

NATIONAL BOARD FOR TECHNICAL EDUCATION

NATIONAL INNOVATION DIPLOMA (NID)

IN

CONSTRUCTION TECHNOLOGY

CURRICULUM AND COURSE SPECIFICATIONS

2007

PLOT 'B' BIDA ROAD, PMB 2239 KADUNA – NIGERIA

GENERAL INFORMATION

1.0 CERTIFICATION AND TITLE OF PROGRAMME

The certificate to be awarded and programme shall read:

“NATIONAL INNOVATION DIPLOMA IN BUILDING CONSTRUCTION TECHNOLOGY” - A statement showing all the courses taken and grades obtained shall be issued together with the certificates.

2.0 Goal and Objectives

The National Innovation diploma programme in Building construction Technology is aimed at producing Technicians with entrepreneur and ICT capacities that are capable of performing basic function in construction Technology practice both in private and public sector.

The Objectives are to produce a diploma that can be self employed and assist the professional Builder in the areas of:

- (i) Production of simple buildings
- (ii) Maintenance of simple Buildings
- (iii) Management of small projects
- (iv) Costing of simple construction works
- (v) Cost control techniques in minor construction and Engineering works
- (vi) Selection of materials and Techniques for new building systems
- (vii) Apply computer aid in execution of simple construction works
- (viii) Establish trade outfits for simple construction works.

3.0 ENTRY REQUIREMENTS:

Applicants with any of the following qualifications may be considered for admission into the National Diploma programme by direct entry.

- a. S. S. S. C or its equivalent (N. T. C. WASC. GCE O' Level) with credit in Physics and Mathematics and any other two subjects from the following: Further Mathematics, Fine Art/Technical Drawing, Geography, Economics, English Language, Chemistry/Biology, Agricultural Science obtained at not more than two sittings. Candidates are expected to have at least a pass in English Language.
- b. Four credit passes in relevant subjects as stated in (1) above obtained at the final examination of an NBTE recognized preliminary ND programme offered in a polytechnic or similar post – secondary technical Institution.
- c. NVC Holders

4.0 CURRICULUM

4.1 The curriculum of the ND programme consists of four main components. These are:

- (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 Art and Humanities -

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English language, Citizenship Education, Social Studies - Citizenship (the Nigerian Constitution), Political Science, Sociology, Philosophy, Geography and Entrepreneurship. The General Education component shall account for not more than 15% of total contact hours for the programme.

- 4.3 Foundation Courses include courses in Mathematics, Pure Science, Technical Drawing, Descriptive Geometry etc. The number of hours will vary with the programme and may account for about 15% of the total contact hours.
- 4.4 Professional Courses are courses which give the student the theory and practical skills he needs to practice his profession at the technician level. These may account for 70% of the total contact hours.
- 4.5 Supervised Industrial Work Experience Scheme (SIWES) shall be taken after second semester of first year and second semester of second year.

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CURRICULUM TABLE:

PROGRAMME: NATIONAL INNOVATION DIPLOMA (NID) IN CONSTRUCTION TECHNOLOGY

YEAR : ONE

SEMESTER : ONE

S/N	COURSE CODE	COURSE MODULE	L	T	P	CU	CH	
1.	MTH	Mathematics	1	1	-	2	2	
2.	CU	Communication Skills	1	1	-	2	2	
3.	CTD 113	Technical drawing	1	-	2	3	3	
4.	Ent	Entrepreneurship	2	-	1	3	3	
5.	CTD 101	Building Science and properties of materials I	1	1	2	4	4	
6.	CTD 103	Construction Technology I	1	1	3	5	5	
7.		ICT I	1	-	2	3	3	
8.	CTD 105	Practical Skills in Construction Trades I	-	-	4	4	4	
9.	CTD 107	Building Site and Surveying I	1	-	3	4	4	
10.	CTD 109	Introduction to Building Measurement	2	-	-	2	2	
11.	CTD 111	Traditional Building Construction	1	-	-	1	1	
		TOTAL	12	4	17	33	33	

PROGRAMME: NATIONAL INNOVATION DIPLOMA (NID) IN BUILDING CONSTRUCTION TECHNOLOGY

YEAR : ONE

SEMESTER : TWO

S/N	COURSE CODE	COURSE MODULE	SECOND SEMESTER				
			L	T	P	CU	CH
1.	MTH	Mathematics	1	1	-	2	2
2.	Com. Skl	Communication Skills	1	1	-	2	2
3.	CTD 114	Building drawing	1	-	2	3	3
4.	Ent	Entrepreneurship	2	-	1	3	3
5.	CTD 102	Building Science and properties materials II	1	1	2	4	4
6.	CTD 104	Construction Technology II	1	1	3	5	5
7.		ICT II	1	-	2	3	3
8.	CTD 106	Practical Skills in Construction Trades. II	-	-	4	4	4
9.	CTD 108	Building Site and Survey II	1	-	3	4	4
10.	CTD 110	Building Measurement and Specifications	2	-	-	2	2
11.	CTD 112	Principles of Environmental Science	2	-	2	4	4
		TOTAL	13	4	19	36	36

INDUSTRIAL TRAINING(3-MONTHS)

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (NID) IN CONSTRUCTION TECHNOLOGY

YEAR : TWO

SEMESTER : THREE

S/N	COURSE CODE	COURSE MODULE	L	T	P	CU	CH	
1.	CTD 201	Construction Technology III	1	1	3	5	5	
2.	CTD 203	Maintenance Technology	1	-	3	4	4	
3.	CTD 205	Practical Skills in Construction Trades III	-	-	4	4	4	
4.	CTD 207	Tendering and Estimating	1	1	2	4	4	
5.	CTD 209	CAD in Construction and Design	1	-	3	4	4	
6.	CTD 211	Principles of Law and Building Contracts	2	-	-	2	2	
7.	CTD 213	Site Management I	1	1	3	5	5	
8.		Principles of Account	1	1	-	2	2	
9.		Entrepreneurship	2	-	1	3	3	
10.	CTD 215	Introduction to Structural Mechanics and Theory of Structures	2	-	-	2	2	
11.	CTD 217	Building Services	1	1	-	2	2	
		TOTAL	13	5	19	37	37	

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PROGRAMME: NATIONAL INNOVATION DIPLOMA (NID) IN BUILDING CONSTRUCTION TECHNOLOGY

YEAR : TWO

SEMESTER : FOUR

S/N	COURSE CODE	COURSE MODULE	L	T	P	CU	CH	
1.	CTD 202	Construction Technology IV	1	1	3	5	5	INDUSTRIAL TRAINING(3-MONTHS)
2.	CTD 204	Practical Skills in Construction Trades IV	-	-	4	4	4	
3.	CTD 206	Introduction to Structural Design and Detailing	1	-	3	4	4	
4.	CTD 208	Introduction to Civil Engineering Construction	2	-	2	4	4	
5.	CTD 210	Site Management II	1	1	0	2	2	
6.	CTD 212	Engineering Geology and Basic Soil Measurement	1	1	-	2	2	
7.	CTD 214	Construction Technician Principles	1	-	2	3	3	
8.	CTD 216	Project	-	-	4	4	4	
		TOTAL	7	3	18	28	28	

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PROGRAMMES: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: CONSTRUCTION TECHNICIAN PRINCIPLES			COURSE CODE: CTD 214		CONTACT HOURS: 1- 0-2	
GOAL: Understand the roles of the construction Technician, rules and regulations governing construction practices						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents		
General Objective: 1.0 Understand the roles of the construction Technician in the construction				General Objective: 1.0 Identify the roles of construction technician on a given site		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
1-2	1.1 Define: <ul style="list-style-type: none"> a) Technician b) Construction Technician c) Building Construction work 1.2 State the duties and responsibilities of the construction Technician 1.3 State the needs, aims and objectives of construction Technician	<ul style="list-style-type: none"> • Lecture and cite examples • Give students assignment • 	<ul style="list-style-type: none"> • Slides • Chalkboard • Films • Brochures • internet 	1.1 Visit a given construction site. 1.2 Observe the roles of various construction Technician site 1.3 Write report on the visit	<ul style="list-style-type: none"> * Guide and supervise students in the visit. * Ask students to write report on the visit. 	<ul style="list-style-type: none"> * Vehicle * Written materials * Recording devices

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COURSE SPECIFICATION: Theoretical Contents				Practical Contents		
General Objective: 2.0 Understand the principles of Estate Management						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
3-5	2.1 Define Management. 2.2 Define Estate. 2.3 Explain Estate Management. 2.4 State the objectives of Estate Management. 2.5 Determine the aim and scope of Estate Management e.g. profit independence, status and prestige etc. 2.6. Outline the different feature of Estate: a) Physical Identity b) Economic Condition c) Legal Status d) Management Character. 2.7 State the factor influencing each of them and their uses. 2.8 Determine the effects of each feature in relation to management decision for the different estates.	<ul style="list-style-type: none"> • Lecture and cite examples • Explain the concept and objectives of management. • Give students assignment 	<ul style="list-style-type: none"> • Slides • Chalkboard • Films • Brochures internet 			

<p>6-7</p>	<p>2.9 State the process involved in the creation of Estates. 2.10 Outline the different types of Estate e.g. freehold, lease hold. 2.11 State their various uses. 2.12 Explain who is an Estate manager. 2.13 Describe the role and qualities of an Estate manager. 2.14 State the various types of Estate Manager. 2.15 Distinguish between an Estate Manager and Estate Agent in relation to their functions. 2.16 Explain the meaning of an Estate life cycle. 2.17 Trace the stages in the life cycle of an Estate from pre-development to obsolescence and re-development stage. 2.18 Outline the management problems encountered at each</p>					
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	<p>stage.</p> <p>Types of property and Interests</p> <p>2.20 Define property and their importance.</p> <p>2.21 Outline the types of properties:</p> <ul style="list-style-type: none"> - Commercial - Residential - Industrial - Recreational. 					
COURSE SPECIFICATION: Theoretical Contents				Practical Contents		
General Objective: 3.0 Know the Health, Safety and Welfare rules and regulations in construction works				General Objective: Apply the Health Safety and Welfare rules and regulations in construction work		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
8-10	<p>3.1 Define Construction Regulation</p> <p>3.2 State the aims and objectives of Construction Regulation</p> <p>3.3 know the parties involved in the execution of Construction Regulation</p> <p>3.4 state the duties of each of the parties in the Construction Regulations.</p> <p>3.5 Understand health,</p>	<ul style="list-style-type: none"> • Lecture and cite example • Give students assignments • List the seven important points for successful planning • Explain different stages of construction project executive • Specify the 	<ul style="list-style-type: none"> • Slides • Chalkboard • Charts • Films • Brochures • Construction Regulations • Factory Acts • Labour Law • Internet 	<p>3.1 Carry out construction site inspection on health, safety and welfare requirements</p> <p>3.2 Write report on the visit</p>	<ul style="list-style-type: none"> • Guide students in the determination of health, safety and welfare requirements • Ask students to write report on the visit 	<ul style="list-style-type: none"> *Vehicle site *Project site *Recording devices * Writing materials

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11	<p>safety and welfare action planning in construction projects.</p> <p>3.6 State the different stages of construction project where health safety and welfare out fits and who is responsible</p>	<p>team responsible for each of the stages above</p>				
General Objective: 4.0 Understand the meaning and working of Building Codes				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
12-13	<p>4.1 Define building code</p> <p>4.2 State aims and objective of the building codes</p> <p>4.3 List the needs for the Building Codes</p> <p>4.4 Identify the parties responsible for the implementation of the Building Codes</p> <p>4.5 List available Building Codes for construction projects.</p>	<ul style="list-style-type: none"> • Lecture and cite examples • Give students assignments 	<ul style="list-style-type: none"> • Slides • Chalkboard • Charts • Films • Brochures • Codes of practices • Building codes 			

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General Objective: 5.0 Understand the meaning and working of Building and planning regulations				General Objective: 5.0 Know the processes of building plan approval by statutory body.		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
14-15	5.1 Define Building and Planning Regulations 5.2 State aims and objectives of Building and Planning regulations 5.3 State the functions of Building regulations 5.4 Define key terms in building regulations. a) Building work b) Approved Documents 5.5 Define building control services 5.6 Know the two different types of Building Control Services 5.7 Understand enforcement of the building regulation	<ul style="list-style-type: none"> • Lecture and cite examples • Give students assignments • Assignments 	<ul style="list-style-type: none"> • Slides • Chalkboard • Charts • Films • Brochures • Building regulations • Planning laws and regulations • National Building Code 	5.1 Conduct a visit to statutory body dealing with building plan and control approvals.	<ul style="list-style-type: none"> * Guide and supervise students in the visit. * Give students assignments 	<ul style="list-style-type: none"> * Vehicle devices *Recording devices *Printing materials *Writing Materials

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PROGRAMMES: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: PRINCIPLES OF ENVIRONMENTAL SCIENCE			COURSE CODE:CTD 112		CONTACT HOURS : 2 – 0 – 2	
GOAL: This course is intended to familiarizes the students with the fundamental concepts in Environmental Science						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents		
General Objective: 1.0 Understand the role of man in Environmental changes.				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
1-2	1.1 Define the following terms: Environmental, Environmental Science, Environmental management, Environmental monitoring and Environmental Deterioration 1.2 Explain each of the following: Environmental determinism, Environmental possibilism and Environmental Hazard. 1.3 Discuss the powers of man in the prolifetion of Environmental impacts. 1.4 Distinguish between	<ul style="list-style-type: none"> • Explain the various terms. • Discuss the roles of man in environmental changes 	<ul style="list-style-type: none"> • Slides • Chalkboard • Charts • Films • Brochures • Building regulations 			

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3	reversible and irreversible environmental changes. 1.5 List examples of reversible environmental changes. 1.6 List examples of irreversible environmental changes. 1.7 Discuss the susceptibility of the environment to changes. 1.8 Describe the role of nature in resisting environmental changes 1.9 Discuss the possible roles of man in preventing environmental changes					
General Objective 2.0: Understand the basic principles of soil conservation			General Objective 2.0: Apply the basic principles of soil conservation			
4-7	2.1 List the aims of soil conservation. 2.2 Explain soil loss/soil renewal processes. 2.3 Discuss the meaning, types and agents of soil erosion.	<ul style="list-style-type: none"> • Lecture and cite examples • Give students assignments 	<ul style="list-style-type: none"> • Slides • Chalk board • Charts • Films • Brochures • Building 	2.1 Put soil into perspective as natural resource. 2.2 Perform soil loss/soil renewal processes.	* Guide students in the process of soil conservation activities.	<ul style="list-style-type: none"> • Slides • Chalkboard • Charts • Films

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	<p>2.4 Explain factors/causes of soil erosion.</p> <p>2.5 Discuss measures of controlling soil erosion.</p> <p>2.6 Discuss the role of manure and fertilizers in soil fertility conservation.</p> <p>2.7 Explain the effects of leaching on soil fertility.</p> <p>2.8 Discuss the effects of pesticides on the soil.</p> <p>2.9 Explain the role of soil micro-organism in soil fertility conservation.</p> <p>2.10 Discuss the use of contour ploughing, strep cropping, crop rotation and other agronomic measures of soil conservation.</p> <p>2.11 Discuss the use of irrigation as a method of soil conservation.</p> <p>2.12 Discuss the usefulness of land classification to soil conservation.</p>		<p>regulations</p>	<p>2.3 Apply some natural and artificial agents to check soil erosion.</p> <p>2.4 Carry out simple soil conservation using basic irrigation method.</p>		
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General OBJECTIVE 3.0: Understand the Importance of conserving Environmental Energy Resources					
8-10	<p>3.1 Explain the concept of “Environmental Energy”</p> <p>3.2 Discuss Environmental Energy Resources as natural resources.</p> <p>3.3 Explain what it means by “fossil fuels”.</p> <p>3.4 Discuss fossil fuels as Environmental Energy resources.</p> <p>3.5 Discuss the need for increased human consumption of fossil fuels.</p> <p>3.6 Discuss water as an energy resource.</p> <p>3.7 Discuss the need for increased human consumption of hydro-electricity.</p> <p>3.8 Discuss sunlight as an energy resource.</p> <p>3.9 Discuss the need for human consumption of solar energy.</p> <p>3.10 Explain recent technological advances made in the development of solar energy.</p> <p>3.11 Discuss wind as an energy resource.</p> <p>3.12 Explain the need for human consumption of</p>	<ul style="list-style-type: none"> • Lecture and cite examples • Give students assignments 	<ul style="list-style-type: none"> • Slides • Chalkboard • Charts • Films • Brochures • Building regulations 		

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	wind energy. 3.13 Discuss recent technological advances made in the development of wind energy.					
	General Objective 4.0: Understand the basic concept in safety, pollution and waste management.			General Objective 4.0: Apply the basic safety, pollution and waste management.		
11-13	<p>4.1 Define safety, Environmental safety, Industrial safety, accident and inspection.</p> <p>4.2 Explain the various reasons for safety in the industry and how industrial safety can be protected in Nigeria.</p> <p>4.3 Discuss the causes, costs types, consequences and prevention of accident.</p> <p>4.4 Explain the role of tools, personnel and environment in accident prevention.</p> <p>4.5 Define maintenance, its types and relevance in accident prevention.</p> <p>4.6 Explain the relationship between safety, inspection and maintenance.</p> <p>4.7 Define pollution, environmental pollution, water pollution, noise pollution, air pollution</p>	<p>* Explain with examples.</p> <p>* Give students assignments.</p>	<ul style="list-style-type: none"> • Slides • Chalkboard • Charts • Films • Brochures • Construction Regulations • Factory Acts • Labour Law 	<p>4.1 Apply basic environmental and industrial safety measures.</p>	<p>* Guide students in the application of the various types of safety measures</p>	<p>* First Aid Box;</p> <ul style="list-style-type: none"> • Chats , • Films, • Slides, • Etc.

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	<p>land pollution and thermal pollution.</p> <p>4.8 Discuss the causes of air, water, noise, land and thermal pollution.</p> <p>4.9 Discuss the effects of air, water, land and thermal pollution.</p> <p>4.10 Explain the various ways in which atmospheric and water pollution can be controlled.</p> <p>4.11 Discuss measure of controlling other types of pollution.</p> <p>4.12 Define waste liquid, waste solid, and gases waste, waste management and waste management system(s).</p> <p>4.13 Explain agricultural, domestic, municipal, industrial, hospital, chemical, biological and toxic wastes.</p> <p>4.14 Discuss the various system, methods/techniques of managing wastes.</p> <p>4.15 Discuss “wealth” that can be generated from wastes.</p> <p>4.16 Explain the term</p>					
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	“recycling” and its relationship with wastes.					
General Objective 5.0: understand concept of sustainable development						
14-15	5.1 Define sustainable development 5.2 State the needs for sustainable development. 5.3 Explain the guiding principles of SD. 5.4 Explain sustainable development indicators 5.5 Define sustainable construction. 5.6 State the needs for sustainable constructions. 5.7 Discuss sustainable construction in developing countries.		<ul style="list-style-type: none"> • Chalk board • Charts • Videos. 			

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PROGRAMMES: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: TRADITIONAL BUILDING CONSTRUCTION.			COURSE CODE :CTD 111	CONTACT HOURS 1 – 0 – 0		
GOAL: Understand the basic factors and concept of traditional Building construction						
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents		
General Objective: 1.0 Understand the factors that influence various traditional construction techniques.				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource
1-4	1.1 Describe the various ways of building in the pre-colonial tradition setting. 1.2 Explain the factors considered in evolving these various traditional solutions e.g. culture, religion, climate, available materials etc. 1.3 Illustrate how these factors in 1.2 above have been brought to play in evolving the various architectural solutions. 1.4 Identify the merits and the demerits of the various solutions.					
General Objective 2.0: Understand traditional responses to climate, culture and religion.						
5-10	2.1 Explain the concept of courtyards in traditional responses. 2.2 Interpret the					

	<p>application of courtyard concepts to the various peoples of Nigeria.</p> <p>2.3 Illustrate the types of courtyards used in the traditional setting.</p> <p>2.4 Illustrate the sequence of spaces in a traditional Village setting and the various traditional settlement patterns.</p> <p>2.5 Describe the origin and evolution of traditional Building construction.</p> <p>2.6 Indicate the idea behind the following traditional building construction: Rectilinear and Curvilinear forms; conical Roofs; Mono-pitched and double-pitched Roofs.</p>					
<p>General Objective 3.0: Appreciate the influence of traditional building materials on traditional building construction.</p>						
11-15	<p>3.1 Illustrate the influence of traditional building materials on traditional bedding e.g. wood earth, thatch, stone, bamboo, raffia, etc.</p>					

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	<p>3.2 Explain the limitations imposed by available materials and building techniques on traditional building construction.</p> <p>3.3 Describe the materials used for finishing and the methods of applying them.</p> <p>3.4 Compare and contrast the traditional building techniques and contemporary construction methods giving their merits and demerits</p> <p>3.5 Enumerate the influences of modern materials and technology on traditional building construction in Nigeria.</p>					
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TECHNICAL DRAWING

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: TECHNICAL DRAWING				COURSE CODE: CTD 113		CONTACT HOURS: 1 – 0 -2
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
	General Objective 1.0: Know the use and care of the different drawing instruments, equipment and materials.			General Objective 1.0: Apply the use and care of different drawing Instruments equipment and materials		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1 - 2	<p>1.1 Explain the different types of drawing instruments, equipments and materials.</p> <p>1.2 Outline the various instruments, equipments and materials.</p> <p>1.3 State the precautions necessary to preserve the items in 1.1 above.</p> <p>1.4 Use each of the item in 1.1 above</p> <p>1.5 Maintain the various instrument and equipment.</p>	<ul style="list-style-type: none"> • Illustrate the uses of various drawing instruments, equipment and materials. • Show how they should be maintained. 	<ul style="list-style-type: none"> • Drawing instruments, equipments and materials such as Ruler, setsquares, T- squares, pencils drawing paper etc. • Chalk board. 	<p>a. Layout drawing sheets with the following.</p> <p>b. Margin</p> <p>c. Title block etc.</p> <p>d. Print letters and figures of various forms and characters.</p> <p>e. Layout a given set of drawings on a given sheet using the conventional signs, symbols and appropriate lettering characters.</p>	<ul style="list-style-type: none"> • Demonstrate using examples. * Give students assignments 	<ul style="list-style-type: none"> • Chalkboard • Drawing sheets of various standards. • Chalkboard.

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	General Objective 2.0: Understand the essentials in graphical communication.		General Objective 2.0: Apply the Knowledge in graphical Communication	
3 - 4	<p>2.1 Explain graphics and the different types of graphical presentations.</p> <p>2.2 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,.</p> <p>2.3 Layout drawing sheets with the following. a. Margin b. Title block etc.</p> <p>2.4 State the various standards of drawing sheets.</p>	<ul style="list-style-type: none"> • Show representation on the chalkboard. 	<ul style="list-style-type: none"> • Chalkboard • Drawing sheets of various standards. 	<p>a. Construct parallel and perpendicular lines.</p> <p>b. Construct and bisect lines, angles and areas.</p> <p>c. Divide a straight line into given number of equal parts. Construct regular polygons with:</p> <p>N sides in a given circle. A given side length and of N side on a straight line.</p> <ul style="list-style-type: none"> • Show students how to construct simple geometrical figures and shapes. • Show students how to construct simple geometrical figures and shapes. • Show students how to construct polygons. • Construct and ellipse using the methods listed. • Demonstrate <ul style="list-style-type: none"> • Chalk Board • Trammel • Drawing Instrument

<p>5</p>	<p>2.5 Print letters and figures of various forms and characters.</p> <p>2.6 Illustrate conventional signs and symbols.</p> <p>2.7 Layout a given set of drawings on a given sheet using the conventional signs, symbols and appropriate lettering characters.</p> <p>2.3 Layout drawing sheets with the following.</p> <p>a. Margin</p> <p>b. Title block etc.</p> <p>2.4 State the various standards of drawing sheets.</p> <p>2.5 Print letters and figures of various forms and characters.</p> <p>2.6 Illustrate conventional signs</p>				<p>with examples.</p> <ul style="list-style-type: none"> • Chalk board • Trammel. • Drawing instruments chalkboard. 	
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	and symbols. 2.7 Layout a given set of drawings on a given sheet using the conventional signs, symbols and appropriate lettering characters.					
	General Objective 3.0: Know the Construction of simple geometric figures and shapes.					
6-7	<p>3.1 Explain the purpose of geometrical construction in drawing.</p> <p>3.2 Explain parallel and perpendicular lines.</p> <p>3.3 Construct and bisect lines, angles and areas.</p> <p>3.4 Divide a straight line into given number of equal parts.</p> <p>3.5 Identify polygons (regular or</p>	<ul style="list-style-type: none"> • Show students how to construct simple geometrical figures and shapes. 	-do-	<p>3.1 Carry out simple geometrical constructions on circles e.g.</p> <p>a. the diameter of a circle given the circumference.</p> <p>b. the circumference of a circle of a given diameter.</p> <p>c. a circle to pass through 3 points.</p> <p>d. a circle compass through 2 points and touch a given line</p> <p>e. a circle to touch a given smaller circle and a given line</p>		

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	<p>irregular).</p> <p>3.6 Construct regular polygons with:</p> <p>a. N sides in a given circle.</p> <p>b. A given side length and of N side on a straight line.</p> <p>3.7 Define a circle.</p> <p>3.8 Explain the properties of a circle, e.g. radius, diameter, normal tangent, circumference etc.</p> <p>3.9 Define an ellipse.</p> <p>3.10 Construct an ellipse by using:</p> <p>a) Trammel method.</p> <p>b) Concentric circle method.</p>			<p>g. Tangents to circles at various points.</p> <p>f. Tangents to circles at various points.</p> <p>g. An arc of know radius, tangent to two lines at an angle of less than and more than 90oi. An arc externally tangent to two circles.</p> <p>h. Inscribing and ascribing</p> <p>l Prject views of three dimensional objects on to the basic planes of projection in both first and third angle to obtain.</p> <p>j The front view or elevation</p> <p>k The top view or plan</p>		
	.		<ul style="list-style-type: none"> • Chalk board • Trammel. 	<ul style="list-style-type: none"> • Construct an ellipse by using: <ul style="list-style-type: none"> a. Trammel method. 		

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				b. Concentric circle method	
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	General Objective 4.0: Know the Construction of Isometric and obloquies projects			General Objective 4.0: Carry out the Construction of Isometric and obloquies projections		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
8-10	4.1 Explain isometric and obliques projections 4.2 Explain a square in isometric and oblique forms 4.3 Explain a circle in isometric and oblique forms 4.4 Explain an ellipse in isometric and oblique forms. 4.5 Explain a polygon with a minimum of eight sides in isometric and oblique forms. 4.6 Explain Dimension holes, circles, circs and angles correctly in			4.1 construct plane scales, diagonal scales and scale cut using appropriate instruments. 4.2 Draw a square in isometric and oblique forms. 4.3 Draw a circle in isometric and oblique forms. 4.4 Draw an ellipse in isometric and oblique forms 4.5 Draw a polygon with a minimum of eight sides in isometric and oblique forms	* Show students how to construct isometric obloquies projections	-do-

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	isometric and oblique drawings. 4.7 Use appropriate conventional symbols and abbreviations.					
	General objective 5.0 Know the principles of orthographic projections			General Objective 5.0: Apply the principles of orthographic projections		
11-12	<p>5.1 Explain the principles of orthographic projections</p> <p>5.2 Illustrate the principle planes of projection:</p> <p>a. vertical plane b. horizontal plane</p> <p>5.3 Explain why the first and third angle are used and the second and fourth angle are not used.</p> <p>5.4 Project views of three-dimensional objects on to the basic planes of projection in both first and third angle to obtain: a. the front view or elevation</p>	-do-	-do-	<p>5.1 Draw the lines of intersections of the following regular solids and planes in both first and third angles:</p> <p>5.2 Two dissimilar square prisms meeting at right angles.</p> <p>5.3 Two dissimilar square prisms meeting at an angle.</p>	<ul style="list-style-type: none"> • show students how construct simple orthographic projections • Give student assignments 	-do-

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b. the top view or plan			
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	General Objective 6.0: Understand the Intersections of regular solids.	General Objective 6.0: Draw the intersections of regular solids				
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
13-15	<p>6.1 Explain interpenetration or intersections of solids</p> <p>6.2 Describe the lines of intersections of the following regular solids and planes in both first and third angles:</p> <p>a. Two dissimilar square prisons meeting at right angles.</p> <p>b. Two dissimilar square prisons meeting at an angle</p> <p>c. a hexagonal prison meeting square prison at right angles.</p> <p>d. Two dissimilar cylinders meeting at right angles.</p> <p>e. Two dissimilar cylinders meeting at an angle.</p> <p>f. Two dissimilar cylinders meeting at right angle, their centers not</p>	-do-	-do-	<p>6.1 Draw hexagonal prism meeting square prism at right angles.</p> <p>6.2 Draw Two dissimilar cylinders meeting at right angles.</p> <p>6.3 Draw Two dissimilar cylinders meeting at an angle.</p> <p>6.4 Draw Two dissimilar cylinders meeting at right angle, their centers not being in the same vertical plane.</p>	* Show students how construct intersections of regular solids	

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	being in the same vertical plane.					
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PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: Building Drawing			COURSE CODE: CTD 114		CONTACT HOURS: 1-0-2	
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
	General Objective 1.0: Know the use and care of the different drawing instruments, equipment and materials.			General Objective 1.0: Apply the use and care of the different drawing Instrument, equipment and materials		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources

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	<p>1.1 Explain the various systems of coding drawings</p> <p>1.2 Illustrate how to layout drawings and present them</p> <p>1.3 Enumerate the various equipment used in graphical reproduction e.g. printing machine, scanning machine, photocopying machine, computer, plotter.</p> <p>1.4 Use the equipment in 1.3 above.</p>	<ul style="list-style-type: none"> • Illustrate and present layout drawings. • Show the students graphical reproduction equipment. • Illustrate use of the above equipment 	<ul style="list-style-type: none"> • Chalk Board, Design studio, • Printing machines, Scanning machines, Photocopying machine, Computer machine, Plotter etc. • Chalk Board, Design studio 	<p>1. Use graphical reproduction equipment.</p> <p>2. Maintain the equipment.</p>	<ul style="list-style-type: none"> • Demonstrate use of equipment. • Demonstrate maintenance vis-à-vis maintenance workshop and technical sales shop. 	<ul style="list-style-type: none"> • Chalk Board, Design studio, • Printing machines , Scanning machines , Photocopying machine, Computer machine, Plotter etc. • Chalk Board, Design studio.
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	General Objective 2.0: Understand the elements of design with respect to space requirements of different functions in residential building			General Objective 2.0: Apply the general elements of design with respect to space requirements of different functions in residential building.		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	2.1 Enumerate the various equipment used in graphical drawing	• Mention and highlight relevant Information and	• Chalk board, Design studio,	2.1 Design kitchen, toilet, living room etc. as a unit.	• Guide Students in their drawings	• Chalk Board, Design studio

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<p>2.2 Derive the human scale.</p> <p>2.3 Work out the scale needed for human movement.</p> <p>2.4 Explain the relationship between form and function in the internal arrangement for a living space,</p> <p>2.5 Derive the space requirement for domestic furniture, fixture, corridor etc.</p> <p>2.6 Arrange furniture, fixture, equipment of common usage in a residential building.</p>	<p>Computer Technology</p> <p>(ICT) equipment.</p> <ul style="list-style-type: none"> • Demonstrate typical drawing examples and models. • Show approved working drawings. 	<p>Printing machine,</p> <p>Scanning machine, Photocopying machine, Computer machine, Approved working drawings, Architect's data</p>	<p>works.</p>	<ul style="list-style-type: none"> • Printing machine, * Scanning machine, Photocopying machine, Computer machine, Approved working drawings, Architect's data.
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	General Objective 3.0: Understand draughting and produce working Drawing of a simple residential building			General Objective 3.0: Carry out draughting and produce working drawing of a simple residential building		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	3.1 Choose size of drawing sheets	<ul style="list-style-type: none"> • Demonstrate with existing 	Chalk board,	3.1 Draught the plan of a given building design using a	<ul style="list-style-type: none"> • Supervise students' 	<ul style="list-style-type: none"> • Chalk board,

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	<p>3.2 Choose the appropriate scales for drawing</p> <p>3.3 Describe the plan of a given building design using a given set of drawings as a guide.</p> <p>3.4 Project the elevations and sections.</p> <p>3.5 Describe doors and windows schedules, finishing Drawings, sanitary drawings and site plan etc.</p> <p>3.6 Code the finished drawings in the conventional order.</p>	<p>approved working drawing.</p> <ul style="list-style-type: none"> • Supervise students' drawings on card board sheets. • Supervise students' drawings on traced sheets. • Demonstrate use of Computer to produce drawings. 	<p>Design studio, Computer machine.</p> <p>Printer plotter and plan</p> <p>Printing machine, Chalk board, studio.</p>	<p>given set of drawings as a guide using appropriate scales.</p> <p>3.2 Draught the doors and windows schedules, finishing</p> <p>3.3 Drawings, sanitary drawings and site plan etc</p> <p>3.4 Trace in ink the drawings draught in 3.1, 3.2 and 3.3 above.</p> <p>3.5 Sketch various planner shapes and three dimensional shapes.</p> <p>3.6 Use the cross-hatching techniques to produce the objects in 3.4</p> <p>3.7 Stencil with annotation the traced drawing</p> <p>3.8 Apply Information and Computer Technology equipment for designs.</p>	<p>drawings on card board sheets.</p> <ul style="list-style-type: none"> • Demonstrate application of graphic art tools. 	<p>Design studio, Computer machine,</p> <ul style="list-style-type: none"> • Printer plotter and plan printing machine, • Chalk board, Design studio.
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	General Objective 4.0: Know the basic materials and tools used for artistic Production and undertake simple pencil sketching			General Objective 4.0: Use the basic materials and tools for artist production and undertake simple pencil sketching		
Week	Specific Objective:	Teachers Activities	Resources	Specific Objective:	Teachers Activities	Resources
	<p>4.1 Explain the role of art in communication</p> <p>4.2 Enumerate the basic</p>	<ul style="list-style-type: none"> • Apply the various grades of pencils. 	<ul style="list-style-type: none"> • Chalk board, • Design 	<p>4.1 Use graphical reproduction equipment.</p>	<p>Guide and supervise tools and</p>	<p>- Chalk board</p> <p>-Drawing</p>

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	<p>tools used in graphic art and their function.</p> <p>4.3 List the various materials used in graphic art.</p> <p>4.4 Illustrate how the materials in 3.3 above are used for graphical production.</p> <p>4.5 State the various grades of pencils and factors affecting their choice for sketching.</p> <p>4.7 Explain the principles of shadow casting.</p>	<ul style="list-style-type: none"> • Show how to make shadow cast • Engage students to produce drawings *Apply the various grades of pencils. • Show how to make shadow cast • Engage students to produce drawings. 	<p>Studio.</p>	<p>4.2 Maintain the tools and equipment use in 4.1 above.</p> <p>4.3 Sketch various planner shapes and three dimensional shapes</p> <p>4.4 Use the cross-hatching technique to produce the objects in 4.3</p>	<p>students.</p> <p>Give students assignments</p>	<p>Instrument</p>
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BUILDING SCIENCE AND PROPERTIES OF MATERIALS

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: Building Science and Properties Materials I			COURSE CODE: CTD 101		CONTACT HOURS: 1-1-2	
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective 1.0: Understand the basic principles of heat transmission.				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resource

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						s
1	1.1 Appreciate the effect of heat 1.2 Explain thermal conductivity 1.3 Describe the principles of heat transmission 1.4 Calculate heat transmission coefficient	<ul style="list-style-type: none"> • With the aid of question and answer discuss thermal conductivity and heat transmission • Use relevant formula to determine heat transmission coefficient. 	<ul style="list-style-type: none"> • Chalk board * Calculator * Writing materials * Films * Slides * Charts 			
General Objective 2.0: Understand the basic principles of sound Insulation and Acoustics.			General Objective 2.0: Apply the basic principles of sound Insulation and Acoustics.			
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
2-3	2.1 Explain the principle of sound transmission 2.2 Illustrate the characteristics of sound e.g. frequency, Pitch, reflection, intensity etc.	<ul style="list-style-type: none"> • Discuss the principles of so sound transmission using questions and answers. • Use the tuning fork to explain the behavior of sound. 	<ul style="list-style-type: none"> • Chalkboard and • Tuning Fork 	2.1 determine the characteristics of sound e.g. frequency, pitch, reflection, intensity etc	*Demonstrate the characteristics of sound	<ul style="list-style-type: none"> • chalk board • Tuning fork • Calculator • Charts.
General Objective 3.0: Understand the principles of Lighting.				General Objective 3.0: Apply the principles of lighting		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning	Teachers Activities	Learning Resources

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				Objective		
4-5	<p>3.1 Explain the characteristics of light e.g. frequency, wave-length, spectrum.</p> <p>3.2 Illustrate the principles of illumination.</p>	<ul style="list-style-type: none"> • Use mathematical equations to formulate • Sabine’s formula • Use a Prism to discuss spectrum and the other characteristics. • Discuss the lighting of a space naturally and artificially. 	<ul style="list-style-type: none"> • Chalkboard and • Prism 	3.1 Carry out experiments on the characteristic of lighting	* Demonstrate and guide students in the experiments	<ul style="list-style-type: none"> * Chalk board * Prism * Drawing Instruments * Optical pins * Drawing sheets
General Objective 4.0: Understand the Properties and different species of timber.						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
6	<p>4.1 Explain the different types of timber</p> <p>4.2 Illustrate the defects in timber e.g. Knot, shakes, cup, warping</p>	<p>4.1 Explain the different types of timber</p> <p>4.2 Illustrate the defects in timbere.g Knot.</p>	* Chalk board			

General Objective 5.0: Understand the composition and properties of ferrous and non-ferrous Metals.						
Week	Specific Objective:	Teachers Activities	Resources	Specific Objective:	Teachers Activities	Resources
7	5.1 Explain the properties and uses of ferrous and non-ferrous metals.	5.1 Explain the properties and uses of ferrous and non-ferrous metals.	<ul style="list-style-type: none"> * Chalk board * Writing materials 			

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			* Metal samples Charts, slides, projectors.			
General Objective 6.0: Understand the composition and properties of paints and varnishes.						
Week	Specific Learning Objective:	Teachers Activities	Resources	Specific Learning Objective:	Teachers Activities	Resources
8	6.1 State the composition of paints and varnishes. 6.2 Describe the characteristics.	<ul style="list-style-type: none"> • Illustrate the defects in paints. • Present samples of paints. 	<ul style="list-style-type: none"> • Chalk board • Writing materials • Charts, slides, projectors • Paint samples 			
General Objective 7.0: Understand the characteristics of glass						
Week	Specific Learning Objective:	Teachers Activities	Resources	Specific Learning Objective:	Teachers Activities	Resources
9	7.1 Enumerate the various types of glass and their function in building construction. 7.2 Describe the manufacturing process of glass.	<ul style="list-style-type: none"> • Present samples of glass. 	<ul style="list-style-type: none"> • Chalk board • Writing materials • Glass samples slides • projectors 			
General Objective 8.0: Know the derivation properties and uses of asphalt and bitumen.						

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10	<p>8.1 Describe the derivation process for asphalt and bitumen.</p> <p>8.2 State the properties of asphalt and bitumen e.g. melting Pt, viscosity etc.</p> <p>8.3 Explain the uses of asphalt and bitumen in building construction.</p>	<ul style="list-style-type: none"> • Show and explain to the students' samples of asphalt and bitumen. 				
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General Objective 9.0: Understand the chemical composition and uses of adhesives.						
Week	Learning Objective:	Teachers Activities	Resources	Learning Objective:	Teachers Activities	Resources
11	<p>9.1 List the properties of adhesives.</p> <p>9.2 Explain the uses of adhesives.</p>	<ul style="list-style-type: none"> • Present samples of adhesives and explain their uses. 	<ul style="list-style-type: none"> • Chalk board • Writing materials • Adhesives 			<ul style="list-style-type: none"> •
General Objective 10.0: Understand the manufacture and uses of asbestos and asbestos products						
Week	Learning Objective:	Teachers Activities	Resources	Learning Outcomes:	Teachers Activities	Resources

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12	<p>10.1 Explain the manufacturing processes of asbestos.</p> <p>10.2 List the properties of asbestos</p> <p>10.3 Explain the uses of asbestos products in building construction.</p>	<p>* Describe the manufacturing process of asbestos</p>	<p>* Chalk board</p> <p>* Writing materials</p>			
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	General Objective 11.0: Understand the causes, effects and prevention of corrosion and fungal attacks in building.					
Week	Specific Learning Objective:	Teachers Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
13	<p>11.1 Describe the different types of corrosion and their prevention.</p> <p>11.2 Describe fungi attack in building.</p> <p>11.3 Explain the causes,</p>	<p>• Illustrate the methods of prevention against termites and fungal attacks in bldgs.</p> <p>* Illustrate the various methods of</p>	<ul style="list-style-type: none"> • Chalk board • Slides • Charts • projectors 			

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14-15	effect and prevention of fungal attacks in building	corrosion prevention				
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PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: Building Science & Properties of Materials II				Course Code: CTD 102	Contact Hours: 1-1-2	
COURSE SPECIFICATION: Theoretical Content						
	General Objective 1.0: Know macroscopic properties of solids and their relation to structure.					
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcome	Teacher's Activities	Resources
	1.1 Differentiate conductor and semi-	• With the aid of question and	• Chalkboard	• Writing materials		

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1	conductor. 1.2 Describe d-electric, plazo-electric and magnetic properties of solids.	answer, explain a conductor and a 'semi-conductor' • Show to the students' examples of conductors like metals water etc. • Demonstrate to the students the dielectric, Plaxo-electric and magnetic properties of e.g. Granite.		<ul style="list-style-type: none"> Charts 		
General Objective 2.0: Know some basic building construction materials			General Objective 2.0: Carry out test on some basic building construction materials			
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
2-10	2.1 Explain the different types of building materials 2.2 Classify good building stones and their characteristics. 2.3 Describe quarrying and dress stones. 2.4 Describe the uses of stones. 2.5 State types of clay products, describing their Manufacturing process. 2.6 Explain tests on bricks listing their characteristics. 2.7 Describe composition	<ul style="list-style-type: none"> List some basic building materials like stone, Sand etc. Show the students samples e.g. Granite. Show them various sizes of stones. Show the students clay products like roofing tiles, Floor tiles, bricks etc. Describe how these products are produced. 	<ul style="list-style-type: none"> Chalkboard writing materials. Slides Films Charts Brocheus 	2.1 Conduct test on bricks/block listing their characteristics 2.2 Conduct site visit to a quarry 2.3 Write report on the visit.	<ul style="list-style-type: none"> * Guide and supervise students on the test. * Guide and supervise students on the visit 	<ul style="list-style-type: none"> * Chalk board * Block and bricks * testing equipment and tools * writing materials * Vehicle * Recording devices

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	<p>and uses of lime and mortars.</p> <p>2.8 Explain mortar as a binder</p>	<ul style="list-style-type: none"> • Show how these tests can be conducted. • Describe to the students the constituents of Calcium carbonate and water. • Show the students sample of lime • Describe to the students that lime is a binding agent. • Explain constituents of mortar, fine aggregates and cement or lime 				
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11	<p>2.9 Explain different types of cement describing their manufacturing processes and uses.</p> <p>2.10 Describe standard tests for current such as finess, setting time, soundness and precautions in storage of cement.</p> <p>2.11 State the materials used in cement concrete mortar</p>	<ul style="list-style-type: none"> • List all types of cements e.g. O.P.C, Rapid hardening, Extra rapid hardening, Sulphate resisting cement etc. • Describe wet and dry manufacturing processes using schematic diagrams. • Explain the use of each type of cement. 	ditto			
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		<ul style="list-style-type: none"> • Describe the standard test for fineness setting time of cement using relevant apparatus. • Describe how cement is stored. <p>* List materials and state concrete in predetermined proportion</p>	ditto			
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12	<p>2.12 Compare types of concrete such as light weight concrete and non-fine concrete.</p> <p>2.13 Explain Sieve analysis test</p>	<ul style="list-style-type: none"> • Explain lightweight concrete and non-fine Concrete. *Show samples of each type for better appreciation. *State the consequences of each type. • Describe batching by volume and by weight. • Describe the term: water/cement ratio 	-do-	<p>2.4 Conduct sieve analysis test.</p> <p>2.5 Carry out batching by volume and by weight</p> <p>2.6 Carry out workability test</p> <p>2.7 Carry out percentage silt-content test of fine</p>	* Guide and supervise students in the practical	* Sieve set * Workability test apparatus and equipment etc.
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		and its important role in the workability of a mix. • Describe sieve analysis test.		aggregates.		
13	2.14 Explain workability	• Describe order to determine Workability of a concrete mix. to the students how Schmidt Hammer is used to determine strength of Concrete on site. • Carry out percentage silt-content test of fine aggregates.	-do-			
14	2.15 Explain curing of concrete vibration of concrete and water proofing concrete.	• Describe to the students the term: • Curing of concrete by the use of questions and answers. • Describe vibration of concrete and its importance.. • Describe well graded concrete as water proofing concrete.	• Chalkboard			
General Objective 3.0: Understand Ferrous and Non-Ferrous Metals						

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Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
15	3.1 Differentiate Pig Iron, Wrought Iron and steel. 3.2 Explain manufacturing of types of Iron and steel mentioned in 3.1.	<ul style="list-style-type: none"> • Describe the various types of Iron and steel. • Provide samples of these Irons and steel. • Describe manufacturing processes and uses of these Iron. 	<ul style="list-style-type: none"> • Chalkboard 			

Construction Technology I

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: Construction Technology I			Course Code: CTD 103	Contact Hours: 1 – 1 – 3		
COURSE SPECIFICATION: Theoretical Content						
General Object 1.0: Know the various building components and their functional requirements						
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
1	1.1 Explain the term building components.	<ul style="list-style-type: none"> • show the students the various building 	<ul style="list-style-type: none"> • Chalk board • Projector 			

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	<p>1.2 Enumerate the building components e.g foundation, floor, wall, ceiling, roof, , doors, windows, .</p> <p>1.3 State the different requirements of building components.</p> <p>1.4 Sketch these various building components.</p>	<p>Components.</p> <ul style="list-style-type: none"> • Use questions and answers to discuss the different requirements of building components. • Make students to carry out good sketches. 	<p>* Drawing Instruments</p> <p>* Drawing sheets</p> <p>* Charts</p> <p>* Slides</p>			
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	General Objective 2.0: Understand the preliminaries involved in the Construction of a building					
Week	Specific Learning Outcome	Teacher's Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources

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2	<p>2.1 List the site activities which precede the actual building construction.</p> <p>2.2 Explain the importance for the provision of the following facilities on site: temporary services, roads, materials storage accommodation, Site sheds and offices.</p>	<ul style="list-style-type: none"> • Use questions and answers to discuss preliminary site activities • Describe with appropriate sketches the need for good site organization and layout 	<ul style="list-style-type: none"> - Chalk board - Projector - Drawing Instrument - Drawing sheets - Slides - Charts 			
3 4	<p>2.3 Analyse factors to be considered in site organization and layout.</p> <p>2.4 Explain the process of setting out a building using the following: 3,4,5, method, builder's square method, theodolite method</p>	<ul style="list-style-type: none"> • Discuss each method. 	-do-			

General Objective 3.0: Understand the general principles of selecting and preparing sites to receive various types of foundations.						
Week	Specific Learning Outcome	Teacher's Activities	Resources	Learning Outcomes	Teachers Activities	Resources

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5	<p>3.1 Explain the methods of excavation.</p> <p>3.2 List the tools used in manual method of excavation.</p> <p>3.3 Explain the principal equipment used in excavation.</p>	<ul style="list-style-type: none"> • Discuss the methods of excavation. • Show the students the various manual excavation tools. 	<ul style="list-style-type: none"> • Chalk Board, shovel, spade, etc. 			
6	<p>3.4 Explain with sketches the different methods of earthwork support to trenches in different types of soils.</p> <p>3.5 Define the term foundation.</p>	<ul style="list-style-type: none"> • Assign students to carry out good sketches of earthwork supports. 	<ul style="list-style-type: none"> • Chalk Board. * Drawing board and instruments * Drawing sheets 			
7 - 9	<p>3.6 Explain the importance of foundation to building structure.</p> <p>3.7 List the various types of soils and how they affect choice of foundation</p> <p>3.8 Illustrate by simple calculation the area of concrete foundation.</p> <p>3.9 Explain the different types of foundations and their applications.</p>	<ul style="list-style-type: none"> • Use question and answer to discuss the importance of foundation. • Involve students in the calculation process. • Use question and answer to explain the types of foundation. 	<ul style="list-style-type: none"> *Chalk Board. * Calculator 			

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10 - 11	3.10 illustrate 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 foundations.	* Give students assignments	* Chalk board * Slides * Films * Projectors * Models			
General Objective 4.0: Understand the principle of damp proofing in building.						
Week	Specific Learning Outcome	Teacher's Activities	Resources	Learning Outcomes:	Teachers Activities	Resources
12 - 13	4.1 Explain the processes of the rising damp and seepage of ground and underground water. 4.2 Explain the importance of damp-proofing in structural works. 4.3 Identify the functions of damp-proof courses.	• Describe with existing building/or Classroom.	<ul style="list-style-type: none"> • Chalk board • Charts • Films • Projectors • Models 			
14	4.4 Explain the principle of tanking in basement works. 4.5 Explain the processes of damp-proofing materials in use. 4.6 Enumerate the various damp-proofing materials	<ul style="list-style-type: none"> • Describe with appropriate sketches. • Discuss with practical examples. 	-do-			

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	in use. 4.7 Explain the importance of hard-core. 4.8 Explain the use of blinding. 4.9 State the use of anti-termite treatment in foundation works.					
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Construction Technology II

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: Construction Technology II				Course Code: CTD 104	Contact Hours: 1 – 1 – 3	
COURSE SPECIFICATION: Theoretical Content						
General Objective 1.0: Know the different types of floors						
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
1-3	1.1 State the functions of floors. 1.2 Enumerate the various types of ground floors. 1.3 Explain the methods of constructing various types of floors. 1.4 Draw the various types of floors. 1.5 Explain with drawings the methods of constructing timber floors. 1.6 Enumerate the various types of suspended floors. 1.7 State the methods of constructing suspended floors.	<ul style="list-style-type: none"> • Use questions and answers to discuss the types of ground floors. • Describe with appropriate sketches. • Assign students to carry out good sketches. 	<ul style="list-style-type: none"> • Chalk board • Charts * Films * Projectors * Models 			

General Objective 4.0: Know the types of roof and ceiling structures						
Week	Specific Learning	Teachers Activities	Resources	Specific Learning	Teachers	Resources

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	Outcome			Outcomes:	Activities	
12	4.1 Illustrate the methods of construction for various roof structures e.g. Timber, concrete and steel. 4.2 State the properties and fixing details of various roof covering.	<ul style="list-style-type: none"> • Describe using sketches * Assign students to carry good sketches 	<ul style="list-style-type: none"> • Chalk board, * Charts * Drawing board, Instruments and sheets * Charts, model, projectors and films 			
13	4.3 Explain the drainage systems of the various types of roofs. 4.4 Describe with drawings the water proofing systems of the various types of roofs.	-do-	-do-			
14-15	4.5 Enumerate the various types of ceilings. 4.6 State the functions of various types of ceilings. 4.7 Explain the methods of constructing the ceilings in 4.5.	<ul style="list-style-type: none"> • Demonstrating sketches 	<ul style="list-style-type: none"> • Chalk board • Chalk Board & Studio board 			

Construction Technology III

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Construction Technology III				Course Code: CTD 201		Contact Hours: 1 – 1 – 3
Course Specification: Theoretical Content						
General Objective 1.0: Know the uses of scaffolds						
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
1 2	1.1 Explain the principles of scaffolding 1.2 State the uses of scaffolds 1.3 Explain the procedure for providing scaffolding for the various building types.	• Use questions and answers to discuss • Assign students to carry out good sketches	• Chalk board * Drawing boards, Instruments and sheets * Charts			
General Objective 2.0: Know the various types of fenestration in buildings.						
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
3 - 9	2.1 Explain the functional requirements of openings. 2.2 Explain the treatment of doors, windows and other openings in wall. 2.3 Explain the uses of lintel and arches. 2.4 List the various types of door. 2.5 List the main principles to be observed in the	• Describe using various examples • use questions and answers to discuss *Assign students to carry out good sketches	• Chalk board • Drawing instruments, boards and sheets • Models • Charts • Brochures • Postal etc.			

<p>construction of door and framing of joiners work in general.</p> <p>2.6 Explain with the aid of sketches the methods of constructing the different types of framed and flush door.</p> <p>2.7 Explain the different types of door linings.</p> <p>2.8 Explain the difference between a door frame and a door lining</p> <p>2.9 Explain the methods of fixing doorframes and linings to openings.</p> <p>2.10 List the various types of metal door and the common materials used in their construction.</p> <p>2.11 Define the term iron-mongery.</p> <p>2.12 List the various types of window are classification.</p> <p>2.13 Explain with sketches the method of constructing the various types of window.</p> <p>2.14 Illustrate the various components of doors and windows.</p>					
<p>General Objective 3.0: Know the different types of finishes for Floors, walls, and ceilings.</p>					

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Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
11 - 15	<p>3.1 State the functions of finishes on floors, walls, and ceilings.</p> <p>3.2 Illustrate the different types of floor finishes in relation to their functions, e.g terrazzo, grano, PVC etc in terms of internal and external functions.</p> <p>3.3 Illustrate the different types of wall finishes in relation to their functions in terms of internal and external functions.</p> <p>3.4 Illustrate the different types of ceiling finishes in relation to their functions in terms of internal and external functions.</p> <p>3.5 Explain the use of various types of paint for different surfaces in relation to their finishes.</p>	<ul style="list-style-type: none"> • Give various examples during discussion. • Use questions and answers to discuss. * Assign students to carry out sketches 	-do-			

Construction Technology IV

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Construction Technology IV				Course Code: CTD 202		Contact Hours: 1 – 1 – 3
Course Specification: Theoretical Content						
General Objective: 1.0 Understand the needs for External works around the Building						
Week	Specific Learning Outcomes:	Teachers Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
1 - 7	<p>1.1 Explain the essence of having external works around a building.</p> <p>1.2 State the functions of external works.</p> <p>1.3 Explain the functions of fencing and hedges in building.</p> <p>1.4 State the conditions for providing roads, pathways, and parking lots to buildings.</p> <p>1.5 State the functions of sewage plants, e.g. septic tank, soakway, manholes, inspection chambers, sewers etc.</p> <p>1.6 Explain with illustrations how sewage plants above are constructed.</p>	<ul style="list-style-type: none"> • Use questions and answers to discuss. • Assign students to carry out good sketches. 	<ul style="list-style-type: none"> * Chalk board * Drawing board, Instruments and sheets * Charts * Films * Slides * Projectors * Brochures 			

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	1.7 State the underlying principles in planning a good drainage system.					
	1.8 Explain the principles of landscaping to a given site layout including all items of external works.					
General Objective 2.0: Understand the general administration of Building Construction						
Week	Specific Learning Outcomes:	Teachers Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
8 - 11	2.1 Explain the responsibilities of the various parties involved in the building industry-client, architect, quantity surveyor, builder engineers etc 2.2 Define contract 2.3 Differentiate types of contracts, signing and completion of contracts. 2.4 Explain the different types of tendering procedure	<ul style="list-style-type: none"> • Use questions and answers to discuss. * describe with sketches * Assign students to carry out god sketches 	-do-			
	2.5 Outline the methods of site layout and organization, planning services on site, safety and security	-do-				
General Objective 3.0 Understand various requirements as regards Fire precautions and regulations as applied to building.						

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Week	Specific Learning Outcomes:	Teachers Activities	Resources	Specific Learning Outcomes:	Teachers Activities	Resources
12 - 15	3.1 List fire-fighting equipment in building. 3.2 Explain means of escape and routes 3.3 List fire precautions in building 3.4 Define fire resistance materials in building. 3.5 List various burglar-proofing materials in buildings. 3.6 Explain the fixing of burglar-proofing materials.	-do-	-do-			

Site Management I

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: Site Management I				Course Code: CTD 213		Contact hours 1-1-3
COURSE SPECIFICATION: Theoretical Contents:				Practical Contents:		
General Objective 1.0: Know the activities involved in site administration				General Objective 1.0: Carry out activities involved in site administration		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1-4	1.1 Explain the principles of administration and control. 1.2 Explain the effects of efficient site administration. 1.3 Explain site management functions with respect to the following: a. Preparation of schedules. b. Forecasting material requirements. c. Processing and ordering (purchasing). d. Storage, protection, transport, loading and handling. e. Forecasting, overall programmes, short term programmes, forecast target. f. Reports writing.	* Describe to students the activities involved in site administration. * Give students assignments	* Chalkboard * Writing materials * Charts * Log books * Slides projector * Calculator * MS project	1.1 Execute the site management functions with respect to the following: a. Preparation of schedules. b. Forecasting material requirements. c. Processing and ordering (purchasing). d. Storage, protection, transport, loading and handling. e. Forecasting, overall programmes, short term programmes, forecast target. f. Reports writing.	* Guide and supervise students in carrying out site management function.	- Writing materials - charts - Log books - Vehicle - Calculator - MS project

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5	<p>g. Day works, variations, progress reports. h. Time books, wages sheet. i. material log books. j. Mechanical plant requirements. k. Scaffolding (types and erection) l. Statutory diaries. m. Statutory inspections to excavation, scaffolding, hoist cranes, portable electric equipment. n. Maintenance and inspection. o. Safe working conditions for mechanical plant etc.</p>			<p>g. Day works, variations, progress reports. h. Time books, wages sheet. i. material log books. j. Mechanical plant requirements. k. Scaffolding (types and erection) l. Statutory diaries. m. Statutory inspections to excavation, scaffolding, hoist cranes, portable electric equipment. n. Maintenance and inspection. o. Safe working conditions for mechanical plant etc.</p>		
	General Objective 2.0: Know the basic legislation that relate to building construction			General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	2.1 Explain delegated	• Introduce students	• Factory Act			

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6-7	<p>legislation. 2.2 Understand building legislation. 2.3 Understand the following.</p> <p>a. Town planning acts. b. Building regulations. c. Factory Acts.</p>	<p>to all building legislation and explain the use and application.</p> <ul style="list-style-type: none"> • Show students the application of the various building legislation to: • Production drawing • Construction work 	<p>legislation.</p> <ul style="list-style-type: none"> • Building regulation legislation. • Town Planning Act/ legislation. • Health and Safety legislation. 			
General Objective 3.0: Know how to organize labour for building construction work			General Objective 3.0: Organize labour for building Construction work using a chart			
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
8-12	<p>3.1 Determine labour requirements. 3.2 Explain labour forecasting. 3.3 Explain method of recruitment of labour.</p>	<ul style="list-style-type: none"> • Show the student the need for labour output. • Demonstrate to the students division of labour. • Show the students how to construct a bar chart and net Work analysis. • Show the students the use of programme progress chart. 	<ul style="list-style-type: none"> • Schedule of labour requirement. • Bar chart. • Net work Analysis. 	3.1 Prepare a bar chart and network analysis for Construction site	* Guide and supervise students in the preparation of the bar chart and network analysis.	<ul style="list-style-type: none"> - Chalk board - Writing materials - Bar Chart - MS projec
General Objective 4.0: Know the basic principles of incentive for workers			General Objective:			
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning	Teachers Activities	Learning Resources

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				Objective		
13-15	<p>4.1 Define and explain productivity</p> <p>4.2 Explain the general principles of incentive schemes.</p> <p>4.3 Explain financial and non financial incentives.</p> <p>4.4 Measuring and recording incentive schemes.</p>	<ul style="list-style-type: none"> • Show the students the various productivity charts for works on site. • Demonstrate and explain setting out of 'job' Bonus standards. • Show calculation to be carried out. 	<ul style="list-style-type: none"> • Schedule of standard output. • Productivity schedule. <p>* Writing materials</p> <p>* Chalk board</p> <p>* Calculators</p>			

Site Management II

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: Site Management II			Course Code: CTD 210		Contact hours 1-1-0	
	General Objective 1.0: Understand the structural problems in site management and organisation.			General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1-3	<p>1.1 Explain the principle of organisation structuring.</p> <p>1.2 Identify site management problems.</p>	<ul style="list-style-type: none"> • Describe what is management and management hierarchy • Describe the organisation structure of small, medium and large Construction company. • Outline the span of site works 	<p>*Chalkboard</p> <p>* Writing materials</p> <p>* Charts</p> <p>* Films</p> <p>* Slides</p>			

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		• Management	* Projectors			
	General Objective 2.0: Understand the principles which govern effective communication in public and human relation.			General Objective:		
WEEK	Learning Objective	Teachers Activities	Learning Resources	Learning Objective	Teachers Activities	Learning Resources
4-5	2.1 Define communication 2.2 Explain how communication affects the individual and group performance.	• Describe communication • Discuss how communication affects the individual and group performance. • Discuss industrial relation on typical construction site.	<ul style="list-style-type: none"> • Chalk board • Writing materials • Films • Slides • Projectors 			
	General Objective 3.0: Understand and appreciate the importance of effective planning and control in the execution of projects.			General Objective:		
WEEK	Learning Objective	Teachers Activities	Learning Resources	Learning Objective	Teachers Activities	Learning Resources
6-11	3.1 Explain the need to plan work. 3.2 Explain the reasons and advantages of planning. 3.3 Explain the importance of control in the execution of projects 3.4 Differentiate between planning and control	• Describe the process of management in decisions planning, communicating, coordinating, organizing, motivating, controlling and staffing at all levels. • List the advantages of planning	<ul style="list-style-type: none"> • Chalk board • Writing materials • Films • Slides • Projectors • MS project. 			

	General Objective 4.0: Understand the process of works study and the application to site works.			General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Learning Objective	Teachers Activities	Learning Resources
12-14	4.1 Define and explain work study 4.2 Explain work measurement and method study. 4.3 Explain the importance of work-study to the individual and organization.	* Describe work study using examples. * Describe the importance of work study.	* Chalk board * Writing materials			

Introduction to Structural Mechanics and Theory of Structures

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
COURSE: Introduction to Structural Mechanics and Theory of Structures				Course Code: CTD 215	Contact hours 2-0-0	
Course Specification: Theoretical Content.						
	General Objective 1.0: Understanding Dynamics using Newton's Laws of motion			General Objective		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
	1.1 Define Newton's Law of Motion and their appreciation. 1.2 Differentiate between impulse and	• Discuss Newton's Laws of Motion through the use of question and answer • Demonstrate the application of Laws using these examples	• Chalk Board * Writing materials			

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1-3	<p>momentum. 1.3 Define Kinetic Energy. 1.4 Explain Kinematics of Points. 1.5 Analyse the composition and resolution of velocities and Acceleration. 1.6 Differentiate relative Velocity and acceleration. 1.7 Present representation by vectors.</p>	<p>such as an object at “rest”, and an object in Motion. E.g. Walking/running, paddling canoe etc. • Demonstrate the force of impulse 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 describe Kinetic Energy. • Discuss 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.</p>	<p>* Calculator * Graph sheet</p>			
General Objective 2.0: Understand the relations between stress and strain.						
Week	Specific Learning Outcome	Teacher’s Activities	Resources			
4-6	<p>2.1 Explain stress and strain. 2.2 Define load. 2.3 Explain tension and compression forces. 2.4 Define Hooks Law. 2.5 Explain Modulus of</p>	<p>• Discuss load • Discuss tensional forces • Discuss stress • Discuss strain • Explain Hook’s Law emphasizing on words like limit of proportionality, yield stress and ultimate stress.</p>	<p>• Chalk Board * Graph sheet *Writing materials *Calculator</p>			

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7	<p>Elasticity. 2.6 Explain the relation between stress and strain in tension. 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 Illustrate the method of analysis of composite body with axial tension or compression 2.10 Discuss equilibrium of concurrent and non concurrent and coplanar forces</p>	<ul style="list-style-type: none"> • Discuss Modulus of Elasticity. • Discuss and explain each of these terms using graphical method. • Discuss the method of analysis of composite body under axial tension or compression by the application of appropriate equation/formula. 				
General Objective 3.0: Understand static and graphical resolution of forces.						
Week	Specific Learning Outcome	Teacher's Activities	Resources			
	<p>3.1 Define and explain types of forces 3.2 Define equilibrium of concurrent and non-</p>	<ul style="list-style-type: none"> • Discuss concurrent forces non concurrent forces and co-planar • Use graphical method to resolve these forces. 	<ul style="list-style-type: none"> • Chalk board * Writing materials 			

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8	concurrent, co-planar forces. 3.3 Illustrate Polygon of forces. 3.4 Analyse resolution of forces.	<ul style="list-style-type: none"> • Use sketches to show Polygon of Forces. • Use graphical method to resolve forces into components or parts. 	<ul style="list-style-type: none"> * Drawing board and instruments * Graph sheet 			
General Objective 4.0: Know how to determine reactions, Bending Moments, shear force values.						
Week	Specific Learning Outcome:	Teacher's Activities	Resources			
9	4.1 Define bending moments and shear force. 4.2 Describe types of loads, and types of support. 4.3 Explain the equation of equilibrium. 4.4 Illustrate sign conventions for bending moment and shear force diagrams. 4.5 Determine the relationship between load, shear force and bending moment. 4.6 Calculate shear force and bending moment values on: (i) Simple supported beam and (ii) Cantilever beam	<ul style="list-style-type: none"> • Use question and answer to discuss bending moments and shear force. • List or mention types of loads e.g. Dead, live and wind loads. • Illustrate types of support such as fixed, hinge and Roller supports. • State the equations of Equilibrium for Plane structures and structures • State the sign convention for type of bending moment 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: 	<ul style="list-style-type: none"> • Chalk Board 			

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10-12	<p>with concentrated and uniformly distributed load (UDL)</p> <p>4.7 Draw bending moments and shear force diagram.</p> <p>4.8 Use graphical method of determination of reactions, shear force and bending moments.</p>	<p>distributed load (UDL)).</p> <ul style="list-style-type: none"> • Show the students how to draw bending moment and shear force diagrams. • Guide and supervise the students on how to draw bending moment and shear force diagrams using graphical method. <p>* Give students assignments</p>				
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General Objective 5.0: Understand moments of inertia, Products of Inertia, Max & Min Principal Axis, Neutral Axis, Bending. Stress, shear stress						
Week	Specific Learning Outcome:	Teacher's Activities	Resources			
13-15	<p>5.1 Explain general principles of simple bending.</p> <p>5.2 Determine the position of neutral axis.</p> <p>5.3 Calculate moments of inertia.</p> <p>5.4 Determine bending stresses in Beam sections.</p>	<ul style="list-style-type: none"> • 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 	<p>*Chalk Board</p> <p>* Writing materials</p> <p>* codes of practice and</p>			

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	<p>5.5 Calculate combined bending and direct stress.</p> <p>5.6 Determine shear stresses in rectangular Beam sections.</p> <p>5.7 Determine moment of inertia about an axis, maximum and minimum values of inertia about the principal axis.</p>	<ul style="list-style-type: none"> • 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. <p>* Give students assignments</p>	<p>students</p> <p>* Drawing boards</p> <p>* Drawing Instruments</p> <p>* Graph sheet</p>			
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Principles of Law and Building Contracts

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Principles of Law and Building Contracts			Course Code: CTD 211		Contact Hours: 2-0-0	
General Objective 1.0: Know the branches and sources of Law and the various schools of Law						
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1-3	<p>1.1 State and describe schools of Law i.e.</p> <p>i. Analytical school.</p> <p>ii. Historical school.</p> <p>iii. Sociological school.</p> <p>iv. Maximum theory of law.</p> <p>v. Natural law school</p>	<p>*Describe the different origins</p> <p>Using question and answer techniques.</p>	Chalkboard,			

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	1.2 State sources of Law i.e. statutory, common law.etc 1.3 State branches of law i.e. criminal, civil and tort.	*Give examples from stated cases.				
	General Objective 2.0: Understand the legislation process and power separation					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Objective	Teachers Activities	Learning Resources
4	2.1 Explain the doctrine of separation of powers, its advantages and disadvantages 2.2 State the functions of different arms of government	*Use question and answer technique *Use present arrangement to illustrate	* Chalk board * Charts			

	General Objective 3.0: Know the general principles of constitutional and administrative Law					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Objective	Teachers Activities	Learning Resources
5-9	3.1 Define the term "constitution" 3.2 Describe and distinguish the different kinds of constitutions: 3.3 Flexible as opposed to rigid constitutions 3.4 Federal as opposed to unitary constitutions	*Give examples to illustrate the term *Give exercises and review assignment with students	* Chalk board * Constitution			

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	3.5 Describe and distinguish between: Presidential system of government and Parliamentary (cabinet, minister system of government)					
	General Objective 4.0 Understand the statutory Acts, Edicts, Decrees, Bye-Laws etc.					
Week	Specific Learning Outcome	Teachers Activities	Resources			
10-11	4.1 Define the following: i. Statutory act ii. Decrees iii. Edicts iv. Bye-laws v. Regulations	Discuss the terms	* chalk board.			
12-14	4.2 Explain the importance of each of them, their promulgation process and their jurisdiction.					

Principles of Accounts

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN BUILDING CONSTRUCTION TECHNOLOGY						
COURSE: Principles of Account				Course Code:		Contact hours 1-1-0
Course Specification: Theoretical Content.						
General Objective 1.0: Understand basic entry systems of accounting				General Objective:		
WEEK	Specific Learning Objective	Teachers Activities	Learning Resources	Specific Learning Objective	Teachers Activities	Learning Resources
1	1.1 Explain the double entry systems of recording transactions. 1.2 Explain the debit and credit sides of an account entry. 1.3 Prepare double entry recording	*Use real samples to explain. *Use questions and answers techniques.	*Chalkboard *Ledger *Calculator *Accounting machine			

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	of transactions. 1.4 Explain the terms and uses of journal, ledger, cash book, etc.					
General Objective 2.0: Understand the use of General ledger.						
Week	Specific Learning Outcomes:	Teachers Activities	Resources			
2	2.1 Explain the ledger 2.2 State the use of a ledger.	Ditto	- do -			
General Objective 3.0: Know how to extract a trial balance.						
Week	Specific Learning Outcomes:	Teachers Activities	Resources			
3 - 4	3.1 Explain the term trial balance. 3.2 Explain the principle of trial balancing. 3.3 Prepare a trial balance.	Give worked examples and assignments to students.	- do -			
General Objective 4.0: Know how to prepare the Final Accounts of a Sole trader.						
Week	Specific Learning Outcomes:	Teachers Activities	Resources			
5 - 7	4.1 Explain the term Final Accounts. 4.2 List the components of a Final Accounts. 4.3 Prepare a Final Accounts for a Sole trader.	Give work example and assignment to students	- do -			
General Objective 5.0: Know how to prepare accounts for a Partnership						
Week	Specific Learning Outcomes:	Teachers Activities	Resources			
8	5.1 Prepare the draft account of a partnership. 5.2 Prepare the partnership current accounts and capital accounts.	Ditto	- do -			

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9	5.3 Prepare the appropriation account of a partnership. 5.4 Prepare profit and loss appropriation account of partnership.	-do-	- do -			
10	5.5 Prepare a Balance sheet for a partnership. 5.6 Prepare the Bank reconciliatory statements for Sole trader and partnership account.	-do-	- do -			
General Objective 6.0: Understand the preparation of contract accounts.						
Week	Specific Learning Outcomes:	Teachers Activities	Resources			
11-15	6.1 Explain what an payment Certificate means. 6.2 State the uses and importance payment of Certificate in the execution of a contract. 6.3 Explain how to treat sub-contract work in the accounts. 6.4 State the treatment of plant and machinery purchases for a contract in the account. 6.5 Explain how to apportion overhead to a particular contract. 6.6 Prepare contract accounts for individual contracts.	Describe the terms as herein applied. Give more worked examples. * Give students assignments				

	6.7 Explain how profit on an uncompleted contract is to be treated.					
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Practical skills in construction Trades I

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Practical skills in Construction Trades I				Course Code: CTD 105		Contact Hours: 0-0-4
Course Specification: Theoretical Content						
General Objective 1.0: Know and apply block-laying and Concreting Tools, equipment and their uses and maintenance Procedure						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1 - 3	1.1 State the required ratios by volume for mixing mortar and concrete for laying facing bricks/blocks (mortar); for floor slab (concrete). 1.2 State the basic materials		* Hand hawk, trowel, scratches (comb), wooden float spirit	1.1 Select bricklaying and concreting tools and equipment such as	* Demonstrate the use of various bricklaying and	• Workshop tools and equipment, Different trowels, spirit level, builders

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	<p>used to produce mortar and concrete (Fine/course aggregate, cements)</p> <p>1.3 State the methods of cleaning and storing a small rotary mixer (wash, dry, oil reservoir checked, cable care).</p> <p>1.4 List and explain the use of blocklaying and masonry walling tools (brick/blocklaying/mason trowel, hand hawk, line and pins, spirit level/ plumb bob, jointers, hammers, chisels).</p> <p>1.5 state the method of cleaning and storing brick/blocklaying and masonry walling tools (wash, dry, oil steel tools).</p> <p>1.6 Identify and explain the use of tools and equipment required for laying and finishing a concrete floor slab (shovel, tamper, screeding rule, steel trowel, steel float, wooder float, brush)</p> <p>1.7 State the method of cleaning and storing tools and equipment required for laying</p>		<p>level/plumb bob</p>	<p>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.</p> <p>1.2 Use the tools and equipment in 1.1 above.</p> <p>1.3 Maintain the tools and equipment in 1.1 above</p> <p>1.4 select, cutting and plastering tools such as</p>	<p>concreting tools.</p> <p>* Demonstrate the use of cutting and plastering tools.</p> <p>* Demonstrate maintenance of the tools.</p> <p>-do-</p>	<p>square, straight edge (range), wooden float, concrete mixers, vibrators, concrete forms, block moulding machine and consumables, Cutting and plastering tools.</p> <p>-do-</p>
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	<p>and finishing a concrete floor slab.</p> <p>1.8 Identify and explain the use of tools and equipment required for rendering a vertical wall surface.</p> <p>1.9 State the methods of cleaning and storing tools and equipment required for rendering a vertical wall surface(wash, dry, oil steel tools)</p>			<p>club hammer bolster chisel, cold chisel, brick saw; and hack saw for specific job requirements.</p>		
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General Objective 2.0: Understand Factory Acts and Safety regulations applicable in the Blocklaying and Concreting Workshop						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
4 - 6				<p>2.1 Choose adequate ventilation for the workshop</p> <p>2.2 Create safe storage of tools and first aid equipment</p> <p>2.3 Demonstrate general safety habits with respect to the equipment</p>	<p>* Demonstrate how to create safe storage of tools and first aid equipment.</p> <p>* Demonstrate how to layout block laying and concreting workshop.</p>	<ul style="list-style-type: none"> • Chalk board * Charts * Drawing Instruments, sheet and board * Slides * Films

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				2.4 Demonstrate the layout of an ideal blocklaying and concreting workshop		* Postals
General Objective 3.0: Know and apply blocks and concrete materials.						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
7 - 10				<p>3.1 Differentiate between various types of fine aggregates, coarse aggregate, blocks, concrete and additives.</p> <p>3.2 Illustrate types of concrete products</p> <p>3.3 Select suitable aggregates for different kinds of construction works.</p> <p>3.4 Carry out various tests on blocks and concrete material.</p>	<ul style="list-style-type: none"> • Show different types of fine and coarse aggregates, blocks, concrete and additives. * Show how to carry out tests on blocks and concrete. 	<ul style="list-style-type: none"> • Chalk board * consumables e.g. sand, water gravel, cement and additives, charts, pictures, films, projectors
General Objective 4.0: Understand the various methods of laying block & Bricks and concreting						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
11 - 13				4.1 Lay blocks of various	* Demonstrate how to lay	• Chalk board

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				<p>types and sizes</p> <p>4.2 Lay wet concrete for simple slabs, beams and lintels.</p> <p>4.3 Carry out various ways of vibrating, finishing and curing concrete.</p>	<p>blocks of various types and sizes.</p> <p>* Demonstrate how to cast concrete slabs, beams and lintels.</p> <p>* Demonstrate various ways of vibrating, finishing and curing concrete</p>	<p>*consumables e.g. blocks, cement, gravel sand etc.</p> <p>* Charts, films, pictures, projectors</p>
General Objective 5.0: Know different types of brick and block walls and their types of bonds						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
14 -15				<p>5.1 Construct various types of bonds in a block work and brickwork.</p> <p>5.2 Construct block walls of different thicknesses.</p>	<p>• Demonstrate how to construct various types of bonds in a block work and brick work.</p> <p>• Engage students to construct.</p>	-do-

Practical Skills in Construction Trades II

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Practical skills in construction trades II				Course Code: CTD 106	Contact Hours: 0-0-4	
Course Specification 1.0: Theoretical Content				Course Specification: Practical Content		
General Objective: 1.0 Know Woodworking tools and Equipment				General Objective 1.0: Use wood working tools and Equipment		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
	1.1 Identify selective basic hand tools and explain their uses. 1.2 State the method of cleaning and storing basic hand tools. 1.3 identify portable power tools suitable	* Guide students in the selection * Lecture students on the methods required	* Saw (coping rip, tenon), planes (smoothing block), Chisels (level edge, firmer, mortice), marking	1.1 Use the clamps, shooting boards and benches 1.2 Use geometrical tools such as marking gauges, tapes, pencil, caliper and wing compasses, tee	• Demonstrate how each tool and equipment is used.	• Workshop clamps, shooting boards, benches, marking gauges, tapes, pencil, caliper &

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	for cleaning and smoothing frames and explain their uses.		out, setting out, driving (hammer, mallet, screw - drivers), measuring (rules, tapes), Boring (wheel brace, twist bits, counter sink bit, bradawl). * Sander (orbital, belt), transformer .	square and sliding level. 1.3 Use cutting tools such as saws chisels and planes 1.4 Illustrate the differences between fixing tools such as Hammer, Mallets, Nail punches, Screw drivers and the Ratchet Brace.		wing compasses, tee square, sliding level • Saws, chisels and planes, hammer, mallets nail punches, screw drivers, ratchet brace.
	General Objective 2.0: Understand and apply Factory Acts and safety Regulations applicable in the Wood workshop					
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
	2.1 Propose adequate ventilation for the workshop 2.2 Explain the storage	• Discuss factory acts. • Discuss	* Chalk board • Factory acts, safety	2.1 Illustrate the layout of an ideal wood-workshop. 2.2 Create storage	* Guide students in the layout * Guide	* Chalk board * Drawing Instrument, boards and

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4-5	<p>facility for tools and first aid equipment.</p> <p>2.3 Explain the general safety habits with respect to both electrical machinery and tools</p>	<p>safety regulations.</p> <ul style="list-style-type: none"> • Discuss how to create storage facility for tools and first aid equipment. 	<p>regulations.</p> <ul style="list-style-type: none"> • First aid kit/box * Charts * Videos * Slides * Projectors * Posters 	<p>facilities for tools and first aid kit/box</p> <p>2.3 Carry out the general safety habits with respect to both electrical and hand tools</p>	<p>students to assemble a first aid kit/box</p> <ul style="list-style-type: none"> * Guide and supervise the students in the practice of safety habits 	<p>sheets</p> <ul style="list-style-type: none"> * First aid kits/box * Charts * Brochures * Films * Projectors
General Objective 3.0: Know the types of Timber used for various work Purposes.				General Objective 3.0: Apply the types of timber use for various work purposes		
Week	Specific Learning Outcome	Teachers Activities	Resources	Learning Outcome:	Teachers Activities	Resources

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6-7	<p>3.1 Explain the basic types of materials and fixing used to form joints components and products.</p> <p>3.2 Explain the basic joints used to form components and products:</p> <p>a) halving b) mortice and tenon c) Bridle</p> <p>3.3 Differentiate hardwoods from softwood.</p> <p>3.4 Illustrate the growth, structure and shrinkage of timber.</p> <p>3.5 Describe suitable timber conversion methods such as slab saw, tangential sawing and quarter sawing.</p> <p>3.6 Explain their respective formation processes.</p> <p>3.7 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 advantage of kiln seasoning.</p>	<ul style="list-style-type: none"> • Show samples of hard wood and softwood • Use questions and answers to discuss. • Discuss seasoning methods. • Engage students in the discussion. 	<ul style="list-style-type: none"> * Chalk board * Charts * Portals * Pictures * Films * Slides * Projectors * Models 	<p>3.1 Select, use, clean and store basic hand tools to prepare timber joints, components and products.</p>	<ul style="list-style-type: none"> * Guide and supervise the students in the selection, use, cleaning and storage. 	<ul style="list-style-type: none"> * Tenon saw, smoothing plane, chisel, marking out equipment selling out equipment mallet, screw-driver, rules, tape, wheel brace, twist bits, counter sink bit, bradawl.
	<p>3.8 Describe timber preservation methods: a)Wood preservatives oil b)Waterborne preservative method:</p> <p>3.9 Describe other preservation methods like pressure process,</p>	<ul style="list-style-type: none"> • Discuss preservation methods with practical examples. • Engage 	-do-	<p>3.2 Identify the various types and sizes of timber available for use in the market.</p> <p>3.3 Select, use,</p>	<ul style="list-style-type: none"> * Show the various types and sizes of timber * Guide and 	<ul style="list-style-type: none"> * Chalk board * Models

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8-9	<p>open tank hot Bath process, and brush, dip stray application.</p> <p>3.10 Analyze diffusion process.</p> <p>3.11 Explain basic products associated with timber such as:</p> <p>a) Windows</p> <p>b) Doors</p> <p>c) Stairs</p> <p>d) Tables</p> <p>e) Units/fitments</p> <p>f) Roofs</p> <p>g) Partitions</p> <p>h) Floor</p>	<p>students in the discussion.</p> <ul style="list-style-type: none"> • Engage students to discuss diffusion process. • Show students various sizes of available timber. 		<p>clean and store basic hand tools</p> <p>3.4 Prepare timber joints, components and products</p>	<p>supervise the students I the selection, using and storing of hand tools.</p> <p>*Guide and supervise the students in the preparation of timber joints component and products</p>	<ul style="list-style-type: none"> * Films * Charts * Posters * Pictures * Projectors * Various hand tools * Cleaning agents
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	General Objective 4.0: Know the various types of wood joints			General Objective: Carry out the various types of wood joints		
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
	4.1 Explain with the aid of sketches various types of wood joints	<ul style="list-style-type: none"> * Describe to students the various types of wood joint * Assign students to draw various types of wood joints. 	<ul style="list-style-type: none"> * Chalk board * Drawing boards, Instrument and sheets * Models * Posters * Pictures * Slides, films, projectors 	4.1 Construct widening joints and tongue and groove joints. 4.2 Construct the following joints: a. Frame joint. b. Tee and cross halving joint. c. Common mortise and tenon, Hunched tenon joint. d. Long and short shouldered mortise and tenon with rebate.	<ul style="list-style-type: none"> • Demonstrate how to construct the various joints • Engage students to construct joints. 	<ul style="list-style-type: none"> • Chalk board * Models * Various hand tools and equipment *Consumables
				4.3 Construct angle joints such as dovetail joint, housing joint and dowel joint	<ul style="list-style-type: none"> •Demonstrate how to construct joints • Engage students to construct joints 	

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	General Objective 5.0: Know the different types of Jointing materials			General Objective 5.0: Apply the different types of jointing materials		
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
12-13	<p>5.1 Explain the different types of jointing materials</p> <p>5.2 Classify wood adhesives e.g. Thermo – setting, Thermoplastic</p> <p>5.3 Differentiate properties of animal and synthetic resin adhesives and their advantages i.e. epoxy resin, polyvinyl acetate (P.V.A) and rubber based adhesives: their advantages and applications</p> <p>5.4 State the consequences of using the different types of wood adhesives.</p>	<p>* Describe to students the various types of jointing materials</p> <p>* Describe the classification of wood adhesives</p> <p>* Describe properties of adhesives</p> <p>Describe the consequences of using adhesives</p>	<p>* Chalk board</p> <p>* Samples of jointing materials</p> <p>* Brochures</p> <p>* Posters</p> <p>* Films, slides, projectors charts</p>	<p>5.1 Use nails of different sizes on given job types.</p> <p>5.2 Use various types of screws such as raised head, round head, countersunk head and coach or square head on given job types.</p> <p>5.3 Use other materials such as bolts and nuts, timber connectors etc.</p> <p>5.4 Apply appropriate wood adhesives, e.g. Thermo-setting Thermoplastic, animal and synthetic resins adhesives</p>	<p>•Demonstrate how to use nails of different sizes.</p> <p>•Demonstrate use of various types of screws.</p> <p>•Demonstrate use of bolts and nuts, timber connectors.</p> <p>• Show samples and limitation of application of adhesives.</p>	<p>* Chalk board</p> <p>*consumables (nails, screws of various types, bolts and nuts, timber connectors etc. Wood adhesives such as thermo-setting and thermoplastic, resins etc.</p>

NID in Building Construction (Draft)

	General Objective 6.0: Know the various woodworking machine in use			General Objective 6.0: Apply various wooding machines.		
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
14-15	<p>6.1 List the various types of woodworking machines</p> <p>6.2 Explain the uses of various types of wood working machines</p> <p>6.3 Explain the maintenance of the machines listed in 6.1 above.</p>	<p>* Out line the various types of machines</p> <p>* Describe the uses of machines</p> <p>* Describe the maintenance of machines</p>	<p>* Chalk board</p> <p>* Charts</p> <p>* Brochures</p> <p>* Films</p> <p>* Posters</p> <p>* Projectors</p> <p>* Pictures</p>	<p>6.1 Identify woodworking machines e.g.</p> <p>a. Planting machine</p> <p>b. Sawing machine</p> <p>c. Band saw machine</p> <p>d. Spindle moulding machine.</p> <p>e. Drilling machine</p> <p>f. Mortise and Tenon machine</p> <p>g. Sanding and portable hand machines.</p> <p>6.2 Use the machines in 6.1 above</p> <p>6.3 Maintain the machines listed in 6.1 above</p>	<ul style="list-style-type: none"> • Identify the listed machines • Demonstrate use of machines • Demonstrate the maintenance of the machine 	<ul style="list-style-type: none"> • Chalk board Planting Machine, Sawing Machine, Band saw machine, Spindle moulding machine, Drilling machine, Mortise and tenon machine, Sanding and portable hand machines.

Practical Skills in Construction Trades III

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Practical Skills in Construction Trades III				Course Code: CTD 205	Contact Hours: 0-0-4	
Course Specification: Theoretical Content						
General Objective 1.0: Know painting and decoration and their effects on buildings				General Objective 1.0: Apply painting and describe to Building surfaces.		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
	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 paints.	<ul style="list-style-type: none"> • Use questions and answers to discuss painting and decoration. * Describe the component of paint * Describe the function of constituents 	<ul style="list-style-type: none"> • Chalk board * Charts * Posters * Pictures * Brochures * Projectors 	1.1 Illustrate the methods of preparing surfaces for painting 1.2 Carry out the methods of application of paint. 1.3 Apply paint to surface materials like block/brick work, concrete, metal, etc.	<ul style="list-style-type: none"> • Demonstrate to the students how to mix paints in correct proportions * Demonstrate the application of paint 	<ul style="list-style-type: none"> * Chalk board * Consumables * Models * Brushes * Rollers * Spry gun
	1.4 Explain 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.	<ul style="list-style-type: none"> • Describe types of Paints. * Discuss the condition of their uses 	-do-	1.4 Maintain paint brushes, rollers, spray guns, etc.	<ul style="list-style-type: none"> * Guide and supervise students in maintenance work 	<ul style="list-style-type: none"> * Spray machine etc. <li style="text-align: center;">-do-

NID in Building Construction (Draft)

	General Objective 2.0: Know the various tools and equipment for painting works.			General Objective 2.0: Apply various tools and equipment		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
3	<p>2.1 Explain basic surface preparation hand tools and explain their uses</p> <p>2.2 State the methods for cleaning and storing basic surface preparation hand tools.</p> <p>2.3 State the methods for cleaning and storing dry brushes, dry rollers, pads mittens</p>	<p>* Describe supervise preparation hand tools</p> <p>* Describe the methods</p> <p>List the parts and materials used</p> <p>-do-</p> <p>Describe the methods</p>	<ul style="list-style-type: none"> • Chalk board • Charts • Posters • Pictures, Brochures, slides, films, projectors 	<p>2.1 Select surface preparation and hand tools</p> <p>2.2 Clean and store surface preparation hand tools</p> <p>2.3 Clean and store brushes, rollers, pads mittens</p> <p>2.4 Store brushes wetted with paint</p> <p>2.5 construct transfer</p>	<p>* Guide and supervise students in the selection, cleaning</p>	<ul style="list-style-type: none"> • Scraper, put Knife, dust brush, shave hook dust knife, nail punch, filling knife, spatula. • New/painted timber surfaces wall paper/painted surface remover, filler/put/seal ant remover, <p>Filler Application</p> <ul style="list-style-type: none"> • hot soapy water, water

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4-5	<p>2.4 State the methods of storing brushes wetted with paint</p> <p>2.5 Know the parts and materials used in the construction of brushes</p> <p>2.6 Name the parts and materials used in the construction of rollers</p> <p>2.7 Explain the methods of cleaning wet paint containers and trays</p>	<p>List the tools</p> <p>* Describe the methods</p> <p style="text-align: center;">-do-</p>		<p>2.6 Construct rollers</p> <p>2.7 Clean wet paint containers</p> <p>2.8 Identify and use portable power tools</p> <p>2.9 Clean and maintain store portable power tools</p> <p>2.10 store liquefied petroleum gas (LPG), Burning – off equipment</p>	<p>Maintaining and storing of tools and equipment</p>	<ul style="list-style-type: none"> • based paint (cold water) • Vapour box (keep) Immerse in water • Handle (wood, plastic), ferrule (stainless steel, copper) ,filling (bristle, synthetic) • Handle (plastic wood) covering (lamb’s wool, synthetic)
	<p>2.8 State portable power tools suitable for surface preparation and describe their use.</p> <p>2.9 Explain the method for storing portable power tools (clean, dry lubricated, cable care, secure)</p> <p>2.10 Explain the methods for storing liquid fied petroleum gas (LPG), Burning – off equipment</p>					

	General Objective 3.0: Understand the Preservative Characteristics of Paint.			General Objective 3.0: Apply preservative characteristic of paint		
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
7	3.1 Explain the preservation characteristics of paint, i.e. moisture prevention, rust prevention, etc	* Discuss preservation characteristics of paint	<ul style="list-style-type: none"> • Chalk board * Films * Slides * Projectors * Posters * Brochures * Charts 	3.1 Mix paint to the right constituents for application using brush, roller or spray gun. 3.2 Identify additives which are available for use as preservative and weathering preventive treatment	<ul style="list-style-type: none"> * Guide and supervise students in the mixing and application of paint * Show additives 	<ul style="list-style-type: none"> * Consumables * Brushes, rollers, spray gun and machine
General Objective 4.0: Know the defects, causes and remedies of Paint work						
8	4.1 Explain the defects in paint work. 4.2 State their causes and remedies.	<ul style="list-style-type: none"> • Describe the defects in Paint work. • Discuss their causes and remedies to the students. 	-do-			

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	General Objective 5.0: Know the Plumbing Tools and Equipment			General objective 5.0: Apply plumbing tools and equipment		
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
9	5.1 State plumbing tools and equipment 5.2 Explain the uses of plumbing tools and equipment 5.3 Explain maintenance methods in 5.1	* List plumbing tools and equipment * Describe the uses of plumbing tools and equipment. * Describe maintenance methods	<ul style="list-style-type: none"> • Chalk board * Slides * Charts * Pictures * Films * Projectors * porters * Brochures 	5.1 Identify plumbing tools and equipment. 5.2 Select plumbing tools and equipment for use. 5.3 Use the tools in 4.1 and portable power tools and equipment. 5.4 Maintain the tools used in 4.2 above.	<ul style="list-style-type: none"> • Show the students plumbing tools and equipment * Guide and supervise students in the uses of the plumbing tools and equipment. * Guide and supervise students in the maintenance of tools and equipment 	<ul style="list-style-type: none"> * Consumable * Plumbing tools and equipment
	General Objective 6.0: Understand Factory Acts and Safety Regulations Applicable in the plumbing Workshop					
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
	6.1 Explain Safety and Upkeep of Workshop. 6.2 Explain the	<ul style="list-style-type: none"> • Show the students how the workshop can be well 	- Factory acts safety regulation	6.1 Create safe storage facilities for tools and first aid equipment	<ul style="list-style-type: none"> * Guide students in the safety and up keep 	<ul style="list-style-type: none"> * Chalk board * Drawing Instrument,

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10	importance of ventilation for the workshop. 6.3 Explain creation of storage facility for tools and first aid kit/box 6.4 Explain the general safety habits with respect to both electrical machinery and tools	ventilated. • Discuss safety * Discuss storage facilities • Describe to the students safety habits to be observed in the workshop	* chalk board * First aid kit/box * Chart * Slides * projectors Etc.	6.2 Carry out general safety habits with respect to plumbing equipment and tools. 6.3 Illustrate the layout of an ideal plumbing workshop.	of workshop * Guide students to assemble first aid kit/box * Guide and supervise the students in the practice of safety habits	board and sheets * First kit/box * Charts * Brochures * Projectors * Films
General Objective 7.0: Know Plumbing Materials for various works			General Objective 7.0: Apply plumbing materials for various works			
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
12	7.1 State the various types of pipe and their accessories for plumbing work 7.2 Explain types of threading and founding materials	• List various types of pipe and accessories for plumbing work • Describe types of threading pipe and jointing methods.	* Chalk board * Charts * Posters * Slides * Projectors * pictures	7.1 Select pipes and accessories used in plumbing work for cold water, waste, soil and ventilation pipe, drainage and domestic control heating. 7.2 Identify their sizes, weights and gauges. 7.3 Carry out methods of jointing, manipulation and fixing 7.4 Prepare threading	* Guide and supervise students in the selection of pipes and accessories.	- Consumables - Tools and equipment

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	General Objective 8.0: Know the principle of Water Supply to Building			General Objective 8.0: Apply the Basic principle of water supply to building		
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
13	<p>8.1 Explain the properties of water based on common sources of supply.</p> <p>8.2 State the rules to be followed in piping for water supply.\</p>	<ul style="list-style-type: none"> • Describe to the students properties of water based on its source. • Discuss rules for piping. 	<ul style="list-style-type: none"> • Chalk board * Charts * Slides * Pictures * Projectors * Films 	<p>8.1 Observe connection to water mains</p> <p>8.2 Illustrate the domestic systems of cold and hot water supply</p> <p>8.3 Carry out connection with pipes for water supply</p>	<ul style="list-style-type: none"> * Guide and supervise students in connection works 	<ul style="list-style-type: none"> * consumables * tools and equipment * Fitting
	<p>8.3 Explain connections to water mains</p> <p>8.4 Explain the domestic systems of cold and hot water supply.</p>	<ul style="list-style-type: none"> • Describe how pipe connections are made. • Describe connections for a domestic water supply * Give students assignments 	-do-			

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	General Objective 9.0: Know the different methods of installing and fixing appliances			General Objective 9.0: Apply the various methods of installing and fixing appliances		
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
14	<p>9.1 State and explain sanitary appliances and accessories.</p> <p>9.2 Explain Installation to sanitary appliances</p>	<p>* List sanitary appliances and accessories</p> <p>• Describe to the students how to install sanitary appliances.</p>	<p>• Chalk board</p> <p>* Charts</p> <p>* Models</p> <p>* Slides</p> <p>* Films</p> <p>* Brochures</p>	<p>9.1 Illustrate plumbing constructional features.</p> <p>9.2 Install sanitary appliances, fittings, soil/water, and ventilation pipes.</p>	<p>* Show to students feature of plumbing</p> <p>Guide and supervise students in the Installation work</p>	<p>• Consumables</p> <p>• Tools and equipment.</p> <p>• Models</p>

	General Objective 10.0: Know the principle projectors of Drainage Systems			General Objective 10.0: Apply the principles of drainage systems		
Week	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
15	<p>10.1 Explain general layout and construction method of drainage systems.</p>	<p>• Describe general layout of workshop.</p>	-do-	<p>10.1 Construct drainage systems.</p> <p>10.2 Test drains and solid pipes</p>	<p>• Show how drainage systems are constructed.</p> <p>• Show the students how to test drains and solid pipes.</p>	-do-
	<p>10.2 Explain private sewage system and public sewage system</p>	<p>• Describe private sewage system and public sewage system..</p>	<p>• Workshop consumables</p>			

Practical Skills in Construction Trades IV

Course: Practical Skills in Construction Trades IV			Course Code: CTD 204		Contact Hours: 0-0-4	
Course Specification: Theoretical Content				Course Specification: Practical		
General Objective 1.0: Understand Electrical Installation Involved in the building process				General Objective 1.0: Apply Electrical installation Involved in the Building process		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1 - 2	<p>1.1 Explain the safety precautions required in workshops and site e.g. how human body can become part of electric circuit , remedy; severe shock and artificial respirations</p> <p>1.2 Explain electrical symbols and regulations with special reference to I.E.E. Regulations</p>	<ul style="list-style-type: none"> Describe the safety regulations required in the workshop. List and draw Electrical symbols and explain each 	<ul style="list-style-type: none"> Chalk board * Charts * Models * Brochures * Films * Projectors * Slides * Pictures 	<p>1.1 Identify tools and equipment used in simple electrical works and their maintenance requirements.</p> <p>1.2 Identify accessory types in use, e.g. ib, Sw, dfb, ccu plug, Main switches, fuses, distribution boards and other protective systems, e.g. ELCB.</p>	<p>Guide and supervise students in the identification uses and main feature</p> <ul style="list-style-type: none"> * Show students the respective cables. * Describe soldering Techniques * Guide Students in the preparation. * Guide and supervise students in the electrical wiring. 	<ul style="list-style-type: none"> Consumable Tools and equipments Electrical fitting Safety devices Charts Brochures Models I. E. E regulations
	1.3 Explain the process of electricity	<ul style="list-style-type: none"> Describe generation, 	-do-	1.3 Identify cable colours and	* Guide and supervise students	<ul style="list-style-type: none"> Workshop consumables

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3-4	<p>generation, transmission and distribution.</p> <p>1.4 Explain the different types of generators used on site with emphasis on portable generators.</p> <p>1.5 Explain electrical power distribution systems, e.g. 1 and 4 wire system for both A.C. & D.C.</p> <p>1.6 Explain the meaning of power factor and the effect of power factor on cable sizes.</p>	<p>transmission and distribution of electricity</p> <ul style="list-style-type: none"> • Describe AC and DC systems. 		<p>regulations applicable.</p> <p>1.4 Illustrate the current rating of cables, cable joints.</p> <p>1.5 Soldering techniques and regulations applicable.</p> <p>1.6 Prepare ends of cable for entry into accessories.</p> <p>1.7 Carry out electrical wiring- (conduit and surface).</p>	<p>in the processes</p> <ul style="list-style-type: none"> * Sketch the wiring diagrams. * Show with the aid of sketches the respective circuits * Sketch wiring socket outlet, plugs and hopping systems 	<p>e.g. wires, switches, light points, (lamp holders) etc.</p> <ul style="list-style-type: none"> • Guide students in the Conversion from one-way to two-ways electrical bells and indicating systems.
	<p>1.7 Explain types of cables and where they are used, e.g MICO.</p>	<ul style="list-style-type: none"> • List and describe types of cables • Describe preparation of cables for use. 	-do-	<p>1.8 Carry out bending, cutting and threading of conduit.</p> <p>1.9 Draw the following practical wiring diagrams: simple lighting points wiring 1-way, two-way, and intermediate switches.</p>		

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5	<p>1.8 Explain PVC conduit and its uses.</p> <p>1.9 List the types of conduits for practical wiring exercises.</p>	<ul style="list-style-type: none"> Describe the students PVC conduit and its uses. 	-do-	<p>1.10 Illustrate series, parallel and series in parallel circuits</p>		
	<p>1.10 Explain the methods of wiring for switches</p> <p>a) One way</p> <p>b) Two way etc</p>	<ul style="list-style-type: none"> Describe practical wiring like one way, two way and intermediate switches. 	-do	<p>1.11 Draw wiring Socket outlet, plugs looping system</p>		
	<p>1.11 Describe regulations applicable to earthing systems.</p>	<ul style="list-style-type: none"> Describe further wiring e.g Socket outlet, plugs, looping system 		<p>1.12 Carry out conversion from one-way to two-ways electrical bells and indicating systems.</p>		-do-
General Objective 2.0 : Know basic tools employed in refrigeration and air – conditioning Installation				General Objective 2.0: Apply the basic tools in refrigeration and air – conditioning Installation.		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources

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6-7	<p>2.1 Explain basic refrigeration and air conditioning hand tools and their uses.</p> <p>2.2 State the method of cleaning and storing basic hand tools in air conditioning and refrigeration</p> <p>2.3 Explain portable power tools suitable for drilling.</p> <p>2.4 Explain the different types of twist drills suitable for various applications</p> <p>2.5 State the methods for storing portable power tools.</p> <p>2.6 describe the basic types of pipe used in refrigeration and air conditioning:</p> <p>a) Thick walled.</p>	<p>* Describe basic refrigeration and air conditioning hand tools and their uses, cleaning and storing</p> <p>* Describe portable power tools for drilling</p> <p>* Describe the types of twist drill</p> <p>* List the methods for storing portable power tools</p> <p>* Describe types of pipes used in refrigeration and air-conditioning (R & A)</p>	<p>- Chalk board</p> <p>- Charts</p> <p>- pictures</p> <p>- Bronchures</p> <p>- Slides</p> <p>- Films</p> <p>- Video etc.</p>	<p>2.1 Select, use, clean and store basic hand tools to install components of a refrigeration and air conditioning system.</p> <p>2.2 Select, use, clean and store portable power tools for drilling walls, screw fixing/pipe access and drilling in metal plate for component/accessory fixing</p> <p>2.3 Set out pipe runs and install pipe work from a liquid recover to an evaporator.</p> <p>2.4 Hand bend pipe work to fit pipe runs and link accessories.</p>	<p>* Guide and supervise students in the selection, using cleaning and storing basic hand tools.</p> <p>* Guide and supervise students in the selection, using cleaning and storing basic power tools</p> <p>* Guide and supervise students in the Installation work.</p>	<ul style="list-style-type: none"> • Tape, measure, spirit level, tube cutter, pipe rammer, screw drivers, spanners, jointing equipments (e.g pipe flaring tools, swaging tools, portable heating equipment) benders (e.g spring, hand bender). • Electric drill • Copper pipe, pipe clips, plastic pipe etc. • Spring
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						<p>hand bender</p> <ul style="list-style-type: none">• Evaporator heat exchanger• Oxy – acetylene, propane, etc.
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<p>8-9</p> <p>10</p>	<p>b) Soft drawn annealed copper coil</p> <p>c) Half hand straight tube</p> <p>d) Plastic</p> <p>e) pipe clips</p> <p>f) Pipe clamps</p> <p>2.7 Explain the basic types of jointing system used for refrigeration and air conditioning:</p> <p>a) Braze</p> <p>b) compression (Copper)</p> <p>c) Push fit</p> <p>d) Threaded</p> <p>e) Solvent welded (plastic)</p> <p>2.8 State the basic types pipe work accessories used for refrigeration and air conditioning.</p>	<p>*Describe types of jointing of system in R & A</p> <p>* List the types of accessories used in R & A</p> <p>* List the methods of storing portable heating equipment</p>		<p>2.5 Fix refrigeration accessories to walls or framework</p> <p>2.6 Terminate pipe work into accessories.</p> <p>2.7 Select, use clean, store and maintain portable heating equipment</p>	<p>-do-</p> <p>-do-</p> <p>* Guide and supervise students in the selection, using cleaning, storing and maintaining portable heating equipment</p>	
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	2.9 State the methods for storing portable heating equipment					
General Objective 3.0: Construct a small model Building complete with all essential services and finishes						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
11				<p>3.1 Identify basic instruments used for setting out.</p> <p>3.2 Demonstrate the use of the tools listed in 3.1 above</p> <p>3.3 Set out the first course of walling for door opening.</p> <p>3.4 Construct wall to window level.</p> <p>3.5 Set out the various windows and their openings</p> <p>3.6 Construct wall to lintel level</p> <p>3.7 Cast lintels</p> <p>3.8 Construct wall up</p>	<ul style="list-style-type: none"> • List and show the students tools for setting out a building • Set out a building • Demonstrate how to set out 1st course of walling for door opening. • Set out openings for doors and windows • Demonstrate 	<ul style="list-style-type: none"> • consumables *pegs, nails, battens, line builder's square • cement, sand, trowels, line, spirit level.

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12-13				<p>to roof level</p> <p>3.9 Carry out roof construction (car casing)</p> <p>3.10 Fix appropriate roof covering</p> <p>3.11 Fix window and door frames</p> <p>3.12 Fix doors and windows</p> <p>3.13 Fix pipes for plumbing and electrical works.</p> <p>3.14 Fix plumbing and sanitary appliances in appropriate positions</p> <p>3.15 Carry out ceiling</p>	<p>laying block wall to lintel level</p> <ul style="list-style-type: none"> •Demonstrate construction of roof. •Demonstrate fixing of fittings like doors and windows •Demonstrate fixing of further fittings e.g. services (plumbing) •Demonstrate how to construct ceiling. 	
				<p>3.16 Plaster walls internally and externally</p> <p>3.17 Lay appropriate</p>	<ul style="list-style-type: none"> • Demonstrate how finishes to a building 	

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				floor finishes 3.18 Fix wall and floor tiles as required 3.19 Correlate electrical wiring 3.20 Fix electrical fittings	is done e.g. plastering • Demonstrate electrical fittings.	
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Building Services and Maintenance Courses

Maintenance Technology

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Maintenance Technology		Course Code: CTD 203			Contact Hours: 1 – 0 – 3	
Course Specification: Theoretical Content				Course Specification: Practical		
General Objective 1.0: Understanding the meaning of the terms used in maintenance and repairs and related facilities.				General Objective 1.0: Apply the principles of maintenance on Buildings and related facilities		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1 - 3	<p>1.1 Define the terms used in the practice of repairs and maintenance of building and related facilities.</p> <p>1.2 Explain the terms used in building maintenance and related facilities.</p>	<ul style="list-style-type: none"> • State the meaning of maintenance generally, narrow this to building maintenance • Describe the various terms used in building maintenance 	<ul style="list-style-type: none"> • Pictures * Films * Slides * Projectors 	<p>1.1 Carry out simple Building inspection.</p> <p>1.2 Prepare schedule of dilapidation of a simple building.</p> <p>1.3 Advance remedies to identified defects in simple building.</p> <p>1.4 Carry out estimates for the</p>	<ul style="list-style-type: none"> • Guide students in the inspection. • Prepare schedule of dilapidation of defects. • Prepare estimates for the renovation work. 	<ul style="list-style-type: none"> - Vehicle - Calculator - Paper - Writing materials.

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				renovation of a simple building		
General Objective 2.0: Understand the ground geological fault and their effect on building.						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
4-6	<p>2.1 Explain the geological faults which cause defect in the foundation of building.</p> <p>2.2 Explain the effect of foundation failures on the walls of buildings.</p> <p>2.3 Explain the ground faults and their remedies to foundations.</p> <p>2.4 Explain the remedies to</p>	<ul style="list-style-type: none"> • Describe faults generally • Describe the meaning of geological fault • Describe how such fault cause defects in foundation of building • Describe the effect of foundation failures on the walls of building • Describe how these faults 	-do-			

NID in Building Construction (Draft)

	various foundation failures	can be remedied				
General Objective 3.0: Understanding the types of defects which affect brick, blockworks and masonry and remedies for them						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
7-9	<p>3.1 State the types of defects in brick, sandcrete wall, block wall, sand masonry walls and timber.</p> <p>3.2 Explain the causes of decay in block-wall and sandcrete wall and masonry wall and timber.</p> <p>3.3 Explain the remedies for the above defects in 3.1</p>	<ul style="list-style-type: none"> • Describe the various defects in walls. • Give examples of such defects * Use questions and answers to explain decays in wall and timber. • Describe remedies for decays in walls and timber. 	-do-			
General Objective 4.0: Understand the causes of defect and their remedies in low-rise buildings.						
	4.1 State the types of defects in	• Describe using questions and	-do-			

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10-15	<p>roofs.</p> <p>4.2 Explain the causes of defects in roofs.</p> <p>4.3 Propose simple methods of prevention and remedies for 4.1 above.</p> <p>4.4 Propose simple methods of remedying the defects in low rise building.</p> <p>4.5 Explain the causes and effects of rising damp and penetrating damp on structure and fabric e.g. walls, floors, roofs etc.</p> <p>4.6 State the effect of technology on maintenance.</p>	<p>answers.</p> <ul style="list-style-type: none"> • Give examples using practical cases. <p style="text-align: center;">-do-</p>				
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PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY

Course: : Building Services

Course Code: CTD 217

Contact Hours: 1 – 1 – 0

Course Specification: Theoretical Content

Course Specification: Practical

General Objective 1.0: Know the sources, quality and classification of water.

Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1-3	1.1 Explain sources of water 1.2 State the quality of water from the sources in 1.1. 1.3 State the two classes of water, viz hard and soft water. 1.4 Describe the methods of purification of water.	<ul style="list-style-type: none"> • Describe sources of water. • Differentiate between hard and soft water. • Describe methods of purifying water. 	<ul style="list-style-type: none"> • Chalkboard, * Charts * Posters * Films * Slides * Projectors 			

General Objective 2.0: Know the system of distribution of pipe work for domestic cold water supply						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
4-6	<p>2.1 Explain the direct and indirect method of cold water supply.</p> <p>2.2 Explain the sizes and types of pipes used along the distribution system</p> <p>2.3 Explain with sketches cold water supply system.</p> <p>2.4 Explain means of providing drinking water</p> <p>2.5 Explain: communication, service, supply, distribution and overflow pipes</p>	<ul style="list-style-type: none"> • Discuss pipe sizing and types • Describe and illustrate the direct and indirect methods of water supply * Describe means of providing drinking water * Describe the differences. 	-d0-			
General Objective 3.0: Understand hot water supply system hot water supply Systems						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
7-8	<p>3.1 Explain direct and indirect systems of hot water supply</p> <p>3.2 Explain need for sizing of pipes and precaution against dead leg</p>	<ul style="list-style-type: none"> • Describe and illustrate direct and indirect hot water supply system • Describe pipe sizing and precaution against dead leg 	<ul style="list-style-type: none"> • Chalk board • Charts • Films • Projectors • Models 			
General Objective 4.0: Know the basic sanitary appliances, fitting and their uses						

NID in Building Construction (Draft)

Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
9-10	<p>4.1 Explain the following appliances and their functions WC, Urinal, Bidet, various showers, wash hand basin sink, taps and valves.</p> <p>4.2 Sketch the sanitary appliances in 4.1.</p> <p>4.3 State the construction requirements for installing the sanitary appliances.</p>	<ul style="list-style-type: none"> • Describe 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 	-do-			
General Objective 5.0: Know the various types of drainage systems used in buildings						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Learning Outcome:	Teachers Activities	Resources

NID in Building Construction (Draft)

11-12	<p>5.1 Explain drainage Systems</p> <p>5.2 Explain the materials and fittings used in drainage work.</p> <p>5.3 Outline the combined and separate systems of drainage.</p> <p>5.4 Produce simple diagrams of the system in 5.2.</p> <p>5.5 State the merits and demerits of the separate and combined drainage systems.</p>	<ul style="list-style-type: none"> • Describe drainage system • Describe materials and fitting. • Sketch combined and separate system. • Describe the merits and demerits of the separate and combined drainage systems. 	-do-			
General Objective 6.0: Know the methods of providing lighting in buildings.						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
13	<p>6.1 State artificial and natural lighting methods</p> <p>6.2 Explain how to provide artificial lighting in houses.</p> <p>6.3 Explain how to provide</p>	<ul style="list-style-type: none"> • Introduce student to daylight factor • Differentiate between natural and artificial lighting 	<ul style="list-style-type: none"> • Provide 'Daylight' factor chart 			

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	natural lighting in a house 6.4 Explain how to integrate natural and artificial lighting in a house					
General Objective 7.0: Know the electrical fittings and controls in a Building						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
14-15	7.1 State the common standard cables used for different fittings. 7.2 List the electrical fittings and controls and their uses. 7.3 Explain the construction provisions made for electrical fittings. 7.4 Explain simple electric circuit system used in residential houses.	<ul style="list-style-type: none"> • Introduce student to I.EE and NEPA Regulations • Show student by illustration the various cables and fitting appropriate to low rise buildings 	<ul style="list-style-type: none"> • I.E.E and NEPA Regulation 			

Surveying Courses

Building site and Surveying I

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY		
Course: Building site and surveying I	Course Code: CTD 107	Contact Hours: 1 - 0 - 2
Course Specification: Theoretical Content		

General Objective 1.0: Understanding the Basic Principles and Scope of Surveying and Geo-informatics						
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1	<p>1.1 Explain the principle of working from 'whole to part' in Survey/Geo-data works.</p> <p>1.2 State the importance of "scientific honesty" made on observations.</p> <p>1.3 Explain with examples the various "checks" made on field observations and during computation.</p> <p>1.4 Define errors or misclosure in surveys and describe methods of "balancing"</p>	<p>Describe examples of various classes of survey as used in construction works</p> <p>-do-</p>	<p>* Field books</p> <p>* Tables</p>			

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	<p>these.</p> <p>1.5 Explain the need and procedure for “examination” of surveys and Geo-data.</p> <p>1.6 Describe the various classes of survey/Geo-data and their order of accuracy.</p> <p>1.7 Explain the principles of ‘economy of accuracy’ and its influence on choice of equipment and methods.</p>					
	<p>1.8 Explain the principles of ‘consistency’ in surveys/Geo-data.</p> <p>1.9 Distinguish between</p>	<p>- do -</p>	<p>-do-</p>			

<p>2</p>	<p>accuracy and precision.</p> <p>1.10 Describe the procedure of entrusting 'custody' of survey/Geo-data monuments to local officials and the instructions for their 'preservation'</p> <p>1.11 Name the different branches of surveying and Geo-informatics stating their aims e.g geodetic survey topographic survey, cadastral survey, hydrographic survey, engineering and large</p>					
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	scale surveys.					
	General Objective 2.0: Understand the uses and methods of using linen and tapes in making linear measurements.			General Objective 2.0: Apply linen and tapes in making linear measurement		
3	<p>2.1 Explain the effect of (a) misalignment (b) slope (c) temperature (d) tension and (e) standardisation error on measured distances.</p> <p>2.2 Explain the corrections listed in 2.1 above.</p> <p>2.3 Explain chain surveying instruments e.g. Linen tapes, steel tapes, ranging rods.</p> <p>2.4 State the necessary precautions in the use of the above</p>	<ul style="list-style-type: none"> Lecture examples of calculation for corrections to be given. 	<ul style="list-style-type: none"> Tapes, chains, and ranging rods. * Calculator 	<p>2.1 Carry out survey of an area of at least one hectare.</p> <p>2.2 Book all field measurement</p> <p>2.3 Plot survey at a suitable scale.</p> <p>2.4 Draw to field standards using conventional signs and hand lettering.</p>	<ul style="list-style-type: none"> * Guide students in the conduct of the survey work. * Give students assignment 	<ul style="list-style-type: none"> *Theodolite Tape, ranging poles, leveling instruments, chains, calculator, Booking Sheets etc

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	instruments. 2.5 State the criteria for selection of survey lines and offsets and the limitations on lengths.					
4	2.6 Explain the methods of making linear measurements in chain surveys - both along the survey line and along offsets. 2.7 State limiting conditions on measurement accuracy on 2.6 above. 2.8 Explain common errors in chain surveying and their sources - e.g squaring of building corners, wrong	- do -	- do -			

	booking of values.					
5	<p>2.9 Explain with sketches the basic methods of check or proof lines, the use of control frame work for position and orientation.</p> <p>2.10 Explain the general procedure for carrying out a chain survey.</p> <p>2.11 Illustrate the method of booking field measurements in chain surveys.</p> <p>2.12 Enumerate field problems and methods of overcoming them.</p> <p>2.13 Explain errors in simple chain surveys.</p>					

	General Objective 3.0: Understand the principles of measurement of angles and bearing with magnetic compass and theodolites			General Objective 3.0: Apply the principles.		
6	<p>3.1 Explain the basic principles of ordinary spirit levelling and digital spirit levelling.</p> <p>3.2 State the specifications of tertiary levelling.</p> <p>3.3 Explain the optimum observing procedure.</p>	<ul style="list-style-type: none"> * Describe basic principles of ordinary and digital spirit leveling. * List the specification * Describe the optimum observing procedure * Describe the use for and criteria for leveling datum. * Discuss adjustment of collimation error in leveling * Describe the construction and use of semi-permanent and permanent tertiary bench marks * Describe booking of field observation. * Describe reduced level * Describe 2 mathematic checks in 	<ul style="list-style-type: none"> * Compass, theodolite, Levelling Instrument , Raging poles, Writing materials, Tapes. 	<p>3.1 Carry out tertiary levelling, reduction and adjustment to produce elevations of all permanent stations along a circuit of about 2km, using ordinary and digital levels.</p>	<ul style="list-style-type: none"> * Guide and supervise students in carry out tertiary leveling reduction and adjustment 	<ul style="list-style-type: none"> * Compass, Theodolite, Leveling, Instrument, Raging poles, Writing materials, tapes, Field book, leveling staff etc.

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		leveling reduction. * List the uses of tertiary levelling				
7	<p>3.4 Explain the use of and criteria for selections of levelling datums.</p> <p>3.5 Adjust collimation error in level.</p> <p>3.6 Explain the construction and use of semi-permanent and permanent tertiary benchmarks.</p> <p>3.7 Explain Book field observations.</p>	Ditto	Ditto			
8	<p>3.8 Explain Reduce level.</p> <p>3.9 Explain 2arithmetical checks in level reduction.</p>					

	3.10 Enumerate the uses of tertiary leveling.					
	General Objective 4.0: Understand principles of Tertiary Leveling			General Objective 4.0: Apply principles of tertiary Levelling.		
9	<p>4.1 Explain the various units of angular measurement e.g degrees grads and radian measures, working out their conversion factors.</p> <p>4.2 Explain the working principles of a surveyors' Prismatic compass.</p> <p>4.3 Explain the procedure of observation with a surveyors' Prismatic compass.</p>	<ul style="list-style-type: none"> • Discuss with examples reduction of levels to National datum. 	<ul style="list-style-type: none"> • Levels of various types, *Staff. * Principles compass. * Theodolite 	<p>4.1 Carry out angular measurements with prismatic compass and theodolites.</p>	<ul style="list-style-type: none"> * Guide and supervise students in carrying out angular measurements. 	<ul style="list-style-type: none"> • Levels of various types, *Staff. * Principles compass. * Theodolite

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10	<p>4.4 Explain the method of observation with a theodolite.</p> <p>4.5 Explain the difference in the readings procedure of Theodolites.</p>					
	General Objective 5.0: Understand and apply the principles of survey computations and plotting					

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11				<p>5.1 Reduce the measured field data with a theodolite to obtain required angles.</p> <p>5.2 Deduce bearings from the obtained angles.</p> <p>5.3 Adjust compass bearings of the compass surveyed area.</p> <p>5.4 Carryout the computation of surveyed areas above.</p> <p>5.5 Retrieve the measured field data of the surveyed</p>	<p>• Discuss using examples of computations.</p> <p>-do-</p>	<p>• Calculators, computers, theodolite, leveling instruments, ranging poles, tapes, chains, total station (data recording device), drawing papers, drawing instruments, plotter etc.</p>
				<p>area by a total station onto a PC.</p> <p>5.6 Process the data using the PC.</p> <p>5.7 Plot the plan of the surveyed area manually at different scales (small, medium and large)</p>		

General Objective 6.0: Read, interpret make measurement from maps, layout and engineering plan.						
13	<p>6.1 State the uses of different types of map e.g atlas, geographical, topographical, engineering and guide maps.</p> <p>6.2 Explain the principles of map scale.</p> <p>6.3 State the relationships between map scales or representative fractions and the contour interval.</p> <p>6.4 Identify map symbols and conventional signs.</p> <p>6.5 Explain their basis and use.</p> <p>6.6 Identify various Nigerian map series.</p> <p>6.7 Use map</p>	<ul style="list-style-type: none"> • Discuss using students maps and examples to work on. 	<ul style="list-style-type: none"> • Chalk board set of maps * Writing materials * Drawing sheets, Instruments and board * Graph sheet * Threads/string s * Slides * Projectors * Films * Scale rules. 			

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	catalogues. 6.8 Explain various methods of showing relief on maps e.g spot heights, features, contours.					
14	6.9 Define map grids. 6.10 Use map grids. 6.11 Explain how to establish different reference directionse.g true north, grid north and magnetic north. 6.12 Define the relationship between the different directions i.e convergence, declination and compass variation. 6.13 Scale off grid coordinates. 6.14 Interpret different types of map, layout plans and	-do-	-do-			

15	diagrams/sketches . 6.15 Identify simple planimetric details on imageries. 6.16 Measure distances from maps and plans. 6.17 Determine radius of curves from given diagram. 6.18 Read off directions/bearing between given features. 6.19 Describe different map reference system.					
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Building site and Surveying II

PROGRAMME: NATIONAL INNOVATION DIPLOMA INCONSTRUCTION TECHNOLOGY						
Course: Building site and surveying II				Course Code: SUG 108		Contact Hours: 1 - 0 - 3
Course Specification: Theoretical Content						
General Objective 1.0: Understand the principles of Tacheometry				General Objective 1.o: Apply the principles of tacheometry		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1 - 3	1.1 Explain the special characteristics and use of self reducing tacheometers. 1.2 Explain the small vertical angles precisely by repetition. 1.3 Explain horizontal distance using vertical stage and tacheometer. 1.4 Explain the use of measure distances using a theodolites as tacheometer. 1.5 Explain spot-heights	* Discuss with examples the special characteristic and use of self reducing tacheometer	* Chalk board * Field book * Levelling staff * Theodolite	1.1 Observe small vertical angles precisely by repetition 1.2 Determine horizontal distance using vertical stage and tacheometer 1.3 Measure - - 1.4 Determine spot-heights and survey detail by	* Guide and supervise the students in the application of tacheometer	* Field book * Levelling staff * Theodolite

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	and survey detail by tacheometry.			tacheometry		
	General Objective 2.0: Understand the procedure and methods of third order theodolite and total station traversing			General Objective 2.0: Apply the procedure and methods of third order theodolite and total station traversing		
4	<p>2.1 Explain the various items of equipment used in theodolite and total station traversing.</p> <p>2.2 State specifications for measurement of angles and distance.</p> <p>2.3 Explain of bearings and tolerable linear and angular misclosures for secondary and tertiary traverses.</p> <p>2.4 Explain the need for connection to and procedure for verification of existing controls.</p> <p>2.5 Explain field method of traversing using surface taping.</p>	<ul style="list-style-type: none"> • Discuss with examples to demonstrate computations. 	<ul style="list-style-type: none"> • Chalk board * Theodolite * Tapes * Total station leveling * Staff * Field book * Calculator 	<p>2.1 Carry out traverse using surface taping</p> <p>2.2. Verify the control to which the survey is connected, the surveying of adjacent details (by radiation and intersection),</p> <p>2.3 computing the traverse, adjusting distances, bearings and co-</p>	<ul style="list-style-type: none"> * Guide and supervise students in carrying out third order theodolite and total station traversing 	<ul style="list-style-type: none"> * Theodolite * Tapes * Total * Levelling staff * Field book * Calculator

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	<p>2.6 Explain the various precautions in field measurements.</p> <p>2.7 Explain the field checks applicable.</p>			<p>ordinates, and producing a plan in ink</p>		
5	<p>2.8 Explain force centring equipment and its special advantages.</p> <p>2.9 Explain the role of theodolite and total station traversing in provision of control for surveys.</p>	-do-	-do-			
General Objective 3.0: Understand the principles, field methods and calculation procedures for minor triangulation						
6	<p>3.1 Explain the basic principles of triangulation.</p> <p>3.2 Enumerate other parameters of triangulation such as selection, beaconing, numbering of triangulation stations, baseline, azimuth determination, extension of connected triangles,</p>	-do-	-do-			

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	angular repetition, reciprocal observations, angular misclosures, field measurement checks etc.					
7	3.3 Explain methods of computing coordinates and heights from field records.	-do-	-do-			
	General Objective 4.0: Understand the basic principles and methods of using total station and GIS Equipment.			Generla Objective 4.0: Apply the basic principles and methods of using total station and GIS equipment		
8-9	<p>4.1 Explain a total station and its accessories.</p> <p>4.2 Compare total station with a theodolite.</p> <p>4.3 Explain the working principles of a total station.</p> <p>4.4 Explain the procedures of observation with a total station.</p> <p>4.5 Explain the working principles of GPS.</p>	* Discuss the working principles of Total station and GPS	<ul style="list-style-type: none"> • Chalk board *Total station • Targets • Computer • GPS • Software 	<p>4.1 Carry out a simple survey using a total station</p> <p>4.2 Retrieve the measured data from a total station field data on to a PC.</p> <p>4.3 Process</p>	*Guide and supervise students in the carrying out simple survey using Total station and GPS	<ul style="list-style-type: none"> * Total station * Targets * Computer * GPS * Software

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	4.6 Explain the various types of GPS equipment e.g hand held and tripod types.			the data from the PC. 4.4 Plot the plan of the surveyed area manually. 4.51 Carry out GPS observations on selected points.		
	General Objective 5.0: Understand problems involved in producing contoured plans.			General Objective 5.0: Solve problems involves in producing contour plans		
10-12	5.1 Name the different reference directions for contoured plans. 5.2 Explain basic need for heights in topographical Engineering and Township Surveys. 5.3 Explain optimum distribution of spot heights for contoured	<ul style="list-style-type: none"> • Discuss with examples 	<ul style="list-style-type: none"> * Chalk board • Levels • Theodolite * Levelling staff * Field book 	5.1 Carry out contouring at 0.5m vertical interval from a mesh of spot heights.	<ul style="list-style-type: none"> * Guide and supervise students in carrying out contouring 	<ul style="list-style-type: none"> * Theodolite * Levels * Levelling staff * Field book

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	plans. 5.4 Explain the use of grids of levels.					
	General Objective 6.0: Understand setting out procedure for a medium sized building external work			General Objective 6.0: Apply setting out procedure for a medium size building including external work		
13	<p>6.1 Explain the equipment required to set-out a building with accompanying access roads.</p> <p>6.2 Explain how to set-out a building</p> <p>6.3 Explain how profiles are used to control.</p> <p>6.4 Explain the instruments used for taking internal and external dimensions.</p>	<p>* Discuss with sketches setting out and its procedures</p>	<p>* Chalk board</p> <p>*Theodolite/Total Station</p> <p>* Optical plumb</p> <p>* Plumb-bob</p> <p>* Levelling staff</p> <p>* Field book</p> <p>* Ranging poles</p> <p>* Pegs</p> <p>* Profile board</p> <p>* Lines</p> <p>* Pins</p>	<p>6.1 Construct profiles and datum for a building.</p> <p>6.2 Determine the areas of a building and its site.</p> <p>6.3 Establish sight rails for horizontal and depth control of a straight drain between manholes</p>	<p>* Guide and supervise the students in setting out and its procedures</p>	<p>* Chalk board</p> <p>*Theodolite/Total Station</p> <p>* Optical Plumb</p> <p>* Plumb-bob</p> <p>* Levelling staff</p> <p>* Field book</p> <p>* Ranging poles</p> <p>* Pegs</p> <p>* Profile board</p> <p>* Lines</p> <p>* Pins</p>

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14	<p>6.5 State the procedure for checking vertically a building using Theodolite, Optical Plumb, and Plumb-bob.</p> <p>6.6 Explain the invert of a drain, a sight rail and a traveller.</p> <p>6.7 Calculate suitable length of a traveller and reduced levels of sight rails from given drawings.</p>	-do-	<ul style="list-style-type: none"> • Theodolite • Optical Plumb • Plumb-bob 			
15	<p>6.8 Explain the survey terms use in road construction.</p> <p>6.9 Explain methods of route surveying.</p> <p>6.10 Explain the types of control used for embarkments, cuttings and levels.</p> <p>6.11 Calculate volumes of cut and fill on a given straight road with transverse sloping ground.</p>	-do-	-do-			

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General Objective 3.0: Know how to write simple specification to various work sections.						
11	3.1	State the purposes and uses of specification.	<ul style="list-style-type: none"> • Write a typical specification work and explain relevant specification in building works. 	Ditto		
	3.2	State the sources of information for writing specifications.				
	3.3	Write clear concise and accurate specification of materials and Workmanship for Sand and Cement.		-do-		
	3.4	Write clear, concise and accurate specification of materials and workmanship for Gravel and concrete work.				
	3.5	Write clear, concise and accurate specification of materials, and workmanship for Excavation and Earthwork.				
12-15	3.6	Write clear, concise and accurate specification for materials and workmanship for brickwork, blockwork and masonry				
	3.7	Write, clear, concise and accurate specification of materials and workmanship for woodwork				

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Building Measurement and Specifications				Course Code: CTD 110		Contact Hours: 2-0-2
Course Specification: Theoretical Content				Course Specification: Practical Content		
General Objective 1.0: Understand the duties and functions of a Quantity surveyor				General Objective		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1-5	1.1 Explain the purpose of preparing bills of quantities. 1.2 Explain the application of computer in producing a bill of quantities. 1.3 State item works that are normally covered by the preliminary section of the bill. 1.4 Write typical preamble clauses for incorporation into a bill.	<ul style="list-style-type: none"> Describe the relevance of bills of quantities in construction processes. Describe the application of computer in the production of bill of quantities. 	<ul style="list-style-type: none"> Chalk Board. * Writing materials * Computer * Software 			
	General Objective 2.0: Know all the different kinds of schedules required in producing a bill of quantities.					
6-10	2.1 Prepare schedules of: (a) Doors and windows (b) Finishing 2.2 Prepare drainage schedules 2.3 State the purposes of the schedule of basic rates	<ul style="list-style-type: none"> Describe using drawings, bill of quantities and give assignments. Describe basic rates 	<ul style="list-style-type: none"> Chalk Board, Drawings, BOQ sheets 			

Quantity Surveying Courses

Building Measurement and Specifications

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Building Measurement and Specifications			Course Code: CTD 110		Contact Hours: 2-0-2	
Course Specification: Theoretical Content				Course Specification: Practical Content		
General Objective 1.0: Understand the duties and functions of a Quantity surveyor				General Objective		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1-2	1.1 State the duties of a quantity surveyor 1.2 Explain the work of the consultant Quantity Surveyors in relation to the contractor Quantity Surveyor.	<ul style="list-style-type: none"> Describe the duties of a Quantity Surveyor and his relationship with the contractors Quantity surveyor. 	<ul style="list-style-type: none"> Chalk Board 			
General Objective 2.0: Understand the relationship between the Quantity Surveyor and the other members of the construction team .						
3	2.1 Explain the relationship between the quantity surveyor	<ul style="list-style-type: none"> Describe the relationship between Quantity surveyor and other members of the building team 				

	and other members of the building team.					
General Objective 3.0: Understand the uses of standard method of measurement for building works						
4-5	<p>3.1 Explain the historical background of SMM.</p> <p>3.2 State various works section heading and their unit of measurement.</p> <p>3.3 Determine where and when to use the various unit of measurement.</p>	<ul style="list-style-type: none"> • Describe using the building models, sections and SMM. 	<ul style="list-style-type: none"> • Chalk Board * SMM 			
General Objective 4.0: Know how to process dimensions, collecting quantities and presenting them for all works sections in traditional elemental and annotated bill forms.						
	<p>4.1 Explain method of booking dimensions and be able to use them where and when necessary.</p> <p>4.2 Prepare an abstracting sheet using traditional</p>	<ul style="list-style-type: none"> • Describe using examples and practical assignments. 	<ul style="list-style-type: none"> • Chalk Board * SMM *Abstracting sheets * Taking-off sheets 			

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6-8	<p>methods.</p> <p>4.3 Explain the difference between taking-off, abstracting, direct billing, cut and shuffle and billing sheet.</p> <p>4.4 State the various methods of bills of quantities.</p> <p>4.5 Explain the primary purpose and other uses of the Bill of Quantities.</p> <p>4.6 Distinguish between the bill formats - traditional, elemental and operational.</p>					
<p>General Objective 5.0: Understand the method of quantities for work involved in simple buildings.</p>			<p>General Objective 5.o: Prepare measurement of Quantities for a simple building</p>			
	<p>5.1 Explain the processes of taking-off</p>	<ul style="list-style-type: none"> • Describe using drawings and models. * Give students assignments. 	<ul style="list-style-type: none"> • Chalk board * Drawings 	<p>5.1 Prepare an abstracting sheet</p>	<ul style="list-style-type: none"> • Demonstrate s using examples 	<ul style="list-style-type: none"> • Chalk & Board

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<p>9-10</p>	<p>quantities for: a) simple substructure work</p>		<ul style="list-style-type: none"> • Models 	<p>using traditional method.</p>	<p>and practical assignments.</p>	
	<p>b) sub-structural for undulating sloping sites, stepped foundation and basements. c) simple wall construction in super structure. d) all kinds of floor construction. e) simple roof construction and coverings.</p>	<p>-do-</p>	<p>-do-</p>	<p>5.2 Take off quantities for: as simple substructure works.</p>	<ul style="list-style-type: none"> • Demonstrate using drawing and models use practical assignments. 	<ul style="list-style-type: none"> • Chalk, board • Drawings and • Models
<p>11-12</p>	<p>f) doors and windows including adjustment to form. g) building works for simple re-inforced concrete</p>	<p>-do-</p>	<p>-do-</p>	<p>a. Simple sub-structural work including undulating sloping sites, stepped</p>	<ul style="list-style-type: none"> • Demonstrates using examples from drawings and models. Use 	<ul style="list-style-type: none"> • Chalk board • Drawing

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	<p>framework.</p> <p>h) building works for simple steel framing and trusses.</p> <p>i) building works for staircases in timber and concrete.</p> <p>j) building works for simple drainage work and external works.</p>			<p>foundation and basements.</p> <p>b. Simple wall construction in superstructure.</p> <p>c. All kinds of floor construction.</p> <p>d. Simple roof construction and coverings.</p> <p>e. Doors and windows including adjustment to form.</p> <p>f. Simple reinforced concrete framework.</p> <p>g. Simple</p>	<p>practical assignments.</p> <ul style="list-style-type: none"> • Use take off sheets, and give assignments. 	
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13-15				<p>steel frame and trusses.</p> <p>h. staircase s in timber and concrete.</p> <p>i. simple drainage work and external works.</p> <p>j. Prepare bills of quantities using:</p> <p>k. The method of abstracting.</p> <p>l. The method of direct billing.</p>		
	<p>k) Explain the methods of Prepare bills of quantities using:</p>	<ul style="list-style-type: none"> • Use Drawing, take off sheets, and give assignments. 	<ul style="list-style-type: none"> • Chalk board. • Drawings • Models 			

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	<p>I. Abstracting. II. Direct billings.</p>					
	<p>I) Explain accurately how to prepare a bill of quantities using the cut and shuffle method.</p>	<p>• Use drawings, take-off sheets and practical assignments.</p>	<p>- do -</p>			

Tendering and Estimating

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Tendering and Estimating				Course Code: CTD 207		Contact Hours: 1-1-2
Course Specification: Theoretical Content				Course Specification: Practical Content		
General Objective 1.0: Know Terminologies in Tendering and Estimating				General Objective 1.0		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1	1.1 Define the terms: All in labour rate	<ul style="list-style-type: none"> • Use relevant examples to explain. • Give students assignments. 	<ul style="list-style-type: none"> • Chalk board, 			
General Objective 2.0: Appreciate contractor's activities during the tender process.				General Objective 2.0: Apply estimating Techniques during tender process		
2-4	2.1 State the information obtained from the following sources. <ol style="list-style-type: none"> Technical reports, including site visits. Bill of quantities. Standard form of building contract conditions. Architect's drawings, schedules and specifications. Codes of practice relating to estimating. Labour and plant 	<ul style="list-style-type: none"> • Explain using relevant examples. • Use questions and answer techniques to ascertain level of understanding. 	<ul style="list-style-type: none"> * Chalk board * Arch drawing * Code of practice 	2.1 Carry out site visit. 2.2 Conduct market survey 2.3 Write technical report	<ul style="list-style-type: none"> * Guide and supervise students during site visit, market survey and in the presentation of technical report 	<ul style="list-style-type: none"> * Vehicle * Calculator

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	<p>performance data.</p> <p>g. Manufacturer's and suppliers' specifications and quotations.</p> <p>h. Subcontractors requirements and quotations.</p> <p>i. Working rule agreement condition.</p> <p>j. Liaison with parties generally.</p> <p>2.2 Explain the purpose of pre-tender liaison meetings.</p>					
General Objective 3.0: Understand the basic principles and scope of estimating						
5	<p>3.1 Explain techniques of approximate estimating by the use of the following methods.</p> <p>a. storey enclosure</p> <p>b. Unit</p> <p>c. Superficial</p> <p>d. Rough qualities</p> <p>e. Cube</p>	<ul style="list-style-type: none"> • Explain using relevant examples. • Carry out at least one worked example for each method. • Give students assignments. 	<ul style="list-style-type: none"> • Chalkboard *calculator. 			
General Objective 4.0: Understand the constituent parts of unit-rates.						
6	<p>4.1 Explain the elements of prime cost under:</p> <p>a. Material elements - delivery, unloading, storing, handling and</p>	<ul style="list-style-type: none"> • Use relevant examples to explain. • Give worked examples to illustrate. 	Ditto			

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7-9	<p>waste.</p> <p>b. plant elements (applied to unit rate): hiring, with associated charges and running costs, builders own plant, including capital cost, depreciation, insurance licenses and running cost.</p> <p>c. labour element - builders own labour, all in labour rate, labour only subcontractors.</p> <p>4.2 Compare rates based on different analysis e.g:</p> <p>a. Builders own labour V- subcontractors labour.</p> <p>b. Builders own plant V- hired plant.</p> <p>c. Builders own unit rate V- subcontractors or suppliers' all-in quotations e.g. plumbing, finishes.</p>	<ul style="list-style-type: none"> • Give students assignment. • Explain using relevant examples. • Explain using relevant examples. 				
General Objective 5.0: Distinguish between prime cost, overhead cost and profits.						
10	<p>5.1 Define:</p> <p>a. Prime cost.</p>	<ul style="list-style-type: none"> • Explain using relevant examples. 	Ditto			

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	b. Project overheads. c. General overheads. d. Special risks and consideration.					
General Objective 6.0: Know types of contract.						
11-12	6.1 Explain cost reimbursable contract: a. Package deal contract. b. Management contract c. Measure and value contract.	a. Explain using relevant examples. b. Give students assignments.	Ditto			
General Objective 7.0: Use rate analysis to price items in bill of quantities.						
13	7.1 Build up unit rate for: a. Surface excavation, trenches and isolated holes, earth work support to simple excavations, basement excavation, disposal of spoil hardcore. b. Concrete to strip foundations, ground floor slab, including formwork and reinforcement. c. Walls in common and facing brick and block work	* Use relevant example to explain. * Build up unit rates with life data. * Give students assignment to build up for their work section	* Chalkboard, , *calculator,			

Civil Engineering Construction

PROGRAMME: NATIONAL INNOVATION DIPLOMA IN CONSTRUCTION TECHNOLOGY						
Course: Introduction to Civil Engineering Construction				Course Code: CTD 208		Contact Hours: 2-0-2
Course Specification: Theoretical Content				Course Specification: Practical Content		
General Objective 1.0: Know the various processes and sequence of Highway construction				General Objective 1.0 Apply the various processes and sequence of high way construction		
Week	Specific Learning Outcome:	Teachers Activities	Resources	Specific Learning Outcome:	Teachers Activities	Resources
1-3	1.1 Explain the importance of Engineering Surveying in route location of Highways. 1.2 Explain how alignments, R.O.W, Profile levelling and cross sections are carried out. 1.3 Explain how bush clearing, felling of trees, removal of stumps are carried out. 1.4 Explain spoil and hauling of materials.	<ul style="list-style-type: none"> • Discuss with the students various processes and sequence of high way construction 	<ul style="list-style-type: none"> • Chalk board * Levelling Instruments * Ranging poles * Bulldozers * Power saws * Grader * Rollers * Trucks 	1.1 Carry out a site visit to a civil Engineering project works to observe: <ul style="list-style-type: none"> a) Surveying work b) Crushing of aggregate c) Earth works d) Soil stabilization method e) Asphalt works f) Compaction methods g) Various plant and machines h) Site 	<ul style="list-style-type: none"> Guide and supervise students through the site visit Assign students to write report on the visit 	<ul style="list-style-type: none"> - Vehicles - Writing materials - cameras - tape recorders.

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			* Scrapers * Water tankers	organization and safety measures.		
4	<p>1.5 State the processes for the blasting of rocks.</p> <p>1.6 Explain how setting out is done in intervals and mark out position for culverts and bridges, mention procedures for setting out targets and curves.</p> <p>1.7 Explain the procedure for carrying out earthworks such as cutting and filling, subgrade. Emphasise the need for proper compaction in lifts of 150mm, Discuss current specifications, LOT etc. Explain the choice of borrow pits, their uses and control.</p> <p>1.8 Mention various side drains and their relevance when used.</p> <p>1.9 Explain thickness</p>	- do -	- do -			

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	<p>requirement, for sub-base, their compaction and relevant in-situ tests.</p> <p>1.10 Explain the need for camber, super elevation, cross falls.</p>					
	<p>1.11 Mention the need for soil stabilization as a means of improving pavement material. Mention stone base (macadam) as alternative base material.</p> <p>1.12 Explain priming as requirement for Tactcoat, the use of MCO or MCI. Also the use of sand for curing.</p>	<p>- do -</p>	<p>- do -</p>			
	<p>1.13 Mention the materials used for surface dressing and surface treatment such as cut-back bitumen, 80/100, Emulsion and stone chippings.</p> <p>1.14 Mention the need for</p>	<p>- do -</p>	<p>- do -</p>			

<p>5-6</p>	<p>more than one course for new roads i.e wearing course and surface course.</p> <p>1.15 Explain the need for Asphaltic Concrete for high wheel loads. Mention components of Asphaltic Concrete such as penetration between 50-70, fine aggregates and crushed aggregates, including fillers, cement, and dust.</p> <p>1.16 Mention use of Marshall stability for Asphaltic concrete.</p> <p>1.17 Differentiate between binder course and surface course.</p> <p>1.18 Mention the use of concrete in Rgid Pavements.</p>					
<p>7</p>	<p>1.19 Explain the need for suitable joints in concrete pavements.</p>					

	<p>1.20 Mention the use of culverts (pipes and boxes) as drainage systems for small streams.</p> <p>1.21 Mention the use of drifts as a means of low-level crossing as alternative to cheap culverts.</p> <p>1.22 Differentiate between culvert and bridge.</p>					
General Objective 2.0: Know the various construction equipment required for Highway Construction.						
8-9	<p>2.1 State the relevant equipment used in Highway Construction and mention what they are used for such:</p> <p>a. Ripper - for uprooting</p> <p>b. Bulldozers - for clearing</p> <p>c. Power saws - tree cutting/falling</p> <p>d. Motor graders - levelling and cutting of side ditches, spreading</p>	<ul style="list-style-type: none"> • List and discuss the functions and uses of various construction equipment 	<ul style="list-style-type: none"> • Chalk board * High way construction equipment * Charts * Films * Pictures * Slides * Brochures 			

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	andCambering. e. Rollers - for compaction					
10	f. Payloaders - for loading trucks g. Trucks - for haulage h. Scrapers - for haulage earth, work, excavation. i. Water tankers - watering j. Crushing plant - production of aggregates. k. Stone - base mixing l. Plant - for production of stone base materials.	- do -	- do -			
11	m. Bitumen sprayer - spraying hot bitumen or road surface. n. Asphalt mixing plant - for production of Asphalt. o. Asphalt paver - laying of Asphalt.	- do -	- do -			
	p. Construction site with reinforced concrete	- do -	- do -			

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	practice. q. Pavers - for spreading, compacting and finishing concrete pavement.					
General Objective 3.0: Know the safety devises required to put in plane during Highway construction.						
12-13	<p>3.1 Explain the use of diversions in highway construction works.</p> <p>3.2 Mention the mandatory requirements for provision of diversion signs and information signs.</p> <p>3.3 Mention the use of flash lights, beacons, cones at dangerous locations.</p> <p>3.4 Explain the need for safety provision after the highway construction.</p> <p>3.5 Explain the need for foot bridges for pedestrians. Also the need for pedestrian walkways.</p>	<ul style="list-style-type: none"> • Discuss safety with devices with students 	<ul style="list-style-type: none"> • Chalk board * Traffic high way codes * Charts * Pictures * Films * Posters * Projectors 			
	3.6 Mention the use of crash barriers for guiding vehicles in difficult	- do -	- do -			

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	terrain. 3.7 Explain the need for proper information on detours.					
General Objective 4.0: Know the furniture required to be put in place on the completed highway.						
14	4.1 Explain the need for provision of road furniture such as road signs, sign posts, kilometer posts and Traffic lights 4.2 Mention the need for the provision of utility ducts during highway construction e.g for water, Electricity and Telephone.	* Discuss road furniture with students	-do-			

NATIONAL INNOVATION DIPLOMA CONSTRUCTION TECHNOLOGY CURRICULUM TEAM

S/No	NAME	ADDRESS
1.	Bldr. A. S. Abdulhameed	Dept of Building Kaduna Polytechnic
2.	BLDR M. D. Arilesere	N.I.O.B Headquarters, 45 OPEBI, Ikeja Lagos
3.	BLDR M. O. Balogun	Dept of Building Yaba College of Tech. Yaba Lagos
4.	Laolu Oguntuyi	Office of the special adviser on Tech. & Vc. Educ. Min. of Educ., Alausa-Ikeja
5.	Chigbu Azubuike	General Manager Environmental Sustainability Thinking Arod Action center Enugu
6.	Okafor Patrick. O.	Tertiary Educ. Dept Technical Vocational Educ. & Training Branch (TVET) FME, Abuja
7.	Engr. Dr. Nuru A Yakubu,OON	Executive Secretary, NBTE Kaduna
8.	Dr. M S Abubakar	Director of Programmes NBTE, Kaduna
9.	Engr. J O Falade	Ag. HOD Polytechnic Division, NBTE, Kaduna
10.	E. B. Umo-Otong	NBTE Kaduna
11.	Engr. A D K Muhammad	D O VEI/IEI, NBTE Kaduna
12.	Mohammed Ibrahim	NBTE Kaduna