machines. 6.2 Classify woodworking machines e.g. a. Planning machine b. Sawing machine c. Band saw machines d. Spindle moulding machine e. Drilling machine f. Mortise and Tenon machine g. Sanding machines h. Portable hand machines. i. Wood lathe etc.	• Identify and explain the listed machines. • Demonstrate the use of the listed machines and their maintenance.	• White board & marker. • Projector. • Computer • Workshop/ equipment/ machines.	• Identify woodworking machines • Use the machines in6.2 to perform operations. • Maintain the machines listed in 6.2	• Show samples of woodworking machines. • Demonstrate the use of wood working machines. • Guide students to use the various wood working machines.	• Identify the various wood working machines • Explain the use of the listed machines. • Demonstrate the use of the various wood working machines.
	Assessment: Coursework: 20%, Course Test 20%, Practical: 20%, Examination: 40% Competency:					

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Introduction to Structural Mechanics		**COURSE CODE:** BLD 124	**Credit HOURS:** 1 CREDIT UNIT 2	
GOAL:. This course is designed to acquaint students with the principles of Soil Mechanics				
COURSE SPECIFICATION: THEORETICAL CONTENT		**COURSE SPECIFICATION:** PRACTICAL CONTENT		
SEMEATER:	**Pre-requisite**			
	GENERAL OBJECTIVE : On completion of this course the student will be able to: 1.0 Understanding Dynamics using Newton"s Laws of motion 2.0 Understand the relations between stress and strain 3.0 Understand analytical and graphical resolution of forces			

COURSE: Introduction to Structural Mechanics		Code: BLD 124	Contact Hours: 1-1-0			
Course Specification Theoretical Content						
	General Objective 1.0: Understanding Dynamics using Newton"s Laws of motion					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1-6	1.1 Explain Newton"s Law of Motion and their appreciation. 1.2 Differentiate between impulse and momentum. 1.3 Define Kinetic Energy. 1.4 Identify Kinematics of Points. 1.5 Analyse the composition and resolution of velocities and Acceleration. 1.6 Differentiate between relative Velocity and acceleration. 1.7 Present representation by vectors.	• Discuss the three Laws of Motion through the use of question and answer • Demonstrate the application of this • Law by using an object at "rest", and an object in Motion. • Give examples of their application e.g • Walking/running, paddling canoe etc. • Demonstrate the force of impulse by • by striking a Nail with a hammer. • Discuss momentum as being the • Product of Mass and Velocity of a body. • Use question and answer to discuss or explain Kinetic Energy. • Use question and answer to identify these points. • Discuss Velocity,	• White/marker board White/marker board White/marker board White/marker board White/marker board White/marker board	• Illustrate where to apply these laws (use of seat belt in vehicles, why more force is required to push back things • Explain why things are balanced	• Show examples to Illustrate where to apply these laws (use of seat belt in vehicles, why more force is required to push back things • Explain why things are balanced	• Why do occupants fly out of vehicles when there is an accident? • Why do people running not stop suddenly? • Why do things sink • What is kinetic energy? • What is velocity? • What is momentum? • What is velocity?

		acceleration using practical examples like an automobile starting from "rest" to attain a certain level of motion. • Discuss these terms by the use of vectors. • Use vectors to throw more light on the terms.				
	General Objective 2.0: Understand the relations between stress and strain.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
7-12	2.1 Define load. 2.2 Explain tension and compression forces. 2.3 Explain stress and strain. 2.4 Define Hooke"s Law. 2.5 Explain Modulus of Elasticity. 2.6 Explain the relation between stress and strain intension. 2.7 Define limit of proportionality, elastic limit, yield point, ductility, brittleness and permanent set. 2.8 Explain shear stress, shear strain, modulus of rigidity, strain energy. 2.9 Describe methods of analysis of composite body with axial tension or compression	• Discuss load in terms of weight mass of a body. • Discuss tensional forces as those that act outwards as a body e.g. pull and compression forces as those that acts inwards on a body e.g. push. • Discuss stress on a body as an • Abnormal condition e.g. A load acting on a body distorts the internal structural arrangement or pattern of the particles of that body. • Discuss strain as a change in shape or form the body undergoes due to stress. • Explain Hooke"s Laws emphasizing on words like limit of proportionality, yield stress and ultimate	White/marker board	Identify of mass, weight, load, tensional forces act and compressional forces act. Apply Hooke"s Law	Show effects of mass, weight, load, tensional forces act and compressional forces act. Use spring to Illustrate tensional forces and to stretch Illustrate that compressional forces tend to crush the spring balance/scale with varying but increasing weight use of videos	• What is the difference between mass and weight • Differentiate a body in tension from one in compression • Differentiate stairs form strain

		stress. • Discuss Modulus of Elasticity. • Illustrate by a sketch the relation between the two terms as being proportional when a body is in tension provided the Elastic limit is not exceeded. • Discuss and explain each of these • Terms using a graph of load against • Extension of mild steel when gradually loaded. • Discuss and explain these terms using illustrations. • Discuss the method of analysis of composite body under axial tension or compression by the application of appropriate equation/formula.			State Hooke‟s Law Why is stress being said to be proportional to strain? with the aid of the , stress strain graph, explain how stress envols strain times constant	

				• Know the stress strain graph by sketching	Draw graph and label it	What is the limit of proportionality?
	General Objective 3.0: Understand analytical and graphical resolution of forces.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
13-15	3.1 Define a force 3.2 Know force as a vector 3.3 Define equilibrium of concurrent and non-concurrent co- planar forces. 3.4 Illustrate Polygon of forces. 3.5 Analyse resolution of forces.	• Discuss force as a product of mass and acceleration • Discuss force as having quantity and acceleration • Concurrent forces. • Discuss non-concurrent forces. • Use graphical method to resolve these forces. • Use sketches to show Polygon of Forces. • Use graphical method to resolve forces into components or parts.	• White/marker board	•	•	• What is force? why is force considered as a vector?
COURSE: Introduction to Structural Mechanics		Code: BLD 124		Contact Hours: 1-1-0		
Course Specification Theoretical Content						

	Assessment: Coursework: 20%, Course Test 20%, Examination: 60% Competency: The Student should be familiar with dynamics, properties of materials in terms of stress-strain and compute solve problems on statistically determinate structure. References: 1. Benham, P.P. "Mechanics of Solid andStructures" 2. Belyaer, N.M. "Strength ofMaterials"			

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: ALGEBRA AND ELEMENTARY TRIGONOMETRY	**COURSE CODE:** MTH 112	**Credit HOURS:** 30Hrs Lectures		
GOAL: Designed to students understand the basic principles in Algebra and Elementary Trigonometry				
COURSE SPECIFICATION: THEORETICAL CONTENT		**COURSE SPECIFICATION:** PRACTICAL CONTENT		
SEMEATER:	**Pre-requisite**			

GENERAL OBJECTIVE :

On completion of this course the student will be able to:

1.0 Understand the laws of indices and their application in simplifying algebraic expressions
2.0 Understand the theory of logarithms and surds and their applications in manipulating expressions
3.0 Understand principles underlying the construction of charts and graphs
4.0 Know the different methods of solving quadratic equations
5.0 Understand permutation and combination
6.0 Understand the concept of set theory
7.0 Understand the properties of arithmetic and geometric progressions
8.0 Understand the binomial theorem and its application in the expansion of expressions and in approximations
9.0 Understand the basic concepts and manipulation of vectors and their applications to the solution of engineering problems
10.0 Understand the concept of equations and methods of solving different types of equations and apply same to engineering problems
11.0 Understand the definition, manipulation and application of trigonometric functions

COURSE: ALGEBRA AND ELEMENTARY TRIGONOMETRY		COURSE CODE: MTH 112	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL			
Course Specification: Theoretical Content						
	General Objective 1.0: Understand laws of indices and their applications in simplifying algebra expressions					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1	1.1 Define index 1.2 Establish the laws of indices 1.3 Solve simple problems using the laws of indices.	• Explain index • Explain the law that establish index • Work out simple problems using the laws of index.	• White board, Textbooks, Calculators., pencil, ruler, biro, etc	•	•	•
	General Objective 2.0: Understand Theory of logarithms surds and their applications in manipulating expression					
Week	Specific Learning Outcomes	Teacher Activities	Resources			

2 - 3	2.1 Define logarithm 2.2 Establish the four basic laws of logarithm 2.3 Solve simple logarithm problem 2.4 Define natural logarithm and common logarithm. 2.5 Define characteristic and mantissa 2.6 Read the logarithmic table for given numbers 2.7 Simplify numerical expressions using log tablese.g. e.g. 18 D = 3%4JPC$^{2}\Lambda$ M^{B,} find D when J = 0935, e.g. θ = 35, P = 1.6 10^{6}, C = 55, M = 0 0025. π = 3.142 2.8 Apply logarithm in solving non-linear equations. e.g. y = ax^{n}; logy - log a + n log x; y = bc^{x} = logy = logb + xlogc; Y = a + bx^{n} B Log (Y B D) = Logb + nlogx., 2.9 Define surds	• Ask the students to solve logarithmic and surd related problems	- White board, Textbooks, Calculators., pencil, ruler, biro, etc			

	2.10 Reduce a surd into its simplestform 2.11 Solve simple problems onsurds					

COURSE: ALGEBRA AND ELEMENTARY TRIGONOMETRY		COURSE CODE: MTH 112	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL			
Course Specification: Theoretical Content						
	General Objective 3.0: Understand Principles underlying the construction of Charts and graphs					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
4	3.1 Construct graphs of functions fractions such as Y = ax +b,n = 1,2 Y = CST (a+x) Y = ax^k, including cases ofasymbles 3.2 Apply knowledge from 3.1 indetermination as laws from experimental data.	• Ask the students to draw graphs	White board, Textbooks, Calculators., pencil, ruler, biro, etc			
	General Objective 4.0: Know the different methods of solving quadratic equations					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5	4.1 Solve quadratic equations by factorization 4.2 Solve quadratic equations by method of completing squares. 4.3 Solve quadratic equations by formula 4.4 Discriminate the roots. 4.5 Form equations whose roots are given in different methods.	• Ask the students to solve quadratic equations	-do-			
	General Objective 5.0: Understand Permutations and Combinations					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

6	5.1 Define permutation 5.2 State examples of permutations 5.3 Define combination 5.4 State examples of combination 5.5 Establish the theorem nPr = n!/[(n-r)!]giving examples e.g. number of ways of collecting two out of 8 balls	• Give exercises on permutation and combination to them	White board, Textbooks, Calculators., pencil, ruler, biro, etc			
	General Objective 6.0: Understand the concept of set theory					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
7	6.1 Establish ${}^{n}C_{r} = {}^{n}C_{n}$ Br. 6.2 Define sets, subsets, and null sets 6.3 Define union, inter-section and completion of sets 6.4 Draw Venn diagrams to demonstrate the concepts in 6.1 B 6.3above. 6.5 Calculate the size or number of elements in a given set.	-do-	-do-			

COURSE: ALGEBRA AND ELEMENTARY TRIGONOMETRY		COURSE CODE: MTH 112	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL			
Course Specification: Theoretical Content						
	General Objectives 7.0: Understand the properties of arithmetic and geometric progressions					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
8 - 9	7.1 Define an Arithmetic progression(A.P.) 7.2 Obtain the formula for nth term and the first n terms of an A.P. 7.3 Give examples of the above e.g. find the 20^{th} term of the series e.g. 2 + 4 + 6 + Y.. Find also the series of the first 20terms. 7.4 Define a geometric progression(G.P.) 7.5 Obtain the formula for the nth term and the first n terms of a geometric series. 7.6 State examples of 7.5 above e.g. given the sequences 1/3, 1,3 Y find the 20^{th} term and hence the sum of the 1^{st} 2oterms. 7.7 Define Arithmetic Mean (AM) and Geometric Mean(G.M.) 7.8 Define convergency of series. 7.9 Define divergence of series.	• Ask the students to apply progression to solve problems	White board, Textbooks, Calculators., pencil, ruler, biro, etc			

	General Objectives 8.0: Understand the binomial theorem and it's application in the expansion of expressions and in approximations.					
Week	Specific Learning Outcomes	Teacher Activities	Resources			
10	8.1 Explain the method of mathematical induction 8.2 State and prove the binomial theorem for a positive integralindex. 8.3 Expand expressions of the forms $(x + y)^2$, $(x^2$ B $\underline{1})^s$ applying binominaltheorem 8.4 Find the coefficient of a particular term in the expansion of simple binomialexpressions. 8.5 Find the middle term in the expansionof binomial expression 8.6 State the binomial theorem for arational index.	• State the importanceand application of thetheorem	-do-			

COURSE: ALGEBRA AND ELEMENTARY TRIGONOMETRY		COURSE CODE: MTH 112	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL			
Course Specification: Theoretical Content						
	General Objectives 8.0: Understand the binomial theorem and it‟s application in the expansion of expressions and in approximations.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
10	8.1 Explain the method of mathematical induction 8.2 State and prove the binomial theorem for a positive integralindex. 8.3 Expand expressions of the forms $(x + y)^2$, $(x^2$ B $1)^s$ applying binominaltheorem 8.4 Find the coefficient of a particular term in the expansion of simple binomialexpressions. 8.5 Find the middle term in the expansionof binomial expression 8.6 State the binomial theorem for arational index. 8.7 Expand expressions of the form: $(1 + x)^{-1}$, $(1$ B $x)^2$, $(1$ B $x)^{-a}$ applying binomialtheorem 8.8 Expand and approximate expressions of the type $(1.001)^n$, $(0.998)^n$, $(1 + x)^2$, $(1$ B $x)^a$ to a stated degree of accuracy applying |scalar expressions.	• State the importanceand application of thetheorem	White board, Textbooks, Calculators., pencil, ruler, biro, etc			

11	9.1 State the definitions and representations of vectors. 9.2 Define a position vector. 9.3 Define unit vector 9.4 Explain scalar multiple of vector 9.5 List the characteristics of parallel vectors 9.6 Identify quantities that may be classified as vector e.g. displacement velocity, acceleration, force etc. 9.7 Compute the modulus of any given vector up to 2 and 3dimensions. 9.8 State the parallelogram law in solving problems including addition and subtraction of vectors	• Apply the techniques of vectors to solve various problems	-do-			

COURSE: ALGEBRA AND ELEMENTARY TRIGONOMETRY		COURSE CODE: MTH 112	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL			
Course Specification: Theoretical Content						
	General Objectives 8.0: Understand the binomial theorem and it‟s application in the expansion of expressions and in approximations.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
11	9.9 Apply the parallelogram law in solving problems including addition and subtraction of vectors. 9.10 Explain the concept of components of a vector and the meaning of orthogonal components. 9.11 Resolve a vector into its orthogonal components. 9.12 List characteristics of coplanar localized vectors. 9.13 Define the resultant or composition of coplanar vectors.	• Apply the techniques of vectors to solve various problems	- White board, Textbooks, Calculators., pencil, ruler, biro, etc			
	General Objectives 9.0: Understand the basic concepts and manipulation of vectors and their applications to the solutions of engineering problems					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

12	9.14 Compute the resultant of coplanar forces acting at a point using algebraic and graphical methods. 9.15 Apply the techniques of resolution and resultant to the solution of problems involving coplanar forces. 9.16 Apply vectoral techniques in solving problems involving relative velocity. 9.17 State the scalar product of two vectors. 9.18 Compute the scalar product of given vectors. 9.19 Define the cross product of the vector product or twovectors. 9.20 Calculate the direction ratios of given vectors. 9.21 Calculate the angle between twovectors using the scalar product.	• Apply the techniques of vector to solve various problems	-do-			

COURSE: ALGEBRA AND ELEMENTARY TRIGONOMETRY		COURSE CODE: MTH 112	CONTACT HOURS: 15 HRS LECTURE 15 HRS TUTORIAL			
Course Specification: Theoretical Content						
	General Objectives 10.0: Understand the Concept of equations and apply same to engineering problems					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
13 - 14	10.1 Explain the concept of equation, ie. A =B where A and B are expressions. 10.2 List different types of equations:- Linear, quadratic, cubic, etc. 10.3 State examples of linear simultaneous equations with two unknowns and simultaneous equations with at least one quadraticequation. 10.4 Apply algebraic and graphical methods in solving two simultaneous equations involving a linear equation and a quadraticequation. 10.5 Apply the algebraic and graphical methods in solving two simultaneous quadratic equations. 10.6 Define a determinant of n^{th}order. 10.7 Apply determinants of order 2 and 3 in solving simultaneous lin earequations.	• Ask the student to solve various equations as indicated in section10	White board, Textbooks, Calculators., pencil, ruler, biro, etc			
	General Objectives 11.0: Understand the definition, manipulation and application of trigonometric functions					

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
15	11.1 Define the basic trigonometric ratios, sine, cosine and tangent of an angle. 11.2 Derive the other trigonometric ratios; cosecant, secant and cotangent using the basic trigonometric ratios in 11.1above. 11.3 Derive identities involving the trigonometric ratios of the form; $Cos^2\theta + Sin^2\theta = 1$, $Sec^2\theta = 1 + tan^2\theta$, etc. 11.4 Derive the compound angle formulae for sin (A+B), Cos (A+B) and Tan(A+B).	• Define and Derive the trigonometric ratios and identities	-do-			
	ASSESSMENT: The continuous assessment, tests and quizzes will be awarded 40% of the total score. The end of the Semester Examination will make up for the remaining 60% of the total score.					

ND TWO FIRST SEMESTER

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Introduction to Theory of Structures		**COURSE CODE:** BLD 211	**Credit HOURS:** 30Hrs Lectures	
GOAL:. The course is designed to introduce students to Theory of Structures				
COURSE SPECIFICATION: THEORETICAL CONTENT		**COURSE SPECIFICATION:** PRACTICAL CONTENT		
SEMEATER:	**Pre-requisite**			
	GENERAL OBJECTIVE: On completion of this course the student will be able to: Know how to determine reactions, Bending Moments, shear force values. Understand moments of inertia, Products of Inertia Max & Min Principal Axis, Neutral Axis, Bending. Stress, shear stress			
1.0 2.0				

COURSE: Introduction to Theory of Structures	Course Code: BLD 211	Contact Hours: 2-0-0			
COURSE SPECIFICATION: Theoretical content.					
	General Objective 1.0: Know how to determine reactions, Bending Moments, shear force values.				
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
	1.1 Define bending moments and shear force. 1.2 Describe types of loads, and types of support. 1.3 Explain the equation of equilibrium. 1.4 Illustrate sign conventions for bending moment and shear force diagrams. 1.5 Determine the relations between load, shear force and bending moment. 1.6 Calculate shear force and bending moment values on: (i) Simple supported beam and (ii) Cantilever beam with concentrated and uniformly distribution loads (UDC) 1.7 Draw bending moments and shear force diagram. 1.8 Use graphical method of determination of reactions, shear force and bending moments.	• Explain bending moments and shear force. • List types of loads e.g. Dead, live and wind loads. • Illustrate types of support such as fixed hinged/pinned and Roller supports. • State the equations of statics equilibrium for • Plane structures • Space structures. • State the sign convention for type of bending moment diagram and shear force diagrams. • Derive equations relating load, shear force and bending moments • Show the students how to calculate Bending moment and shear force values for: Simply supported beam. Cantilever beam (with concentrated and uniformly distributed load (UDL)).	• White board and Marker • Projector			• What is bending moment? • State the types of loads in building. • Describe the three types of support and their force components. • State the equations of static equilibrium. • Differentiate between hogging and sagging moment. • What is shear force?

		• Show the students how to draw bending moment and shear force diagrams. • Demonstrate to the students how to draw bending moment and shear force diagrams using graphical method.		• Carry out calculation on bending moment and shear force. • Analyse a simply supported beam. • Solve a problem using a cantilever beam. • Identify concentrated/point load and uniformly distributed load (UDL) • Sketch bending moment and shear force diagrams.	• Guide students to calculate bending moment and shear force. • Guide students to analyse a simply supported beam. • Guide students to identify different types of load. • Guide students to sketch bending moment and shear force diagrams.	• Differentiate a simply supported beam from a cantilever beam. • Describe the shapes of the bending moment diagrams produced by a point load and a uniformly distributed load on a simply supported beam.

	General Objective 2.0: Understand moments of inertia, Products of Inertia Max & Min Principal Axis, Neutral Axis, Bending. Stress, shear stress					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
9-14	2.1 Explain general principles of simple bending. 2.2 Determine the position of neutral axis. 2.3 Calculate moments of inertia. 2.4 Determine bending stresses in Beam sections. 2.5 Calculate combined bending and direct stress. 2.6 Determine shear stresses in rectangular Beam sections. 2.7 Determine moment of inertia about an axis, maximum and minimum values of inertia about the principal axis.	• State/mention the principles of simple bending • Show the students how to determine the position of Neutral axis of a body • Show the students how to calculate moments of Inertia • Show the students how to determine bending stresses in Beam sections • Demonstrate to the students how to calculate combined bending and direct stress. • Show the students how to determine shear stresses in rectangular Beam sections • Show the students how to determine moment of maximum and minimum values of moment of inertia about the principal axis.	White board and marker. Projector	Drive the relationship of pure bending equation, ie $\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$	Guide students to drive relationship.	State the pure bending moment equation. • State the formula for the moment of inertia of a circular section with D diameter.

	Assessment: Coursework: 20% Course test: 20% Practical 0% Examination 60% Competency: The students should be able to analyse simple statically determinate structures. References: 1. Durka, F. “StructuralMachanics: 2. Optimum Structural design: theoryapplication”					

PROGRAMME: NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Building Construction III	**COURSE CODE:** BLD 213	**CREDIT HOURS: 4** **CREDIT UNIT: 3**		
GOAL: Equip students with skill and knowledge in Building Construction				
COURSE SPECIFICATION: THEORETICAL CONTENT 2		**COURSE SPECIFICATION:** PRACTICAL CONTENT 2		
SEMEATER: 2	**Pre-requisite**			

GENERAL OBJECTIVE :

On completion of this course the student will be able to:

1.0 Understand principles of constructing and uses of scaffolding in building construction.
2.0 Understand the various types of fenestration in buildings.
3.0 Understand the different types of finishes for Floors, walls, and ceilings.

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Course: Building Construction III			Course Code: BLD 212	Contact Hours: 4			
Course Specification: Theoretical Content 2				Practical 2			
	General Objective 1.0: Understand principles of constructing and uses of scaffolding in building construction.						
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation	
1 2	1.1 Explain the principles of scaffolding 1.2 State the use of scaffolding in walls, roof and suspended roof construction. 1.3 Describe the procedure for providing scaffolding for the various building types. 1.4 List out the use of form work in floor construction.	Explain the principles of scaffolding and its uses in building construction. .Explain the use of form work in floor construction.	• White Marker board • White Marker board	Identify the use of scaffolding in walls, roof and suspended roof construction. • illustrate the use of form work in floor construction.	• With the aid of sketches explain the principles of constructing scaffolding and form work. • Guide students to site visit	State the use of scaffolding in walls, roof and suspended roof construction. • Mention the uses of a form work.	
	General Objective 2.0: Understand the various types of fenestration in buildings.						
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation	
3 - 9	2.1 Explain the functional requirements of openings. 2.2 Describe the treatment of doors, windows and other openings in wall. 2.3 Explain the use of lintel and arches in fenestrations. 2.4 State the various types of doors and materials used in construction. 2.5 State the main principles to be observed in the construction of doors and framing of joiners work in general. 2.6 Explain the method of constructing the different types of framed and flush doors.	• Explain the functional requirements of openings. • Explain the principles of fenestration and state their uses in buildings. • Explain the method of constructing the different types of framed and flush doors. • Explain the difference between door frame and door lining. •	• White Marker board • Drawing instruments • White Marker board • Different types of Doors and door frame samples	• Demonstrate functional requirement of fenestration • Sketch various types of windows. Doors and form work	• Guide students to sketch various types of windows. Doors and form work • Site visit to demonstrate construction and fixing of window, Doors and form work	• Sketches, the method of constructing the various types of windows. • Draw different types of Door, Door frame and form work • Explain the principles of fenestration and state their uses in buildings. •	

	2.7 Explain the difference between door frame and door lining. 2.8 Describe the methods of fixing doorframes and linings to openings. 2.9 Define the termiron- mongery. 2.10 List the method by which windows are classified.					

	General Objective 3.0: Understand the different types of finishes for Floors, walls, and ceilings.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
11 - 15	3.1 Describe the functions of finishes on floors, walls, and ceilings. 3.2 Differentiate types of wall finishes in relation to their functions in terms of internal and external functions. 3.3 Differentiate types of ceiling finishes in relation to their functions in terms of internal and external functions. 3.4 Explain the use of various types of paints for different Surfaces in relation to their finishes.	• Explain the functions of finishes on floors, walls, and ceilings. • Explain the different types of wall finishes in relation to their functions in terms of internal and external functions. • Explain the various types of paints for different Surfaces in relation to their finishes.	• White Marker board • Samples of tiles marbles, granite, wood etc. • Samples of ceiling finishes. • Samples of paints.	• Illustrate fenestration in buildings • Illustrate the functions of finishes to floors, walls, paint and ceilings.	• Show the functions of finishes to floors, walls, and ceilings. • Guide students to the site visit for installation of various floor,wall and ceiling finishes.	• Explain the functions of finishes on floors, walls, and ceilings. • Explain the different types of wall finishes in relation to their functions in terms of internal and external functions.
2	Assessment: Coursework: 20%, Course Test 20%, Practical: 0%, Examination: 60% Competency: The Student should understand the use of scaffolding, fenestration and finishes to structural members of building. References: 1. Bowyer “BuildingTechnology” Adams, E. C. “Fundamentals ofBuilding”					

PROGRAMME: NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Workshop Practice and Technology III		**COURSE CODE:** BLD 213	**CREDIT HOURS: 4** **CREDIT UNIT: 2**	
GOAL: Designed to equip students with knowledge of Workshop Practice				
COURSE SPECIFICATION: THEORETICAL CONTENT 0		**COURSE SPECIFICATION:** PRACTICAL CONTENT 4		
SEMEATER:	**Pre-requisite**			

GENERAL OBJECTIVE :

On completion of this course the student will be able to:

1.0 Know painting and decoration and their effects on buildings
2,0 Understand the Preservative Characteristics of Paint. Work Plumbing Tools and Equipment
3.0 Understanding Factory Acts and Safety Regulations Applicable in plumbing Workshops
4.0 Plumbing Materials for various Job Purposes
5.0 Water Supply
6.0 Know the different methods of fixing appliances
7.0 Drainage System

PROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY.						
COURSE: Workshop Practice and Technology III		Course Code: BLD 213			Contact Hours: 4hours/week	
Course Specification: Theoretical Content 0				Course Specification: Practical Content 4		
General Objective 1.0: Know painting and decoration and their effects on buildings						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	Evaluation
1	1.1 Define the terms painting and decoration as they apply to building and other facilities. 1.2 List the components of paint. 1.3 Explain the function of each of the constituents used in making paint	Explain the terms painting and decoration, the components of paint and function of each of the constituents used in making paint	Paint, brush, blocks, wall, charts of different colors	Practice painting and decoration as they apply to building and other facilities. Identify the function of each of the constituents used in making paint	Lead students in the Practice of painting and decoration as they apply to building and other facilities. Identify the function of each of the constituents used in making paint	Define the terms painting and decoration as they apply to building and other facilities
2	Describe painting and decoration. 1.4 Describe the types of paint in use and their specific peculiarities; i.e. emulsion, oil etc. 1.5 State the conditions for use of each paint type	Explain painting and decoration. and the types of paint in use and their specific peculiarities; i.e. emulsion, oil etc. Explain the conditions for use of each paint type	Paint, brush, blocks, wall, charts of different colors	Use paints to decoration Use different types of paint in their specific peculiarities; i.e. emulsion, oil etc. Show the conditions for use of each paint type	Use paints to decoration Use different types of paint in their specific peculiarities; i.e. emulsion, oil etc. Show the conditions for use of each paint type	Describe the types of paint in use and their specific peculiarities
3	1.6 Describe the methods of preparing surfaces for painting 1.7 Describe the methods of application of paint. 1.8 Apply paint to surface materials like block/brick work,	Exemplify the methods of preparing surfaces for painting and paint to surface materials like block/brick work	Paint, brush, blocks, wall, charts of different colors	Illustrate the methods of preparing surfaces for painting Demonstrate the methods of application of paint. Apply paint to surface materials like block/brick work,	illustrate the methods of preparing surfaces for painting Demonstrate the methods of application of paint. Apply paint to surface materials like block/brick work, concrete, metal etc. 1.9 Maintain paint brushes, rollers, spray	Explain the methods of preparing surfaces for painting and paint to surface materials like block/brick work

	concrete, metal etc. 1.9 Maintain paint brushes, rollers, spray guns, etc.			concrete, metal etc. Maintain paint brushes, rollers, spray guns, etc	guns, etc.	
General Objective 2.0: Understand the Preservative Characteristics of Paint.						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	Evaluation
4	.1 Explain the preservation characteristics of paint, i.e. moisture prevention, rust prevention, etc 2.2 Describe paint to the right constituents for application using brush, roller or spray gun. 2.3 Identity additives which are available for use as preservative and weathering preventive treatment.	Explain the preservation characteristics of paint, i.e. moisture prevention, rust prevention, etc 2.2 Explain paint to the right constituents for application using brush, roller or spray gun. 2.3 Identity additives which are available for use as preservative and weathering preventive treatment.	Paint, brush, blocks, wall, charts of different colors	Show the preservation characteristics of paint, i.e. moisture prevention, rust prevention, etc Mix paint to the right constituents for application using brush, roller or spray gun. Identity additives, which are available for, use as preservative and weathering preventive treatment.	Guide students to see the preservation characteristics of paint, i.e. moisture prevention, rust prevention, etc Mix paint to the right constituents for application using brush, roller or spray gun. Identity additives, which are available for, use as preservative and weathering preventive treatment.	
General Objective 3.0: Paint work						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	Evaluation
5	List the defects in paint work and their causes and remedies.	3.1 Identify the defects in paint work. 3.2 State their causes and remedies.		.		
General Objective 4.0: Plumbing Tools and Equipment						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	Evaluation
6						

	4.1 list plumbing tools and equipment. 4.2 Select plumbing tools and equipment for use. 4.3 Explain the use of tools in 4.1 and portable power tools and equipment. 4.4 Explain how to maintain the tools used in 4.2 above.	List out plumbing tools and equipment. Explain the Use of the listed tools and equipment. Explain Maintenances of the tools used in 4.2 above.	Tools and equipment	Select plumbing tools and equipment for use.	4.1 Identify plumbing tools and equipment. 4.2 Select plumbing tools and equipment for use. 4.3 Use the tools in 4.1 and portable power tools and equipment. 4.4 Maintain the tools used in 4.2 above.	list plumbing tools and equipment. and explain their uses.
General Objective 5.0: Understand Factory Acts and Safety Regulations Applicable in the plumbing Workshop						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	Evaluation
7	The activities should be carried out In the workshop			Describe the Safety and Upkeep of a Workshop.	5.1 Safety and Upkeep of Workshop. 5.2 Propose adequate ventilation for the workshop. 5.3 Create safe storage facilities for tools and first aid equipment.	Describe the Safety and Upkeep of a Workshop.
General Objective 6.0: Plumbing Materials for various Jobs Purposes						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	
8	The activities should be carried out In the workshop			Identify the pipes and tubes used in plumbing work	6.1 Select pipes and tubes used in plumbing work for cold water, waste, soil and ventilation pipe,drainage and domestic control heating	Identify the pipes and tubes used in plumbing work
9	The activities should be carried out In the workshop			Identify the pipes and tubes used in plumbing work	6.2 Identify their sizes, weights and gauges. 6.3 Apply methods of jointing, manipulation and fixing 6.4 Prepare threading and jointing pipes in galvanised iron copper and plastics.	Identify the pipes and tubes used in plumbing work
General Objective 7.0: Water Supply						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	

11	The activities should be carried out In the workshop			Name the properties of water based on common sources of supply.	7.1 Explain the properties of water based on common sources of supply. 7.2 State the rules to be followed in piping for water supply.\	Name the properties of water based on common sources of supply.
12	The activities should be carried out In the workshop			Name the properties of water based on common sources of supply.	7.3 Observe connections to water mains 7.4 Illustrate the domestic systems of cold and hot water supply.	,,
General Objective 8.0: Know the different methods of installing and fixing appliances						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	
13	The activities should be carried out In the workshop			Illustrate plumbing constructional features.	8.1 Illustrate plumbing constructional features. 8.2 Install sanitary appliances, fittings, soil/water, ventilation pipes.	Illustrate plumbing constructional features.
General Objective 9.0: Drainage Systems						
Week	Specific Learning Outcome	Teachers Activities	Learning Resources	Specific Learning Outcome	Teachers Activities	Learning Resources
14	The activities should be carried out In the workshop			Show general layout and construction method of drainage systems.	9.1 Show general layout and construction method of drainage systems.	- Workshop consumables
15	The activities should be carried out In the workshop			Differentiate between private and public sewage systems.	9.2 Differentiate between private and public sewage systems. 9.3 Test drains and solid pipes.	- Workshop consumables

• Workshop consumables

Competency: The Student should be familiar with use of paints and decorations. They should also acquaint themselves with the safety regulations in the plumbing workshop.

References:

1. Tubb, L. F. J. “Painting and Decorating
2. Hall, F. Plumbing

ASSESSMENT STRUCTURE

TYPE OF ASSESSMENT	PURPOSE AND NATURE OF ASSESSMENT (ITD)	WEIGHING
Examination	Final Examination (written) to assess knowledge and understanding	60%
Course Test	At least 2 progress tests for feedback.	20%

Coursework	At least 5 home works to be assessed by the teacher	20%
TOTAL WEIGHT		**100**

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Building Services		**COURSE CODE:** BLD 214	**CREDIT HOURS: 1** **CREDIT UNIT: 2**	
GOAL:. This course is designed to equip students with skills and knowledge of building services				
COURSE SPECIFICATION: THEORETICAL CONTENT 1		**COURSE SPECIFICATION:** PRACTICAL CONTENT 1		
SEMEATER:	**Pre-requisite**			

GENERAL OBJECTIVE :

On completion of this course the student will be able to:

1.0 Understand the Sources, Quality and Classification of water.
2.0 Understand the system of distribution of pipe-work for domestic cold water supply
3.0 Understand water supply system to a Buildings
4.0 Understand the basic sanitary appliances, fittings and their uses
5.0 Understand the various types of drainage systems used in buildings
6.0 Understand the methods of providing lighting in buildings.
7.0 Understand electrical fittings and controls in Buildings

COURSE: Building Services		Course Code: BLD 214	Contact Hours: 1- 1-0			
COURSE SPECIFICATION						
	General Objective 1.0: Understand the Sources, Quality and Classification of water.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1-3	1.1 Identify sources of water 1.2 State the quality of water from the sources. 1.3 State the two classes of water, viz hard and soft water. 1.4 Describe the methods of purification of water.	• Explain sources of water. • Differentiate between hard and soft water. • Describe methods of purifying water.	• White Board and marker.	. Identification of hard and soft water. . Practice methods of water purification	• To illustrate to students how to differentiate hard and soft water. • Visit to water cooperation service.	• Differentiate between soft and hard water. • Discuss methods of water purification.
	General Objective 2.0:Understand the system of distribution of pipe-work for domestic cold water supply					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
4-6	2.1 Explain the direct and indirect method of water supply system to building 2.2 Identify the sizes and types of pipes used along the distribution system 2.3 Describe with sketches cold water supply system. 2.4 Describe means of providing drinking water 2.5 Differentiate between communication ,service, supply, distribution and overflow pipes	• Explain pipe sizing and types • Explain and illustrate the direct and indirect methods of water supply • Identify communication ,service, supply, distribution and over flow pipes	White Board marker.	Draw direct and indirect method of water supply system to building. . Identification of various types of pipes for water supply in building	Illustrate with diagram direct and indirect method of water supply. . Provide various types of pipes for water supply	Draw direct and indirect method of water supply. .Identify communication ,service, supply, distribution and over flow pipes

	General Objective 3.0: Understand water supply system to a Buildings					
Week	Specific Learning Outcomes	Teacher's Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
7-8	3.1 Explain the two systems of hot water supply to building 3.2 Describe direct and indirect systems of hot water supply 3.3 Identify need for sizing of pipes and precaution against dead leg	• Describe hot water supply systems to building • Explain hot water supply systems to building	White board marker. Sample size of hot water supply pipes	Sketch direct and indirect systems of hot water supply system to building . Identify Sample size of hot water supply pipes.	Illustrate direct and indirect systems of hot water supply	Explain and sketch hot water supply system to building.

COURSE: Building Services	Course Code: BLD 214	Contact Hours: 1- 1-0			
COURSE SPECIFICATION					

	General Objective 4.0: Understand the basic sanitary appliances, fittings and their uses					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
9-10	4.1 Explain the use of following appliances and their functions: WC, Urinal, Bidet, various showers, wash hand basin sink, tap and valves. 4.2 Sketch the fittings in4.1. 4.3 Explain the construction requirements for installing the sanitary appliances.	• Explain the following sanitary appliances: W.C Urinal, Bidet various showers, wash hand basins, sinks, taps and valves • Discuss the construction requirements for the installation of sanitary appliances	White marker and board, Samples of valves, taps	Sketch different sanitary fittings and valves	Shows and explain various sanitary fittings ,valves and taps	Sketch different sanitary fittings and valves
	General Objective 5.0: Understand the various types of drainage systems used in buildings					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
11-12	5.1 Explain Drainage Systems 5.2 Identify the materials and fittings used in drainage work. 5.3 Outline the combined and separate systems of drainage. 5.4 Produce simple diagrams of the system in5.2. 5.5 Describe merits and demerits of separate and combined drainage system.	Explain drainage systems. Show students samples of fittings and pipes for drainage Discuss the merit and demerits of separate and combined drainage systems	= DO=	Identify materials for drainage work . Sketch combined and separate systems of drainage.	Explain and show different materials for drainage work Guide students to Sketch combined and separate systems of drainage.	. Identify various types of materials and fittings used in drainage work. . Sketch combined and separate systems of drainage.
	General Objective 6.0: Understand the methods of providing lighting in buildings.					

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

13	6.1 Explain artificial and natural lighting methods 6.2 Describe how to provide artificial lighting in buildings. 6.3 Explain the techniques of providing natural lighting in buildings. 6.4 Describe how to integrate natural and artificial lighting in buildings	• Explain daylight factor • Differentiate between natural and artificial lighting	White board and marker			• Differentiate between artificial and natural lighting • Describe how to integrate natural and artificial lighting in buildings

COURSE: Building Services		Course Code: BLD 214	Contact Hours: 1- 1-0			
COURSE SPECIFICATION						
	General Objective 7.0: Understand electrical fittings and controls in Buildings					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
14-15	7.1 Differentiate the common standard cables used for different fittings. 7.2 List and state the uses of electrical fittings and controls in buildings. 7.3 Explain the construction provisions made for electrical fittings. 7.4 Describe simple electric circuit system used in residential houses.	• Introduce student to I.EE and NERC Regulations • Show student by Illustration the various cables and fitting appropriate to low-rise buildings	• White board marker • I.E.E and NERC Regulations	• identify simple electric circuit system used in residential houses. • Install simple electric wiring in low- rise buildings	• Guide students to identify different electrical cables and fittings • Guide students to produce electrical circuit on board	• Identify electrical cables and fittings used in buildings • Draw simple electric circuit system used in residential houses.

	Assessment: Coursework: 20% Course test: 20% Practical: 0% Examination: 60% References: 1. Hall, F. “Plumbing: Cold Water Supplies, Drainage” 2. Hall, F. “Plumbing: Hot Water Supply and eating Systems”			

PROGRAMME: NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Site Management I	**COURSE CODE:** BLD **215**	**CREDIT HOURS: 1** **CREDIT UNIT: 2**		
GOAL:. This course is design to enable students acquire knowledge of activities involved in site administration.				
COURSE SPECIFICATION: THEORETICAL CONTENT 1		**COURSE SPECIFICATION:** PRACTICAL CONTENT 0		
SEMEATER:	**Pre-requisite**			

GENERAL OBJECTIVE:

On completion of this course the student will be able to:

1.0 Know the activities involved in site administration
2.0 Know the basic legislation that relate to building construction
3.0 Know how to organize labour for building construction work
4.0 Know the basic principles of incentive for worker

COURSE: Site Management I		Course Code: BLD 215	Contact hours 1			
COURSE SPECIFICATION Theory 1				Practical 0		
	General Objective 1.0: Know the activities involved in site administration					
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
1 - 7	1.1 Explain the principles of administration and control. 1.2 Explain the effects of efficientsite administration. 1.3 Explain site management functions. with respect to the following: a. Preparation of schedules. b. Forecasting material requirements. c. Processing andordering. d. Storage, protection, transport, loading and handling. e. Forecasting, overall programmes, short term programmes, forecast target. f. Reports to head office. g. day works, variations, progress reports. h. Time books, wages sheet. i. material logbooks. j. Mechanicalpl ant requirements. k. Scaffolding (typesand erection)	-Explain the principles of administration and control -Explain the effects of efficient site administration -Explain site management functions	White board, materials, e.g charts, log books, projector etc.	-Demonstrate how to prepare schedule for a given site.	-Guide students how to prepare schedules	-Explain site management functions -Describe the effects of efficient of site administration - -

	l. Statutorydiaries. m. Statutory inspections to excavation, scaffolding, hoist cranes, portable electric equipment. n. Maintenance andinspection. o. safe working conditions for mechanical plantetc.					

COURSE: Site Management I		Course Code: BLD 215	Contact hours 1			
COURSE SPECIFICATION Theory 1				Practical 0		
	General Objective 2.0: Know the basic legislation that relate to building construction					
Week	Specific Learning Outcome	Teacher"s Activities	Resources	Specific Learning Outcome	Teacher"s Activities	Evaluation
8-10	2.1 Explain delegated legislation. 2.2 Explain building legislations. 2.3 Explain Town planning acts, Building regulations, and FactoryActs.	-Explain building legislations. - Explain Town Planning Acts, Building regulations and Factory Acts.	White Board, Factory Act, Building regulation legislation, Town PlanningAct legislation.	•	•	-Define building legislation - Differentiate between Town Planning Acts and Building Legislation.
	General Objective 3.0: Know how to organize labour for building construction work					
Week	Specific Learning Outcome	Teacher"s Activities	Resources	Specific Learning Outcome	Teacher"s Activities	Evaluation
11 - 12	3.1 Determine labourrequirements. 3.2 Explain labourforecasting. 3.3 Explain method of recruitment oflabour. 3.4 Explain factors that influence choice of labour	- Explain the need for labour requirements in construction works - Explain division of labour - Discuss how to construct a bar charts and net work analysis. - Explain factors that influence choice of labour .	White board, projector, Schedule of labour requirement, Bar chart.Net workAnalysis.	•	•	-What are the labour requirements? - What are the methods used in labour recruitment?

	General Objective 4.0: Know the basic principles of incentive for worker					
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
13 - 15	-Explain the general principles of incentive schemes. -Explain financial and non financial incentives. -Explain how to measure and record performance	- Explain the general principles of incentive schemes. - Explain financial and non financial incentives. - Explain how to measure and record performance	White board, projector, Schedule of standard output • Productivity schedule.	•	•	-What are the general principles of incentive schemes -What is the different between financial and non financial incentives? - How do we measure and record performance?
	Assessment: coursework: 20% Course Test 20% Practical 0% Examination 60% Competency: The Student should be able to manage a site and know the basic laws connected tom building References: 1. J. T. Butter "Element of Administration for Building Students" 3rd Edition 2. John D. Donnw, A. James Barnes and Michael B. Metzo "Law forBusiness"					

PROGRAMME: NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Principles of Law and Building Contracts	**COURSE CODE:** BLD 216	**CREDIT HOURS: 2** **CREDIT UNIT: 2**		
GOAL: This course is designed to enable students understand the principles of law in building contracts				
COURSE SPECIFICATION: THEORETICAL CONTENT 2		**COURSE SPECIFICATION:** PRACTICAL CONTENT 2		
SEMEATER:	**Pre-requisite**			

GENERAL OBJECTIVES:

On completion of this course the student will be able to:

1.0 Know the branches and sources of Law and the various schools of Law
2.0 Understand the legislation process and power separation
3.0 Know the general principles of constitutional and administrative Law
4.0 Understand the statutory Acts, Edicts, Decrees, Bye-Laws etc.

Course: Principles of Law and Building Contracts		**Course Code:** BLD 216	**Contact Hours:** 2			
Course Specification: Theoretical Content 2				Practical 0		
	General Objective 1.0: Know the branches and sources of Law and the various schools of Law					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
1 2	1.1 Describe schools of Law in relation to: i. Analytical school. ii. Historical school. iii. Sociological school. iv. Maximum theory of law. v. Natural law school 1.2 State sources of Law i.e. statutory law, common law, etc. 1.3 Describe branches of law i.e. criminal, civil and tort.	Explain school of law, sources of law and branches of law Give examples from stated cases.	White board, projector	-	-	What are various school of law? List and explain sources of law?
	General Objective 2.0: Understand the legislation process and power separation					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
3 4	2.1 What is legislation process and power separation? 2.2 Explain the doctrine of separation of power. 2.3 State the advantages and disadvantages of separation of power? 2.4 List different arms of government 2.5 State the functions of different arms of government	-Explain legislation process, power separation and doctrine of power separation. -Explain arms of government and their functions.	White Board, projector.	-	-	-What is the different between power separation and legislative processes? - What are the advantages and disadvantages of separation of power?

						-State functions of arms of government.
	General Objective 3.0: Know the general principles of constitutional and administrative Law					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
5 - 7	3.1 Define the term "constitution" 3.2 Describe the different kinds of constitutions. e.g Written, unwritten, Flexible and rigid constitutions etc. 3.3 Describe Presidential and Parliamentary system of government	-Discuss constitution and its types. -Explain presidential and parliamentary system of government.	-White board, projector	-	-	What do you understand by the term constitution? Differentiate between written, unwritten and rigid constitutions

Course: Principles of Law and Building Contracts		Course Code: BLD 216	Contact Hours: 2-0-0			
Course Specification: Theoretical Content						
	General Objective 4.0 Understand the statutory Acts, Edicts, Decrees, Bye-Laws etc.					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher"s Activities	Evaluation
- 10	4.1 Define Statutory act, Decrees, Edicts, Bye-laws and Regulations 4.2 Explain the importance of each in 4.1 above. 4.1 Explain promulgation process and their jurisdiction.	-Explain statutory act, degrees, edicts bye-laws and regulation -Discuss the importance of promulgation process and their jurisdiction.	White Board, Projector	-	-	-Define Statutory acts and Edicts -What are the importance of Bye-laws and legislation?
	General Objective 5.0: Understand the simple Building regulations and planning Laws.					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teacher"s Activities	Evaluation
11 -15	5.1 Explain Building regulations and planning laws 5.2 State the various Acts and statutes applicable to the erection of buildings.	-Explain building regulations and planning laws -Explain Acts and statutes applicable to building erection.	White board, projector	-	-	What are the building regulations and planning laws? Differentiate between Acts and statutes applicable to the erection of building.

	Assessment: Coursework - 20%; Course Test - 20%; Practical - 0%; Examination - 60% Competency: The student should be able to have the basic knowledge of law and building regulations. References: 1. I.E. Sagay “Nigerian Law of Control” Spectrum Lawseries 2. Kodilinye and Aluko “Nigerian Law of Torts” Spectrum Lawseries			

PROGRAMME: NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Calculus (MTH 211)		**COURSE CODE:** MTH 211	**CREDIT HOURS: 1** **CREDIT UNIT: 2**	
GOAL: 1.0:				
COURSE SPECIFICATION: THEORETICAL CONTENT 1		**COURSE SPECIFICATION:** PRACTICAL CONTENT 0		
SEMEATER:	**Pre-requisite**			

GENERAL OBJECTIVE :

On completion of this course the student will be able to:

1.0 Understand the basic concepts of differential calculus and its application in solving engineering problems.
2.0 Know integration as the reverse of differentiation and its application to engineering problems.
3.0 Understand first order homogenous linear ordinary differential equation's with constant coefficients as applied to simple circuits.
4.0 Understand the basic concepts of partial differentiation and apply same to engineering problems.

COURSE: CALCULUS		Course Code: MTH 211	Contact Hours 2			
Course Specification: Theoretical Content 2				Practical 0		
	General Objective: 1.0 Understand the basic concepts of differential Calculus and in application in solving engineering problems					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

1 - 4	1.1 Define limits with examples 1.2 State and prove basic theorems on limits 1.3 Prove that lim sin θ/θ, lim Tan θ/θ = 1 asθ60 1.4 Define differentiation as an incremental notation or a function. 1.5 Differentiate a function from first principles. 1.6 Prove the formulae for derivative of functions, Function of a function, products, and quotient of functions. 1.7 Differentiate simple algebraic, trigonometric, logarithmic, exponential, hyperbolic parametric, inverse and implicit functions. 1.8 Derive second derivative of a function. 1.9 Apply differentiation to simple engineering and technological problems. 1.10 Explain the rate of change of a function 1.11 Explain the condition for turning point ofa function. 1.12 Distinguish between maximum and minimum value of a function. 1.13 Sketch the graph of a function showingits maximum and minimum points and points of inflexion.	• Teachers are to give and solve simple engineering and technological problems	Chalkboard, textbooks, lecture notes, chalk			

COURSE: CALCULUS		Course Code: MTH 211	Contact Hours 3/0/0			
Course Specification: Theoretical Content						
	General Objective: 1.0 Understand the basic concepts of differential Calculus and in application in solving engineering problems					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation
1 - 4	1.14 Estimate error quantities from thesmall increment of afunction. 1.15 Determine the tangent to acurve. 1.16 Determine the normal to acurve.	• Teachers are to give and solve simple engineering and technological problems	Chalkboard, textbooks, lecture notes, chalk			
	General Objective 2.0: Know integration as the reverse of differentiation and its application to engineering problems					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

5 - 8	2.1 Define integration as the reverse of differentiation. 2.2 Explain integration as a limit of summation of a function. 2.3 Distinguish between indefinite and definite integrals. 2.4 Determine the indefinite and definite integrals. 2.5 Determine the definite integral of a function. 2.6 Integrate algebraic, logarithmic, trigonometric and exponential simple functions. 2.7 List possible methods of integration. 2.8 Integrate algebraic and trigonometric functions by the substitution method 2.9 Integrate trigonometric and exponential functions byparts 2.10 Integrate algebraic functions by partial fraction. 2.11 Integrate trigonometric andlogarithmic functions applying reduction formula. 2.12 State standard forms of some basic integrals. 2.13 Calculate length of arc, area under a curve, area between two curves, volume of revolution, center of gravity, center of surface area, second moment and moment of inertia.	Ask students to apply integral calculus to simple function	-do-			

COURSE: CALCULUS		Course Code: MTH 211	Contact Hours 3/0/0			
Course Specification: Theoretical Content						
	General Objective 2.0: Know integration as the reverse of differentiation and its application to engineering problems					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5 - 8	2.14 Define Trapezoidal and Simpson's rule as methods of approximating areas under given curves. 2.15 Find approximate area under a curve applying Trapezoidal method. 2.16 Find approximate area under a curve applying Simpson's rule. 2.17 Compare result obtained from Trapezoidal and Simpson's rules with the results by direct integration. 2.18 Apply integration to kinematics.	Ask students to apply integral calculus to simple function	-do-			
	General Objective 3.0: Understand first order homogenous linear ordinary equations with constant coefficients as applied to simple engineering problems					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

9 - 12	3.1 Define first order differential equation 3.2 List order, degree, general solution, boundary or initial conditions and particular solution of differential equations. 3.3 List examples of various types of first order differential equations. 3.4 Define first order homogenous differential equations 3.5 List the methods of solving differential equations by separable variables. 3.6 Identify differential equations reducible to the homogenous form. 3.7 Explain exact differential equations. 3.8 Solve exact differential equations, e.g. Show that $(3x^2 + y \cos x)\,dx + (\sin x - 4y^3)\,dy = O$ is an exact differential equation; Find its general solution. 3.9 Define integrating factors.	Ask students to apply differential equation to solve engineering problerns	-do-			

COURSE: CALCULUS	Course Code: MTH 211	Contact Hours 3/0/0			
Course Specification: Theoretical Content					

	General Objective 3.0: Understand first order homogenous linear ordinary equations with constant coefficients as applied to simple engineering problems					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
9 - 12	3.10 Determine the solution of differential equations using integrating factors. 3.11 Define linear differential equations of the first order.	Ask students to apply differential equation to solve engineering problerns	-do-			
	General Objective 4.0: Understand the basic concepts of partial differentiation and apply same to engineering problems					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
13 - 15	4.1 Define partial differentiation 4.2 List and explain the uses of partial derivatives. 4.3 Solve problems on partial differentiation. e.g. f (x, y) = $x^2 + y^2 = 2xy$, find dy/dx, dx/dy 4.4 Apply partial differentiation to engineering problems.	• Solve problems on partial differential	-do-			
	Assessment: The continuous assessment, test and quizzes will be awarded 40% of the total score. The end of the semester Examination will make up for the remaining 60% of the score					

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Introduction to Computer Using Packages		**COURSE CODE:** COM 101	**CREDIT HOURS: 4** **CREDIT UNIT: 3**	
GOAL: This course is designed to students needed Skill required to Appreciate Computers and Associated Packages.				
COURSE SPECIFICATION: THEORETICAL CONTENT 2		**COURSE SPECIFICATION:** PRACTICAL CONTENT 2		
SEMEATER:	**Pre-requisite**			
1.0	**GENERAL OBJECTIVE** : On completion of this course the student will be able to : To give the students the skill needed to appreciate the use of computers and specialist software Packages in a competent manner, within their own engineering technology specialty. The learning methodology should be student centered, with the student using various available packages in order to be competent when using them. The use of student workbooks or guided learning materials is recommended			

Course: Introduction to Computing Using Packages	Course Code: COM 101	**CREDIT HOURS: 4** **CREDIT UNIT: 3**			
Course Objectives: To give the students the skill needed to appreciate the use of computers and specialist software Packages in a competent manner, within their own engineering technology specialty. The learning methodology should be student centered, with the student using various available packages in order to be competent when using them. The use of student workbooks or guided learning materials is recommended.					

Key Objectives: The outcome from the learning process should be that the student would be able to do the following.

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
	1.1 Define what is meant by a computer. 1.2 Narate the history of computer development (briefly) 1.3 State the uses of computers and understand the impact of the PC on computer technology. 1.4 Differentiate between hardware and software 1.5 Appreciate the input-process- output algorithm a. Central processor b. Input mechanism c. Output mechanisms 1.6 Know how data is stored a. RAM b. ROM c. Fixed discs d. Removable disk	• Define what is meant by aComputer. • Teach the history of Computers developments. (Briefly) Teach the uses of computers and the impact of PC on the society: home, office, banks etc. • Explain the need for data storage. Dismantle a computer system and show the students the RAM card, the Hard	• Maximum of 4 students to 1 computer • Maximum of 4 computers to a printer except when a Net work is in use. • 1 Ream of A4 papers to 10 students. - 4 Ink cartridge per printer per semester.			

	e. Discs Flash drive 1.7 Understand the concept of an operating system a. PC-DOS/MS-DOS b. Windowssh c. machinto d. Linux e. Unix	Disk and the Processors. Explain the concept of an operating system.				

Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
3	Access computers correctly through Windows operating system. Open/Close a window Program Manager Button bars/scroll bars/menu bars moving from one window to another	• Discuss the advantage of the Windows Operating System. • Explain the windows menu and tools. Each student must be given an opportunity to start a computer, open/close the window operating system, understand the program manager and move around in the windows environment.				
4	a. Understand file management and how to manage files b. Creating a file and folder c. Manipulating files (moving, copying, saving, deleting) d. Print manager	• Explain the process of creating a file, manipulating the file and use of the print manager.				
	Understand the concept of a software package a. MS Office b. Archicad	• Load MS Office with the students and explain the various packages that make up MS Office. Load and discuss its use with the students.				

5 - 6	Demonstrate ability in the competent use of a word-processing package such as MS Word (or equivalent standard) a. Entering text b. Formatting text (emboldening, font size, italicising) c. Creating and Saving textfiles d. Editing and moving text e. Importing objects	• Demonstrate the installation ofMS Words. • Identify the different features of the software. • Ask students to type a short document and save it. Ask students to edit a document and carry out a spelling check. • Demonstrate the use of tables.				

Course: Introduction to Computing		Course Code: COM 101	Contact Hours: 2-1 - 2			
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5 – 6	f. Spelling and Grammar Checking g. Creating and manipulating tables, text boxes, equations h. Printing	• Demonstrate the installation of MS Words. • Identify the different features of the software. • Ask students to type a short document and save it. Ask students to edit a document and carry out a spelling check. • Demonstrate the use of tables.				

7 - 8	Demonstrate ability in the competent use of a graphics package such as Corel Draw (or equivalent standard) a. Drawing tools b. Text asgraphics c. Creating and saving imagefiles d. Editing and moving images e. Importing and exporting graphics f. Windows „Clipboard"facility g. Creating and manipulating images (re-sizing etc) h. Image file standard (JPEG, PCX, GIFetc) i. Printing	• Load CorelDraw. • Explain features of the softwares. • Demonstrate the creating and saving of images. • Edit the imagessaved. • Export the graphics to otherpackages • Demonstrate the manipulation (re- sizing) ofimages.				

9 - 11	Demonstrate ability in the competent use of a spread sheet package such as MS Excel (or equivalent standard). a. Setting upthe worksheet b. Enteringdata c. Formatting data (decimal places, alpha-numeric)	• Load MSExcel. • Explain features of thesoftware. • Create a worksheet and editit. • Demonstrate how to format a workshop.				

Course: Introduction to Computing		Course Code: COM 101	Contact Hours: 2-1 - 2			
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
9 - 11	d. Creating and savingworksheets e. Creating a formula in cells f. Importing objects g. Exporting the worksheet h. Creating and manipulating graphical representations of data i. Printing	• Load MS Excel. • Explain features of the software. • Create a worksheet and edit it. • Demonstrate how to format a workshop.				

12-13	Demonstrate ability in the competent use of a database package such as MS Access (or equivalent standard) a. Drawing tools b. Text asgraphics c. Creating & saving imageiles d. Editing &moving images e. mporting & exportinggraphics f. indows „Clipboard" facility g. Creating & manipulating images (re-sizing etc) h. Image file standards (JPEG, PCX, GIFetc) i. Printing	• Load MSAccess. • Explain the features and working of the software. • Use students record as example and enter the records in the structure query modify and produce typical report. • Show how to index and sort files in alphabetical order.				

Course: Introduction to Computing		Course Code: COM 101	Contact Hours: 2-1 - 2			
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
14-15	Use the Internet to retrieve information. a. World WideWeb (WWW) Download information b. Paste retrieved information into an appropriate application c. Use e-mail to send and receive messages. d. National and internationale-mail e. E-mailattachments f. (sending & receiving)	• Show students how to look on to the Internet. • Write and send an email. • Surf the net.				
	Assessment: Coursework 10%; Course test 10%; Practical 20%; Examination 60%. Competency: The student should be expose to understand basic computer programming. Reference: Chapra, S.C. and Canale, R.P. “Introduction to Computing for Civil Engineers, Mcgrew hil, 1994 Press, W.H., Teukolsky, S.A., Vetterling, W.T. and Fannery, B.P. “Numerical recipes”. Cambridge Univ. Press, 1993.					

ND II SEMESTER II

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY					
COURSE: Introduction to Structures Design and Detailing		**COURSE CODE:** BLD 221		**CREDIT HOURS: 4** **CREDIT UNIT: 2**	
GOAL: This course is Designed to enable students understand the principles of structures and detaining.					
COURSE SPECIFICATION: THEORETICAL CONTENT 1		**COURSE SPECIFICATION:** PRACTICAL CONTENT 3			
SEMEATER:	**Pre-requisite**				
	GENERAL OBJECTIVE: On completion of this course the student will be able to: 1.0 Know how to determine reactions, Bending Moments, shear force values. 2.0 Understand the nature of sudden failure, buckled shapes and effective lengths 3.0 Understand Framed Structures 4.0 Understand the Design of Simple Structural Elements				

COURSE: Introduction to Structures Design and Detailing	Course Code: BLD 221	Contact Hours:14			
COURSE SPECIFICATION: Theoretical content. 1		Practical 3			

	General Objective 1.0: Know how to determine reactions, Bending Moments, shear force values.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1 - 4	1.1 Define the terms strut 1.2 Illustrate the end fixture of columns. 1.3 Determine effective column length and slenderness ratio. 1.4 Determine the strength of columns. 1.5 Determine Euler's crippling load on different and conditions	• Lecture give examples	• White/marker Board	Identify Column, compression members and forces in struits structure. Use 15cm and 30cm pressure rulers to show the various crippling loads for short and long columns	• Guide the students to identify struts in structures Guide students to see how short column will withstand higher crippling forces before failing	• What is a strut? • List the factors that affect the strength of column State the formula for Euler's crippling load for a pin-ended strut
	General Objective 2.0: Understand the nature of sudden failure, buckled shapes and effectivelengths.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5- 7	2.1 Explain elastic buckling modes with different conditions. 2.2 Determine the buckled shapes and effective lengths. 2.3 Explain how to avoid	• Lecture giveexamples	• White/marker Board	Use Perspex ruler to show buckling a. illustrate Euler crippling load on different supports. b. Demonstrate elastic buckling modes with	Lead students to Use Perspex ruler to show buckling c. illustrate Euler crippling load on different supports.	Explain the mode of failure of short and long column Explain with the use of sketches how to avoid buckling in struts?

	buckling instruts.			different conditions.	Demons trate elastic bucklin g modes with	
	General Objective 3.0: Understand Framed Structures.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
8 - 9	3.1 Compare graphical and analytical methods of determination of forces in members of roof trusses and statically determinate plane frames. 3.2 Compute the forces in a given framed structure.	• Lecture give examples	• White/marker Board	Carry out analytical and graphical determination of forces in trusses and both statically determinants plane frames	Guide the students to carry out resolution of forces both analytically and graphically	
	General Objective 4.0: Understand the Design of Simple Structural Elements.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
10 - 11	4.1 Determine loads to be carried by slabs and beams. 4.2 Determine moments of resistance of TEE and ELL beams with tensile reinforcement only EURO CODE	• Lecture and give examples. • Make students carry out good details.	• White/marker board	• Estimate loads on slabs • -Self-weight, Screeding Plaster, Partitions life loads • Estimate loads on beams - Loads from slabs and self-weight of beam. Design simple rectangular beam by the EUROCODE Bring a derailed drawing to be method by the student. Identify TEE beam as internal and edge beams as ell either in the class or on site	• Guide the students to be able to calculate these loads using their various densities Guide students to know the weight slab being transfer to which beam Guide students to make observations on the detailed drawings Guide the students to apply $K \leq 0.156$ for tension reinforcement	• Estimate the load on a 15cm thick slab in an office if screeding is 3cm and plaster is 2.5cm and live load is $2.5kl/m^2$ Determine the ultimate moment to be carried out by a T-beam spaced at 3m intervals given that h_f=15cm, h=45cm,

						b_u=25cm f_{cu}=25N/mu^2 and f_y=410N/mu^2
13 - 14	4.4 Explain the various types of concrete and reinforced concrete foundations. 4.5 Explain the general principles governing the design of foundations. 4.6 Design load bearing walls and isolated footings. 4.7 Explain the elementary principles of bolted, riveted and welded joints.	Explain the various types of concrete and reinforced concrete foundations. Explain the general principles governing the design of foundations. Design load bearing walls and isolated footings. Explain the elementary principles of bolted, riveted and welded joints.	Samples of buildings	identify strip pad, raft, buoyancy piled foundation etc as various types of concrete and reinforced concrete foundation Illustrate the various types of concrete and reinforced concrete foundations.	Guide the students by sketching and showing where each is to be applied	in a desert area that is sandy, ten-storey building to be constructed Recommend the type of foundation suitable for the nature of the sand

1 - 15	d. Carryout graphical and analytical methods of determination of forces in members of roof trusses and statically determinate plane frames.	• Technologist to ensure practical work are carried out. - do - • Make students carry out good details.	• Strut buckling of strut apparatus. • Model frame work apparatus. • Whiteboard • Marker	•	•	•
	Assessment: Coursework: 20% Course test: 20% Practical 20% Examination 40% Competency: The students should be familiar with design of simple structural elements.. Reference: 1. Lerchroch. V.V. “Reinforced Concrete Structures design a Systematicguide” 2. Oladipo I.O. “Fundamentals of the design concreteStructure”					

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Building Construction IV		**COURSE CODE:** BLD 222	**CREDIT HOURS: 4** **CREDIT UNIT: 3**	
GOAL: Designed to enable students understand the principles in Building Construction				
COURSE SPECIFICATION: THEORETICAL CONTENT 1			**COURSE SPECIFICATION:** PRACTICAL CONTENT 3	
SEMEATER:	**Pre-requisite BDL 212**			
	GENERAL OBJECTIVE : On completion of this course the student will be able to:			
1.0 2.0 3.0	Understand the needs for External works around the Building Understand the general administration of Building Understand various requirements as Regards Fire precautions and regulations as applied to building			

Course: Building Construction IV		Course Code: BLD 222	Contact I urs: 3			
Course Specification: Theoretical Content 1				PRACTICAL 2		
	General Objective: 1.0 Understand the needs for External works around the Building					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1 - 7	1.1 Explain the essence of having external works around a building. 1.2 State the functions of external works eg fences and hedges, drainages, septic hard and soft landscaping etc 1.3 State the conditions for providing roads, pathways, and parking lots to buildings. 1.4 State the functions of sewage plants, e.g. septic tank, soak ways, manholes, inspection chambers, sewers etc. 1.5 Explain with illustration how the above sewage plants are constructed. 1.6 State the underlying principles in planning a good drainage system. 1.7 Explain the principles of landscaping to a given site layout including all items of external works.	Explain external works around a building and its functions. • Demonstrate with sketches during discussion. • Illustrate with sketches sewage plants, e.g. septic tank, soak ways, manholes, inspection chambers, sewers etc •	• White Marker board • Drawing equipment	• illustrate functions of external work around the buildings. • Understand working principles of septic tanks. • Sketch septic tank, soak ways, manholes, inspection chambers, sewers etc	• Show students external works around the buildings • Show students some sewage plants, e.g. septic tank, soak ways, manholes, inspection chambers, sewers etc • Guide students to sketch. • Site visit	. Explain functions of external works eg fences and hedges, drainages, septic hard and soft landscaping etc • Explain with sketches the construction process of sewage treatment plants

	General Objective 2.0: Understand the general administration of Building.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
8 - 11	2.1 Explain the responsibilities of the various parties involved in the building industry-Client, Architect, Quantity surveyor, Builders etc 2.2 Define contract, different types of contracts, signing and completion of contracts. 2.3 Describe the different types of tendering Procedures.	. Discuss the responsibilities of the various parties involved in the building industry-Client, Architect, Quantity surveyor, Builders etc Explain contracts and tendering procedures.	• White Marker board •	•	•	• list the parties involves in construction project. •
	2.4 Explain the method of site layout and organization, reconstruct planning services on site, safety and security	Illustrate with sketch site layout and Organization.	• White Marker board /.projector	Understand the method of site layout of construction site		Draw site layout of a construction site.
	General Objective 3.0 Understand various requirements as Regards to Fire precautions and regulations as applied to building.					
Week	Specific Learning Outcomes	Teacher's Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

12 - 15	3.1 List fire-fighting equipment in buildings. 3.2 Describe means and routes of escape. 3.3 List fire precautions in building 3.4 Define fire resistance materials in building. 3.5 Describe various burglar-proofing materials in buildings. 3.5 Describe Fixing of burglar-proof	• Discuss with drawing fire-fighting equipment in buildings.. • Use questions and answers to discuss.	• White/Marker board	.Identify fire-fighting equipment in buildings .Sketch different fire-fighting equipment in buildings	Explain with sketches the different fire-fighting equipment in buildings. •	• Draw fire-fighting equipment in buildings . List fire resistance materials in building. •
	Assessment: Coursework: 20%, Course Test 20%, Practical: 0%, Examination: 60% Competency: The Student should be able to carry out external work, general administration of building construction including precautions against fire References: 1. Hall, F. Plumbing Cold Water supplies, drainage Butler, J. T. Element of administration for building students					

PROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY		
COURSE TITLE: Workshop Practice and Technology IV	**COURSE CODE: BLD 223**	**CONTACT HOURS: 3- HRS/WEEK** **CREDIT UNIT: 2**
COURSE SPECIFICATION: Theory 0		**Practical Content**: 3 HRS/WEEK
Goal: This course is designed to provide students with knowledge in Workshop practice		
General Objectives:		
On completion of this module students should be able to :		
1.0	Understand Electrical Installation Involved in the building process	
2.0	Understand Electrical Installation Involved in the building process	
3.0	Know the construction of a small model Building complete with all essential	

Course: Workshop Practice & Technology IV		Course Code: BLD 223	Contact Hours: 3			
Course Specification: Practical Content						
	General Objective 1.0: Understand Electrical Installation Involved in the building process					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1	1.1 Describe the safety precautions required in workshops and site. 1.2 Describe how human body can become part of electric circuit and remedy such as: severe shock and artificial respirations 1.3 Describe electrical symbols and regulations with special reference to I.E.E. Regulations 1.4 Identify tools and equipment used in simple electrical works and their maintenance requirements. 1.5 Identify accessory types in use, e.g. ib, Sw, dfb, ccu plug and the like. Main switches, fuses, distribution boards and other protective systems, e.g. ELCB.	Explain the safety precautions required in workshops and site e.g. how human body can become part of electric circuit and remedy, severe shock and artificial respirations Describe electrical symbols and regulations with special reference to symbols and regulations with special reference to I.E.E. Regulations • Identify tools and equipment used in simple electrical works and their maintenance requirements. • Identify accessory types in use, e.g. ib, Sw, dfb, ccu plug and the like. Main switches, fuses, distribution board sand other protective systems, e.g. ELCB.	• Workshop Chalkboard	• Use safety precaution kit	• Use safety precaution kit	• List the advantages of the use of safety precaution kit.

2	1.5 Explain the process of electricity generation, transmission anddistribution. 1.6 Describe the different types of generators used on site with emphasis on portable generators. 1.7 Explain electrical power distribution systems, e.g. I and 4 wire system forboth A.C. & D.C. 1.8 Explain the meaning of power factor and the effect of power factor on cable sizes.	• Explain generation, transmission and distribution ofelectricity • Explain AC, DCsystems. Explain the process of electricity generation, transmission anddistribution, types of generators used on site with emphasis on portable generators, 1.6 Explain electrical power distribution systems, e.g. I and 4 wire system forboth A.C. & D.C. 1.8 Explain the meaning of power factor and the effect of power factor on cable sizes.	• Workshop Chalkboard	•	•	•
3	1.9 Describe types of cables and where they are used 1.10 Identify cable colours and regulations applicable. 1.11 Describe the current rating of cables, cable joints. 1.12 Describe soldering techniques and regulations applicable.	• Explain types of cables and where they are used Explain the current rating of cables, cable joints. • Soldering techniques and regulations applicable	• Workshop Chalkboard • Consumables(cables)	• Identify cable colours and regulations applicable. • Demonstrate Soldering of cables	• guide students to identify cable colours and solder cables	Explain types of cables and where they are used. Explain different soldering techniques

	General Objective 2.0: Understand Electrical Installation Involved in the building process					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
3	1.13 Describe how to prepare cables for use 1.14 Describe how to install the following electrical wiring-conduit and surface.	1.15 Explain how to prepare cables for use Explain how to install the following electrical wiring-conduit and surface.	• Workshop whiteboard • Consumables(cables)	• Prepare cables for use Demonstrate the installation of conduit and surface wiring systems.	Assist in Preparing cables for use And demonstrate the installation of conduit and surface wiring systems.	Explain process of installation of conduit and surface wiring systems.
4	1.15 Describe PVC pipes. 1.16 List the types of conduits pipes for electrical installation.	• Describe PVC pipes. • Explain bending, cutting and threading of conduit pipes.	• Workshop Consumables: • PVC Conduit pipes	Carry out bending, cutting and threading of conduit.	• Show the students PVC conduit and demonstrate bending, cutting and threading of conduit.	• Explain bending, cutting and threading of conduit pipes.
5	1.18 Explain the following wiring diagrams: simple lighting points wiring one-way, two-way, and intermediate switches. 1.19 Explain series and in parallel circuits in electrical installation	• Explain process of wiring such as one way, two way and intermediate switches.	• Workshop consumables e.g. wires, switches, light points, (lamp holders) etc.	• Demonstrate the following practical wiring diagrams: simple lighting points wiring 1-way, two-way, and intermediate switches. • Illustrate series, parallel and series in parallel circuits	• Demonstrate the following practical wiring diagrams: simple lighting points wiring 1-way, two-way, and intermediate switches. • Illustrate series, parallel and series in parallel circuits	• Explain process of wiring: One way, two way and intermediate switches.

6	1.20 Explain wiring Socket outlet plugs looping system 1.21 Prepare conversion from one-way to two-ways electrical bells and indicating systems. 1.22 Describe regulations applicable to earthing systems.	• Explain wiring of Socket outlet plugs looping system, conversion from one- way to two-ways electrical bells and indicating systems. 1.23 Describe regulations applicable to	• Workshop • consumables. Wire Socket, outlet plugs, electrical bells.	• Demonstrate wiring of Socket outlet plugs looping system, conversion from one-way to two-ways electrical bells and indicating systems. •	Guide students in the demonstration wiring of Socket outlet plugs looping system, conversion from one-way to two-ways electrical bells and indicating systems. •	•

Course: Workshop Practice & Technology IV	Course Code: BLD 206	Contact Hours: 0-0-4			
Course Specification: Practical Content					
	General Objective 3.0:Know the construction of a small model Building complete with all essential services and finishes				
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific learning Outcome	Teachers Activities	Evaluation
7-14	2.1 List basic instruments used for setting out a building. 2.2 Explain the use of the tools listed in 2.1above 2.3 Describe the process of Setting out the first course of walling for door opening, windows and their openings, wall to lintel level, Casting of lintels. 2.4 Explain process of the following: 2.5 Construct wall up to roof level 2.6 Carry out roof construction 2.7 Fix appropriate roof covering 2.8 Fix window and doorframes 2.9 Fix doors and windows 2.10 Fix pipes for plumbing and electrical works. 2.11 Fix plumbing and sanitary appliances in appropriate positions 2.12 Carry out ceiling construction 2.13 Fix ceiling boards.	Explain tools used for setting out a building Set out a building Explain how to set out 1st course of walling for door opening, doors and windows. Explain laying block wall to lintel level Explain construction of roof. Explain fixing of fittings like doors and windows Describe fixing of further fittings e.g. services (plumbing). • Construct wall up to roof level • Carry out roof construction • Fix appropriate roof covering • Fix window and doorframes • Fix doors and windows • Fix pipes for plumbing and electrical works. • Fix plumbing and sanitary appliances in appropriate positions • Carry out ceiling construction Fix ceiling boards.	• Workshop consumables (pegs, nails, battens, line builder"s square) .	• Demonstrate the use of the tools listed in 2.1above • Set out the first course of walling for door opening. • Construct wall to window level. • Set out the various windows and their openings • Construct wall to lintel level • Cast lintels • Construct wall up to roof level • Carry out roof construction • Fix appropriate roof covering • Fix window and doorframes • Fix doors and windows • Fix pipes for plumbing and electrical works. • Fix plumbing and sanitary appliances in appropriate positions • Carry out ceiling construction Fix ceiling boards.	Assist students to construct a small model building.	• Explain process of constructing a small model building.

15			• Workshop consumables • Cement • Sand plastering tools.	• Plaster walls internally and externally • Lay appropriate floor finishes • Fix wall and floor tiles as required • Correlate electrical wiring • Fix electrical fittings	Plaster walls internally and externally Lay appropriate floor finishes Fix wall and floor tiles as required Correlate electrical wiring • Fix electrical fittings	•
	Assessment: Coursework: 20% Course test: 20% Practical: 0% Examination: 60%					

PROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY		
COURSE TITLE: Introduction to Programming Visual-Basic	**COURSE CODE: COM 102**	**CONTACT HOURS: 3 HRS/WEEK** **CREDIT UNIT: 3**
COURSE SPECIFICATION: Theory 1h		**Practical Content**: 2h
Goal: Equip students with the principles of program mining		
General Objectives:		
On completion of this course students should be able to :		
1.0	Develop basic programming skills	
2.0	Implement programming concept using BASIC	
3.0	Define Q-BASIC expressions	
4.0	Use Q-BASIC Functions	
5.0	Use Q-BASIC syntax	
6.0	Use Q-BASIC Environment	
7.0	Use Simple programs	

Course: Introduction to Programming using Visual Basic		Course Code: COM 102	Contact Hours 3			
Course Specification: Theoretical Content 1				Practical 2		
	General Objective 1.0: Develop basic programming skills					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1 - 2	Explain Computer Programming. Define programming Define Algorithm Outline basic steps in developing algorithm Write simple algorithm to solve simple problem Explain Flowchart Identify Flowchart symbols Draw Flowchart of the algorithm in 1.2.2	• Define program and give examples • Give real- life example relating to the student"s trade e.g Building process, Chair making process • Draw different Flow chart symbols and explain each • List different programming languages • Give the features of HLL and LLL • Give definitions of translators	Charts			
	General Objective 2.0: Implement programming concept using BASIC					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation

3	2.1 State BASIC character set 2.2 State BASIC variable names 2.3 Describe variable name formation 2.4 Form variable names 2.5 Define identifiers 2.6 Classify identifiers e.g string, numeric, realetc	• List the basic character • Set e.g. Alphabets, digits, • special character • Explain how variable names are formed • Differentiate between identifiers and variable names				
	General Objective 3.0: Use Q-BASIC expressions					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	Teachers Activities	Evaluation
4	3.1 Explain arithmetic expressions 3.2 Explain relational expressions 3.3 Explain logical expressions	• Give examples of arithmetic, relational and logical expressions				

Course: Introduction to Programming using Visual Basic		Course Code: ICT 102	Contact Hours 0/0/2 Practical simultaneously			
Course Specification: Theoretical Content						
	General Objective 4.0: Use Q-BASIC Functions					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
5	4.2 Explain Functions 4.3 Explain in-built functions 4.4 Explain user defined functions	• Give examples of in-built and user defined functions				
	General Objective 5.0: Use Q-BASIC syntax					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
6	5.1 Explain READ/DATA Statements 5.2 Explain INPUT Statements 5.3 Explain REMARK Statements 5.4 Explain PRINT Statements	• Illustrate the use of the different statements with examples				
	General Objective 6.0: Use Q-BASIC Environment					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation

7-8	6.1 Explain how to enter the Q-BASIC Editor 6.2 Explain how to key in programs 6.3 Explain how to save Q-BASIC programs 6.4 Explain how to debug Q- BASIC program	• Get student to switch on to the Q-BASIC • Show the student how to enter the Q- BASIC Environment • Open the Editor • Instruct the student to SAVE, RUN and DEBUG the program • PRINT results	• PCs, Q-BASIC Software • Printer	•	•	•

Course: Introduction to Programming Concepts using Q-Basic		Course Code: ICT 102	Contact Hours 0/0/2 Practical simultaneously			
Course Specification: Theoretical Content						
	General Objective 7.0: Use Simple programs					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
9-14	7.1 Write Simple programs 7.2 Run the programs 7.3 Print program result 7.4 Explain Control Statements 7.5 Explain Branching statements 7.6 Explain IF-THEN-ELSE 7.7 Explain FOR-NEXT	• Write program to illustrate the use ofIF-THEN-ELSE and FOR-NEXT • Give the student programming projects embracing all concept that have been taught in their areas of trade	PCs, Q-BASIC Software Printer			
15	Write simple programs using the different statement and constructs					
	Assessment: Coursework 20%; Course test 20%; Practical 10%; Examination 50%. Competency: The student should be able to use Qbasic to write programs for Civil Engineering works.					

PROGRAMME: NATIONAL DIPLOMA IN BUILDING TECHNOLOGY		
COURSE TITLE: Maintenance Technology	**COURSE CODE: BLD 224**	**CONTACT HOURS: 2- HRS/WEEK** **CREDIT UNIT:2**
COURSE SPECIFICATION: Theory 2h		**Practical Content**: 0h
Goal: This course is designed to provide students with knowledge of Maintenance of Building		
General Objectives:		
On completion of this module students should be able to :		
1.0	Understanding the meaning of the terms used in maintenance and repairs and related facilities.	
2.0	Understanding the ground geological fault and their effect on building.	
3.0	Understanding the types of defects which affect brick, block works and masonry and remedies for them	

Course: Maintenance Technology	Course Code: BLD 224	Contact Hours: 2- Credit Unit:			
Course Specification: Theoretical Content					

	General Objective 1.0: Understanding the meaning of the terms used in maintenance and repairs and related facilities.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
1 - 3	1.1 Define maintenance 1.2 Define the terms used in repair and maintenance of buildings and related facilities 1.3 Explain reasons for various maintenance of building. 1.4 Classify maintenance.	• Explain the meaning of maintenance. • Explain the various terms used in building maintenance explain different types of maintenance.	• Chalkboard, chalk, duster	•	•	• Explain building maintenance
	General Objective 2.0: Understanding the ground geological fault and their effect on building.					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
4 - 6	2.1 Identify causes of foundation failures in building. 2.2 List the effects of foundation failures on the walls of buildings. 2.3 Explain ground faults and the remedies to foundations of Buildings. 2.4 Identify remedies to various foundation failures in building.	2.5 Explain causes of foundation failures in building. 2.6 Explain the effects of foundation failures on the walls of buildings. 2.7 Explain ground faults and the remedies to foundations. Explain remedies to various foundation failures in building.	Ditto			Explain the causes of foundation failures in Building

	General Objective 3.0: Understanding the types of defects which affect brick, block works and masonry and remedies for them					
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
7-9	3.1 State the types of defects in brick, sand crate, block, stone and timber walls respectively. 3.2 Explain the remedies for the defects in 3.1	Explain different types of defect in brick, sand crate, block, stone and timber walls respectively. Explain the remedies to the defects.	Ditto	Observe types of defects in brick, sandcrate, block, stone and timber walls respectively.	Show different types of defect in buildings	Explain remedies to defects in building.

Course: Maintenance Technology	Course Code: BLD 224	Contact Hours: 2-0-0			
Course Specification: Theoretical Content					
	General Objective 4.0: Understand the causes of defect and their remedies in low-rise buildings.				
Week	Specific Learning Outcomes	Teacher Activities	Resources	Specific Learning Outcomes	Teacher Activities	Evaluation
10 -15	4.1 State the types of defects in roofs. 4.2 Explain the causes of defects in roofs. 4.3 State simple methods of prevention and remedies for defects 4.1 Explain the cause and effects of rising damp and penetrating damp on structure and fabric e.g. walls, floors, roofs etc.	• Explain types of defects in roofs. • Explain the causes of defects in roofs. • Explain simple methods of prevention and remedies for defects. • Explain the cause and effects of rising damp and penetrating damp on structure and fabric e.g. walls, floors, roof setc.	White board& marker.			State the types of defects In roofs
	Assessment: Coursework: 20% Course test: 20% Practical: 0% Examination: 60%					

PROGRAMME:NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Site Management II	**COURSE CODE:** BLD 225	**CREDIT HOURS: 2** **CREDIT UNIT: 2**		
GOAL:. To equip students with the basic knowledge and skills of site administration and management				
COURSE SPECIFICATION: THEORETICAL CONTENT 2		**COURSE SPECIFICATION:** PRACTICAL CONTENT 0		
SEMEATER:	**Pre-requisite**			

	GENERAL OBJECTIVE : On completion of this course the student will be able to:
1.0 2.0 3.0 4.0	Understand the structural problems in site management and organization Understand the procedures of decision making. Understand the principles which govern effective communication in public and human relation. Understand the importance of planning and controlling in building production management..

COURSE: Site Management II		Course Code: BLD 225	Contact Hours: 2			
COURSE SPECIFICATION: Theoretical Content 2				PRACTICAL 0		
	General Objectives 1.0: Understand the structural problems in site management and organisation.					
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
1 - 2	1.1 Explain the principles of organizational structure. 1.2 Explain the term site management. 1.3 Explain the principles of administration and control. 1.4 Explain the effects of efficient site administration. 1.5 Explain site management functions with respect to the following: • Preparation of schedules. • Forecasting material requirements. • Processing and ordering of materials. • Storage, protection, transport, loading and handling. • Forecasting overall programmes, short term programmes, for easy targets. • Reports to head office. • Day works, variations, progress reports.	• Explain the principles of organizational structure. • Define site management • Explain the principles of administration and control as it relates to site management • Explain various types of management functions and their significant to site management	• White Marker board, projector, Textbooks, chart.	-	-	-

	• Time books, wages sheet. • Material logbooks. • Statutory diaries. • Statutory inspections					
	General Objective 2.0: Understand the procedures of decision making.					
Week	Specific Learning Outcome	Teacher"s Activities	Resources	Specific Learning Outcome	Teacher"s Activities	Evaluation
3 - 5	2.1 Explain the rationality of decision making.	• Define the concept of decision making process. • Discuss the critical approach to decision making process. • Explain the need for decision on Projects.				
	General Objective 3.0: Understand the principles which govern effective communication in public relations.					
Week	Specific Learning Outcome	Teacher"s Activities	Resources	Specific Learning Outcome	Teacher"s Activities	Evaluation
6 - 8	4.4 Describe the effect of communication on individual and group performance. 4.5 Explain different types of communication on construction sites 4.6 Give barrier to effective communication on site.	• Define communication • Explain the effect of communication on individual and group performance • Explain difference types of communication on construction site • Discuss how communication affects the individual and group performance. • Discuss industrial relation on typical construction site. • Discuss the effect of barrier to effective communication on site	White board marker, projector	-	-	-

	General Objective 4.0: Understand the importance of planning and controlling in building production management.					
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
9-13	4.1 Give the need to plan work. 4.2 Appreciate the reasons and advantages of planning.	• Explain to students the involvement of management in carrying out decisions, planning, communicating, coordinating, organizing, motivating, controlling and staffing at all levels. • Discuss the necessity of planning • Explain the advantages of planning • Discuss the techniques used in planning simple construction work using daily, and weekly bar charts . Programme and Analyze simple construction work	• White/Marker board	•	•	•
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
14-13	4.3 Explain work of measurement and method study. 4.4 Appreciate value of work- study to individual and organization.	• Differentiate between work measurement and method study • Explain value of work study to: 1. Individual 2. Organization	White board, projector	-	-	-
	Assessment: coursework: 20% Course Test 20% Practical 0% Examination 60% Competency: The Student should be able to manage a site and understand the application of works study to site Reference: 1. Cole G.A. "Management Theory and Practice" 5th Edition 2. Ivor H. Seeley "Building Economics" 4th Edition					

PROGRAMME: NATIONAL DIPLOMA BUILDING TECHNOLOGY				
COURSE: Entrepreneurship Development II		**COURSE CODE:** BLD 211	**CREDIT HOURS: 2** **CREDIT UNIT: 2**	
GOAL:.				
COURSE SPECIFICATION: THEORETICAL CONTENT 2		**COURSE SPECIFICATION:** PRACTICAL CONTENT		
SEMEATER:	**Pre-requisite**			

GENERAL OBJECTIVE :

On completion of this course the student will be able to:

1.0 Understand Financial Management
2.0 Know how to prepare simple accounts
3.0 Know simple cost preparation
4.0 Know product and job costing
5.0 Understand the Laws relating to formation of Companies of Companies
6.0 Comprehend Labour and Industrial Law
7.0 Understand Copyright and patent laws
8.0 Comprehend the nature of sale of goods

Course: Entrepreneurship Development II		Course Code: EED 221	Contact Hours: 1-0-1			
Course Specification: Theoretical Content						
	General Objective 1.0: Understand Financial Management					
Week	Specific Learning Outcome	Teacher Activities	Resources	Specific Learning Outcome	Teacher"s Activities	Evaluation
1 2	1.1 Define financial management 1.2 Explain sources and types of finding 1.3 Define the concepts of cost, price, revenue, profit and break-even point. 1.4 Explain financial statements e.g budgeting, balance sheet, profit and loss accounts, and cash flow budget. 1.5 Apply financial statements in business management.	• Explain financial management • Discuss sources and types of funding • Explain the concepts of cost, price, revenue, profit, break-even point • Discuss various types of financial statements • Discuss the application of financial statement in business management.	White/Marker board	-	-	=
	General Objective 2.0: Know how to prepare simple accounts.					
Week	Specific Learning Outcome	Teacher Activities	Resources	Specific Learning Outcome	Teacher"s Activities	Evaluation
	2.1 Dealing with assets 2.2 Preparing profit and loss statement. 2.3 Preparing balance sheet.	• Explain assets • Explain how to prepare profit and loss account • Explain balance sheet preparation	• White board Examples of a balance sheet.	•	•	•

3-8	General Objective 3.0: Know simple cost preparation					
	3.1 Determining labour costs. 3.2 Determining direct machine cost. 3.4 Determine Overheads: labour, machine, and general	• Explain how to determine labour cost • Discuss direct and machine cost •	White board Examples of a balance sheet	-	-	-
	General Objective 4.0: Know product and job costing					
	4.1 product costing 4.2 Job costing 4.3 Project costing	• Differentiate between product costing, job costing and project costing	. White board Examples of a balance sheet	-	-	-
	General Objective 5.0: Understand the Laws relating to formation of Companies of Companies					
	5.1 Identify the fundamental concepts in company law. 5.2 Explain memorandum and Articles of Association.	• Explain the fundamental concepts in company law • Differentiate between Memorandum and Articles of Association	White board, projector, copy of Memorandum and Articles of Association.	-	-	-

Course: Entrepreneurship Development II		Course Code: EED 216	Contact Hours: 1-0-1			
Course Specification: Theoretical Content						
	General Objective 5.0: Understand the Laws relating to formation of Companies of Companies					
9 10	5.3 Explain promoters, promotion and the prospectus. 5.4 Distinguish between shares and debentures. 5.5 Analyse the functions and powers of Directors, Secretaries and Auditors. 5.6 Explain liquidation of companies.	• Explain promoters, promotion and the prospectus • Distinguish between shares and debentures. • Explain the functions and powers of Directors, Secretaries and Auditors • Explain liquidation of companies	White board, projector, charts, video clipps	-	-	-
	General Objective 6.0: Comprehend Labour and Industrial Law					
Week	Specific Learning Outcome	Teacher Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
11 12	6.1 Analyse the laws relating to employer - employee relationship 6.2 Explain industrial safety laws. 6.3 Examine water and public health laws. 6.4 Evaluate land acquisition.	• Explain the law that relate to employer and employee relationship • Explain industrial safety laws. • Discuss water and public health laws • Explain land acquisition.	White/marker board	-	-	-
	General Objective 7.0: Understand Copyright and patent laws					
Week	Specific Learning Outcome	Teacher Activities	Resources	Specific Learning	Teacher's Activities	Evaluation

				Outcome		
	7.1 Explain copyrights. 7.2 Explain patent. 7.3 Explain rights and liabilities under the copyrights and patient laws. 7.4 Evaluate beach and remedies	• Explain copyrights and patent • Differentiate between copyrights and patent • Explain rights and liabilities under the copyrights and patient laws. • Discuss beach and remedies	White board, projector	-	-	-
	General Objective 8.0: Comprehend the nature of sale of goods					
Week	Specific Learning Outcome	Teacher Activities	Resources	Specific Learning Outcome	Teacher's Activities	Evaluation
14 - 15	8.1 Define contract of sale of goods 8.2 Distinguish sale of goods from other contracts e.g bastar, hire purchase and works and materials. 8.3 Explain duties of the parties. 8.4 Explain passing of properties and titles.	• Explain contract of sale of goods • Distinguish sale of goods from other contracts e.g bastar, hire purchase and works and materials • Explain duties of the parties. • Explain passing of properties and titles. •	White board, projector	-	-	-

Course: Entrepreneurship Development II	Course Code: EED 216	Contact Hours: 1-0-1			
Course Specification: Theoretical Content					
	Assessment: Course Work 20, Course test 20, Practical Examination 40 Competency: The students should be able to read and understand accounts and balance sheets, they should also have a knowledge of Nigerian Law as applied to business routine. A sound knowledge of financial control of a small business should be acquired. Assessment: Coursework 20% Course tests 20% Practical 0% Examination 60%. References: 1. A. E. Jenning “Accounting and Finance for Building and Surveying”Mamillam” 2. I. E. Sagag “Nigerian Law of Contract” spectrum LawSeries”				

INSTITUTION: .....

STRUCTURES LABORATORY

s/n	Equipment/tools	No Required	No Available	Shortfall	Remarks
1.	Two-hinged arch apparatus	1			
2.	Continuous beam apparatus	1			
3.	Deflection of beams apparatus	1			
4.	Bending moment and shear force apparatus	1			
5.	Elastic beam apparatus	1			
6.	Elastic deflection of frames	1			
7.	Struts buckling apparatus	1			
8.	Plastic bending of portal frames	1			
9.	Perfect or redundant trusses apparatus	1			

INSTITUTION: .....

SOIL MECHANICS LABORATORY

s/n	Equipment/tools	No Required	No Available	Shortfall	Remarks
1.	Consistency limit test apparatus	10			
2.	Compacting core machine	1			
3.	Compacting factor testing machine	1			
4.	Portable size distribution test apparatus	5			
5.	Compacting test apparatus	1			
6.	Cone penetrometer	1			
7.	Moisture content test apparatus	6			
8.	Specific gravity test apparatus	10			
9.	Density test apparatus	10			
10.	Le chateller test apparatus	5			
11.	V-B Consistometer test apparatus	1			
12.	Drying Ovens	3			
13.	Sample collecting trays and sample containers	10			
14.	150mm cube moulds	30			
15.	150mm cylindrical moulds	30			
16.	Balances	2 of each			
17.	Vicat apparatus	2			
18.	Thermometer	5 of each			
19.	Cement lineness test apparatus	2			
20.	Measuring cylinders	5			
21.	Soil hydrometer	5			
22.	Crucibles, spatulas, filter, paper funnel and vernier caliper	Assorted			
23.	Dessicatus	6			
24.	Curing tank	1			
25.	Stop watches	10			
26.	Beam moulds	4			
27.	Crushing Machine	1			
28.	Whiteboard	1			
29.	Set of sieve	7 set			
30.					

INSTITUTION: .....

CARPENTARY AND WOOD WORKSHOP

s/n	Equipment/tool	No Required	No Available	Shortfall	Remarks
	Planes and Saws				
1.	Jack planes	6			
2.	Smoothing planes	6			
3.	Block planes	6			
4.	Shoulder planes	6			
5.	Rebate planes	6			
6.	Grooving/Plough planes	6			
7.	Bull nose planes	6			
8.	Jointing planes	6			
9.	Rip saws	6			
10.	Cross cut/hand saws	6			
11.	Tenon saws	6			
	Chisels				
12.	Ordinary firmer (set-3mm, 6mm, 12mm, 18mm and 25mm)	6 sets			
13.	Bevel-edge firmer (set-3mm, 6mm, 12mm, 18mm and 25mm)	6 sets			
14.	Mortice (set-6mm, 9mm and 12mm)	6 sets			
	Bits				
15.	Centre	5 sets			
16.	Auger	5 sets			
17.	Twist	5 sets			
18.	Counter-sink	5 sets			
19.	Rose	5 sets			
20.	Gimlet	5 sets			
	Driving/striking tools				
21.	Screw drivers (set of 6)	10 sets			
22.	Mallet	6			
23.	Claw hammer	6			
24.	Plane hammer	6			
	Cramps				
25.	Sash	6 sets			
26.	Gee ("G") cramp	6			

27.	Corner	6			
28.	Bench-hold fast	6			
	Gauges, Knives, etc				
29.	Marking gauges	5			
30.	Mortice gauge	5			
31.	Combined gauge	5			
32.	Cutting gauge	5			
33.	Marking knives	5			
34.	Vernier Knives	5			
35.	Try square	5			
36.	Mitre square	5			
37.	Four-fold wooden ruler metric	5			
38.	Metric measuring tapes (6m)	5			
	Powered Hand Tools				
39.	Circular saw	4			
40.	Drills	4			
41.	Disc sander	4			
42.	Jig saw	4			
43.	Blower	4			
44.	Sprayer	4			
45.	Grinding machines	2			
46.	Sharpening machines	2			
47.	Grinding stones	5			
48.	Grinder for long blades, eg. surface plane	1			
49.	Glue spreader	30			
50.	Glue heater (electric)	2			
	Machines				
51.	Circular sawing machine	1			
52.	Surfacer	1			
53.	Spindle moulder	1			
54.	Mortiser (chisel and chain)	1			
55.	Drilling machine	1			
56.	Lathe machine	1			
57.	Combination machine (D9) (performs combination of functions, thus can serve as substitute)	1			
	Miscellaneous				
58.	Triangular files	6 sets			
59.	Flat files	6 sets			

60.	Scrapers (flat)	6 sets			
61.	Scrapers (cabinet)	6 sets			
62.	Dividers	6 sets			
63.	Round files	6 sets			
64.	Spoke shaves	6 sets			
65.	Wood-workers pencils	40			
66.	Saw vices	5			
67.	Oil cans	5			
68.	Bench stop (metal type)	5			
69.	Paint brushes	10 sets			
70.	Paint containers	10			
71.	Putty knives	10			
72.	Glue brushes	10			
73.	Glue pots	30			
	Utilities				
74.	Work benches	16			
75.	Hangers for dresses	32			
76.	Display board	2			
77.	Whiteboard	1			
78.	Safety chart	5			
79.	Fire extinguisher	3			
80.	First aid box	3			
81.	Fire buckets	5			

INSTITUTION:

BLOCKLAYING AND CONCRETE WORKSHOP

s/n	Equipment/tool	No Required	No Available	Shortfall	Remarks
1.	Bar bending machine	1			
2.	Steel cutter	1			
3.	Builders square	6			
4.	Mesh/BRC cutter	1			
5.	Tyrolean machine	1			
6.	Concrete vibrators: poker and table vibrators	1 set			
7.	Hand hammers	4 sets			
8.	Portable concrete mixer (at least 2cu. ft. capacity)	1			
9.	Brick/Block-making machine	1			
10.	Wheel barrow	5			
11.	Watering can	5			
12.	Shovels	30			
13.	Spade	30			
14.	Head pans	10			
15.	Terrazzo polishing machine	1			
16.	Brick saw	1			
17.	Concrete nail gun	1			
18.	Cement box	5			
19.	Aggregates and sand box	5			
20.	Slump cones	2			
21.	Cube testing machine	1			
22.	Hand tools, eg. spirit level, towels, hammers, rules, squares, mallets, tapes, floats, etc.				
23.	Bucket	10			

INSTITUTION: .....

PLUMBING WORKSHOP

s/n	Equipment/tool	No Required	No Available	Shortfall	Remarks
1.	Guillotine	1			
2.	Fittings	Assorted			
3.	Pumps (various types, e.g. centrifugal, submersible, etc.)	1 each			
4.	Valves, surge tanks, water hose	Assorted			
5.	Pipe bending machine	1			
6.	Light duty drilling machine	1			
7.	Heavy duty drilling machine	1			
8.	Table drilling machine	1			
9.	Sheet metal folding machine	1			
10.	Tapping machine	1			
11.	Forge	1			
12.	Arc-welding machine	1			
13.	Oxy-acetylene welding equipment	1			
14.	Acetylene generator	1			
15.	Electric soldering tool	1			
16.	Refixhydraulic pipe bender	1			
17.	Grinding machine	1			
18.	Jack pump	6			
19.	Pipe standing vices	6			
20.	Table vices	15			
21.	Copper bits	1			
22.	Copper tube bender	1			
23.	Hack saw	1			
24.	Shave hooks	10			
25.	Box wood bending dresser	1			
26.	Tin snips	6			
27.	Hacking knife	6			
28.	Wrencher	Assorted			
29.	Dices	Assorted			

INSTITUTION: .....

LAND SURVEYING EQUIPMENT STORE

s/n	Equipment/tool	No Required	No Available	Shortfall	Remarks
1	**Leveling Instruments**	**6**			
2	Theodolites	6			
3	Compasses with Tripods	6			
4	Plane Table	5			
5	Tripods (Level and Theodolite)	12			
6	Staves	10			
7	Ranging Poles	20			
8	Surveying Umbrella	2			
9	Chains	10			
10	Steel arrows	30			
11	Measuring tapes (30m, 50m and 100m)	6 each			
12	Optical Square	6			
13	Pocket Altimeter	7			
14	Set of Targets	3			
15	Steel Band	5			
16	Plain meter	6			

INSTITUTION: .....

ELECTRICAL WORKSHOP

s/n	Equipment/tool	No Required	No Available	Shortfall	Remarks
1.	Bending vices/machine	10			
2.	Electrician tool kits	4			
3.	Soldering iron and equipment	10			
4.	Avometers	2			
5.	Ammeters	2			
6.	Voltmeters	2			
7.	Ohmmeters	2			
8.	Wiring boards	6			
9.	Consumer units				
	a) Circuit breakers	Assorted			
	b) Distribution box	5			
	c) Outlets, plugs and switches	Assorted			
	d) Meters	5			
	e) Mains switch	Assorted			

INSTITUTION: .....

PAINTING, DECORATION AND GLAZING WORKSHOP

s/n	Equipment/tool	No Required	No Available	Shortfall	Remarks
1.	Spraying machine	2			
2.	Paint rollers	6			
3.	Diamond/Glass cutter	2			
4.	Paint kettle and hook	2			
5.	Bucket	10			
6.	Tray	10			
7.	Sanders	6			
8.	Wire brush	6			
9.	Descaling chisels	5			
10.	Needle gun	2			
11.	Gas torch	1			
12.	Brushes	10			
13.	Paint pad	2			
14.	Paint mitten	10			
15.	Assorted hand tools, eg, knives, hooks, stirrer, hammers, pincers, punch, straight edge, screw driver, wire brushes, trowels, chisels, strainers, filing board and hawk, rubbing block, etc.				
16.	Tile cutter	4			
17.	Tile spacer (assorted sizes)	40 each			

INSTITUTION: .....

MATERIAL SCIENCE LABORATORY

s/n	Equipment/tools	No Required	No Available	Shortfall	Remarks
1	B & K Sound Level Unit Octave Filter	3			
2	Micro Computers	1			
3	Planimeter	3 Sets			
4	Stop Watches	10			
5	Daylight Factor Units	3 sets			
6	Sound Pressure Meter	2			
7	Accelerometer for Vibration Analysis	6			

REQUIREMENTS FOR COMPUTER LABORATORY

s/n	Equipment/tools	No Required	No Available	Shortfall	Remarks
1	Desktop computer	30 pieces			
2	Printers	5			
	Softwares required				
1	ArchiCad/Revit	1			
2	Primavera/MS project	1			
3	Orion	1			
4	Technology Innovator	1			
5	SPSS/Statistica/Matlab	1			
6	Microstation	1			
7	Bespoke	1			

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