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United Nations
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Organisation
des Nations Unies
pour l'éducation,
la science et la culture

Building Technology
Higher National Diploma (HND)

Curriculum and Course Specifications

NATIONAL BOARD FOR TECHNICAL EDUCATION
Federal Republic of Nigeria

UNESCO – Nigeria Project

2001

Building Technology - Higher National Diploma (HND)

Curriculum and Course Specifications 2001
Plot B, Bida Road, P.M.B. 2239 Kaduna
Nigeria
National Board for Technical Education

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General Information

1.0 The certificate to be awarded and the programme title shall read:-
"HIGHER NATIONAL DIPLOMA IN BUILDING TECHNOLOGY" A transcript showing all the courses taken and grades obtained shall be issued together on demand.

2.0 **GOAL AND OBJECTIVES**

The Higher National Diploma course in Building Technology is designed to develop diplomates for an active role in the building industry. With emphasis on production.

On completion of all prescribed courses, the diplomate should be able to:

i. Supervise and manage efficiently the construction of buildings of all sizes from setting out to final completion.
ii. Understand and interpret all kinds of project drawings - architectural, structural, services to be able to implement them on site.
iii. Design and prepare working structural drawings for medium size buildings structures.
iv. Prepare realistic estimates in terms of cost, materials and labour for all building works including maintenance works.
v. Appreciate and determine quality of materials to be used for construction through appropriate tests in line with relevant codes of practice.
vi. Carry out surveys of various kinds on existing buildings and prepare a schedule of dilapidation and repairs.
vii. Prepare a cost effective post-tender report for all sizes of buildings contracts for competitive building.

3.0 **ENTRY REQUIREMENTS**

Candidates with qualifications as listed below shall be considered for admissions into the programme:

1. The minimum entry requirements for ND programme in Building Technology.
2. National Diploma in Building Technology only.
3. A minimum of one year Post-National Diploma cognate work experience where a candidate has a minimum of lower credit. Where a candidate has a pass, he shall have not less than three (3) years of cognate work experience.

4.0 NATURE AND STRUCTURE OF CURRICULUM

The curriculum of the programme in an attempt to give it a broad base has been designed to cover four components as follows:

1. *General Studies* - meant to give the diplomate general knowledge of himself and the society. This include courses in Art and Humanities which shall account for not more than 15% of the total contract hours of the programme.
2. *Foundation Courses* - meant to give students background knowledge which are applied in professional courses in the programme to aid easy understanding. Courses shall include: Mathematics, Principles of Architecture and Management, Law etc. they shall not account for more than 15% of the total works covered in the syllabus.
3. *Professional Courses* - they give the student the theory and practical skills needed to practice. These include:- Construction Technology; Structures, Estimating and Price Analysis etc. These account for between 60-70% of the total contact hours.

The structure of the HND Programme consists of Four Semester of classroom, laboratory and workshop activities. Each semester shall be of 17 weeks duration made up of:

1. 15 weeks of teaching i.e lecture sand practical exercises;
2. 2 weeks of tests, examinations and registrations.

5.0 ACCREDITATION

The programme shall be accredited by the NBTE before the diplomates can be awarded the diploma certificates. Details about the process of accrediting the programme for the award of the HND are available from the Executive Secretary, Programme Department, NBTE, Plot ´B' Bida Road, P.M.B. 2239, Kaduna - Nigeria.

6.0 CONDITIONS FOR THE AWARD OF THE HND

Once the programme is accredited, a candidate shall be awarded HND when he has successfully completed the programme after passing prescribed course work, examinations, and the project. Such candidates should have completed a maximum of semester units, as per the programme curriculum. The performance of the candidates in each course and the classifications of the HND shall follow the existing NBTE classification.

7.0 GUIDANCE NOTED FOR TEACHERS TEACHING THE PROGRAMME

7.1 The new curriculum is drawn in unit courses. This is in keeping with the provisions of the National Policy of Education which stresses the need to introduce the semester credit units which will enable a student who wish to transferring.

7.2 In designing the units, the principles of the modular system by product has been adopted: thus making each of the professional modules, when competed to adequately cover technician operative skills, which can be used for employment purposes. (See attached sheet).

7.3 As the success of the credit unit system depends on the articulation of programmes between the institutions and industries, the curriculum content has been written in behavioural objectives, so that it is clear to all, the expected performance of the student who successfully completed some of the courses or of the diplomates of the programme. This is a sight departure in the presentation of the performance based curriculum which requires the conditions under which the performance are expected to be carried out and the criteria for the acceptable level of performance.

It is deliberate attempt to further involve the staff of the department teaching the programme to write their own curriculum stating the conditions existing in their institution under which the performance can take place and to follow that with the criteria to determine an acceptable level of performance. Departmental submission on the final curriculum may be vetted by the Academic Board of the Institutions. Our aim is to continue to encourage institutions to have a solid internal evaluation system for ensuring minimum standard and quality of education in the programmes offered throughout the Polytechnic system.

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

Curriculum Table

PROGRAMME: Higher National Diploma in Building Technology

YEAR OF STUDY: Year One

SEMESTER: One

COURSE CODE	COURSE TITLE	L	T	P	CU	CH	Prerequisite
BLD 301	Theory of structure I	2	1	-	5	5	
BLD 303	Construction Technology I	2	-	3	5	5	
BLD 305	Structural Design & Detailing I	1	1	3	5	5	
BLD 307	Advanced Measurement of Construction Work I	2	-	2	4	4	
BLD 309	Building Service & Equipment I	1	1	-	2	2	
GNS 413	Industrial Management	1	1	-	2	2	
QUS 313	Contract Law & Arbitration	2	-	-	2	2	
ARC 323	Principles of Arch. Design & Drawing	0	-	4	4	4	
MTH 312	Advanced Calculus	1	-	-	1	1	
SUG 208	Engineering Surveying I	1	-	3	4	4	
	TOTAL	**13**	**4**	**15**	**32**	**32**	

PROGRAMME: Higher National Diploma Building Technology

YEAR OF STUDY: Year One

SEMESTER: Two

COURSE CODE	COURSE TITLE	L	T	P	CU	CH	Pre-Requirement
BLD 302	Theory of structure II	2	-	-	2	2	BLD 301
BLD 304	Construction Technology II	2	-	3	5	5	BLD 303
BLD 306	Structural Design & Detailing II	2	-	3	5	5	BLD 305
BLD 308	Advanced Measurement of Construction Works II	2	1	-	3	3	BLD 307
BLD 310	Building Service & Equipment II	2	-	-	2	2	BLD 309
QUS 314	Conditions of Contract	2	-	-	2	2	QUS 313
BLD 301	Information Technology I	3	-	-	3	3	-
GNS 311	International Relation	1	-	3	1	1	-
BLD 314	Management Principles and Practice	2	-	-	2	2	
BLD 312	Technical Report Writing	1	-	-	1	1	
	TOTAL	**19**	**1**	**6**	**26**	**26**	

PROGRAMME: Higher National Diploma in Building Technology

YEAR OF STUDY: Year Two

SEMESTER: Two

COURSE CODE	COURSE TITLE	L	T	P	CU	CH	Pre-Requirement
BLD 401	Theory of structure III	1	1	-	2	2	BLD 302
BLD 403	Construction Technology III	2	1	-	3	3	BLD 304
BLD 405	Structural Design & Detailing III	1	-	3	3	3	BLD 306
BLD 407	Estimating and Price Analysis I	1	1	-	2	2	-
BLD 409	Maintenance Technology	1	-	2	4	4	-
BLD 411	Construction Management I	2	-	-	2	2	-
BLD 413	Budgeting & Financial Control I	2	-	-	2	2	-
QUS 316	Measurement of Civil Engineering Work I	1	-	3	4	4	-
BTC 301	Computer Application in Project Management	-	-	3	3	3	
	TOTAL	**11**	**3**	**11**	**25**	**25**	

PROGRAMME: Higher National Diploma in Building Technology

YEAR OF STUDY: Year Two

SEMESTER: Two

COURSE CODE	COURSE TITLE	L	T	P	CU	CH	Pre-Requirement
BLD 402	Project	-	1	6	7	7	-
BLD 404	Construction Technology IV	2	-	3	5	5	BLD 403
BLD 406	Structural Design & Detailing IV	1	-	3	4	4	BLD 405
BLD 408	Estimating and Price Analysis II	1	1	-	2	2	BLD 407
BLD 410	Maintenance Management	2	-	-	2	2	BLD 409
BLD 412	Construction Management II	2	-	-	2	2	BLD 411
BLD 414	Budgeting and Financial Control II	2	-	-	2	2	BLD 413
	TOTAL	**10**	**2**	**12**	**24**	**24**	

Architectural Courses

Principle of Architectural Design and Drawing

PROGRAMMLE: HIGHER NATIONAL DIPLOMA IN BUILDING TECHNOLOGY			
Course: Principles of Architectural Design and Drawing		**Course Code: ARC 323**	**Contact Hours: 0-0-4**
Course Specification: Theoretical Content			
	General Objective 1.0: Know how to draw and interpret drawings.		
Weeks	**Specific Learning Outcome.**	**Teachers Activities**	**Resources**
1-2	1.1 State the hierarchical order of the various spaces for a given Building type 1.2 Explain the factors affecting the arrangement of these spaces. 1.3 Determine the sizes of the spaces	• Explain more examples • Make good use of the locality	• Chalkboard, chalk, duster, pair of compass, divider, protractor, projectors
	General Objective 2.0: Know how to prepare design briefs.		
Weeks	**Specific Learning Outcome.**	**Teachers Activities**	**Resources**
3-5	2.1 Enumerate the key ingredients of a good design brief. 2.2 Describe the process of gathering information for design brief preparation. 2.3 Articulate a proper presentation format for a good design brief. 2.4 Prepare a design brief for a given project. 2.5 Appraise a given design brief in respect of an existing building in relation to the executed project particularly in relation to cost benefit analysis.	• Give more assignment • Site Visit • More class exercises	-Ditto
	General Objective 3.0: Understand the design process.		
Weeks	**Specific Learning Outcome.**	**Teachers Activities**	**Resources**
6-8	3.1 Describe the culture of the people around the locality of a given site for a chosen type of residential building design. 3.2 Explain the environmental and climatic determinants on the design. 3.3 Prepare preliminary sketch design based on a prepared design brief. 3.4 Make material specification for the design	- ditto -	- ditto -

PROGRAMMLE: HIGHER NATIONAL DIPLOMA IN BUILDING TECHNOLOGY			
Course: Principles of Architectural Design and Drawing		**Course Code: ARC 323**	**Contact Hours: 0-0-4**
Course Specification: Theoretical Content			
	General Objective 4.0: Know the procedures for development and programming for full scale drawing.		
Weeks	**Specific Learning Outcome.**	**Teachers Activities**	**Resources**
9	4.1 Interpret a given preliminary sketch designs. 4.2 Articulate the constituents of the working drawing and details to be done. 4.3 Choose size of drawing sheets and select overall dimensions 4.4 Identify significant details that should be produced. 4.5 Produce the required working drawings and details with dimension and annotators	Lectures. Illustrations with sketches Assignment	Ditto, drawings
	General Objective 5.0: Understand the principle of modular coordination in draughting		
Weeks	**Specific Learning Outcome.**	**Teachers Activities**	**Resources**
10	5.1 Define modular coordination 5.2 Explain the basic methods in modular coordination. 5.3 Illustrate known modular draughting methods and conventions. 5.4 Illustrate the use of modular dimensioning in the assembly of component units in architectural working drawing 5.5 Prepare architectural working drawing using modular draughting techniques for a given design. 5.6 Prepare modular details 5.7 State the range tolerances for on - site lay-out of coordinates		

PROGRAMMLE: HIGHER NATIONAL DIPLOMA IN BUILDING TECHNOLOGY			
Course: Principles of Architectural Design and Drawing		Course Code: ARC 323	Contact Hours: 0-0-4
Course Specification: Theoretical Content			
	General Objective 6.0: Know schedules and specifications.		
Weeks	Specific Learning Outcome.	Teachers Activities	Resources
11	6.1 Define schedules and specifications 6.2 Clarify the differences between schedules and specification. 6.3 Articulate the key ingredients of good schedules and specifications. 6.4 Enumerate the various types of schedules used in project drawing. 6.5 Prepare the necessary schedules for given building project drawing	-do-	-do-
	General Objective 7.0: Know how to prepare services drawing		
Weeks	Specific Learning Outcome.	Teachers Activities	Resources
12-13	7.1 Describe services drawing 7.2 Enumerate the various types of services drawing 7.3 State the importance of services drawings in production drawings. 7.4 Articulate services lay-out for a simple residential projects e.g. water supply system, drainage, sewage disposal, solid waste disposal, electricity supply and distribution, telecommunication network, etc. 7.5 Prepare necessary drawing with annotations and schedules for 7.4 above.	-do-	-do-

PROGRAMMLE: HIGHER NATIONAL DIPLOMA IN BUILDING TECHNOLOGY			
Course: Principles of Architectural Design and Drawing		Course Code: ARC 323	Contact Hours: 0-0-4
Course Specification: Theoretical Content			
	General Objective 8.0: Understand working drawing detailing		
Weeks	Specific Learning Outcome.	Teachers Activities	Resources
14-15	8.1 Explain the importance of detailing working drawing 8.2 State the key ingredients in a good detail 8.3 Produce working details for various foundation types such as strip, pad, raft and pipe foundation. 8.4 Produce working details for various damp proofing systems in basement wall construction. 8.5 Produce details for various types of floor, wall and stair construction. 8.6 Produce details for various types of penetration works in building 8.7 Produce details for various types of roof and ceiling construction.	- do -	- do -
	Assessment: Course Work - 10% Course Test - 10% Practical - 40% Examination - 40%. **Competency:** The student should be able to produce Architectural drawings of buildings. **Reference:** Spence W.P., "Architecture design engineering drawing". Neufert, "Architects Data".		

PROGRAMMLE: HIGHER NATIONAL DIPLOMA IN BUILDING TECHNOLOGY			
Course: Principles of Arch Design and Drawing		Course Code: ARC 323	Contact Hours: 0-0-4
Course Specification: Practical Content			
	General Objective 1.0: Develop Competency in Architectural Drawings.		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
2 - 14	1.1 Determine the sizes of spaces. 1.2 Prepare a design brief for a given project. 1.3 Prepare preliminary sketch design based on a prepared design brief. 1.4 Make material specification for the design. 1.5 Produce the required working drawings and details with dimension and annotators. 1.6 Prepare architectural working drawing using modular draughting techniques for a given design. 1.7 Prepare modular details. 1.8 Prepare the necessary schedules for given building project drawing. 1.9 Produce working details for various foundation types, damp proofing systems in basement wall construction, penetration works in building, and various types of roof and ceiling construction.		

Building Courses

Construction Technology I

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE :Construction Technology I		COURSE CODE: BLD 303	CONTACT HRS: 2-0-3
Course Specification : Theoretical Content			
	General Objective 1.0: Understand how to Organize a Site		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 List the main factor to be considered in the layout of a new construction site. 1.2 Outline the principal factors, which affect layout of materials, storage facilities and workshops on site.	• Use question and answer to discuss	• Chalk board
2	1.3 Explain the basis of the client-engineer-contractor relationship in Civil Engineering contracts. 1.4 Itemize the principal duties of a resident engineer.		
3	1.5 Outline a recommended procedure for lifting heavy or bulky objects on site to minimise the rise of injury.		
	General Objective 2.0: Understand the techniques, procedures and plans involved in large scale earth movement		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
4	2.1 List factors, which influence the choice of earth moving equipment. 2.2 Explain the operation of the following types of earth moving plants: a. Back-acting excavator b. Dragline c. Scraper d. Grader	• Use sketches to illustrate	• Chalk board
5	2.3 Describe by means of annotated sketches the stages of construction of a diaphragm wall.	- do -	- do -
6	2.4 Explain the use of topsoil on site. 2.5 Explain the use of imported backfill materials on site outlining the correct compaction procedure.		

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE :Construction Technology I		COURSE CODE: BLD 303	CONTACT HRS: 2-0-3
Course Specification : Theoretical Content			
	General Objective: 3.0 Understand the principles and construction of formwork, trusses and floors.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
7	3.1 Describe by means of sketches how formwork is supported for: a. a reinforced concrete column b. a large reinforced concrete wall c. a suspended beam	• Use questions and answers to discuss formwork. • Illustrate with sketches	-do-
8	3.2 Summarise the requirements of formwork 3.3 Describe briefly the following types of formwork; timber, steel, plastic, pneumatic tubing, etc.		• Chalk board
9	3.4 Write brief notes on the following; a. Release agents. b. Exposed aggregates. c. Knock-off finish.		
10	3.5 Sketch a typical steel roof truss with welded connectors illustrating methods of fixing the roof truss to a universal column stanchion.		
11	3.6 Explain the principle of triangulation in relation to roof trusses.		
12	3.7 Explain with the aid of sketches a typical timber roof truss of short to medium span indicating methods of securing the members together.	• Illustrate with good sketches showing the distinctions	• Chalk board
13	3.8 Sketch details of forming small opening in the following types of suspended floors: a. Timber b. Solid reinforced concrete	- do -	- do -
14	3.9 Sketch details of forming small opening In the following types of suspended floors: c. Precast concrete d. Hollow pot in sites reinforced concrete	• Illustrate with good sketches showing the distinctions.	• Chalk board
15	3.10 Carry out the construction of solid reinforced concrete and hollow pot in -situ reinforced concrete floors.		

PROGRAMME: BUILDING TECHNOLOGY HND		
COURSE :Construction Technology I	COURSE CODE: BLD 303	CONTACT HRS: 2-0-3
Course Specification : Theoretical Content		
	Assessment: Coursework: 20% course test: 20% Practical 20% Examination 40%. **Competency:** The Student should understand how to organize a site and be familiar with earthwork and formwork in the construction industry. **References:** (i) Ching, F. D. K, "Building Construction illustrated". (ii) Clyde, P. E., "Construction inspection".	

PROGRAMME: HND BUILDING TECHNOLOGY			
COURSE :Construction Technology I		COURSE CODE: BLD 303	CONTACT HRS: 2-0-3
Course Specification: Practical Content			
	General Objective: Understand how to organize a site and be familiar with earthworks and formwork in the construction industry.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
2-4	1.1 Draw sketches of how formwork is supported for: a. a reinforced concrete column. b. A large reinforced concrete wall c. A suspended beam.	• Show students examples	• Chalkboard, drawing, • Instruments and materials.
5-7	1.2 Sketch a typical steel roof truss with welded Connectors illustrating methods of fixing the roof Truss to a universal column stachin.		
8-9	1.3 Sketch details of forming small openings in the Following types of suspended floors: a. Timber b. Solid reinforced concrete c. Precast concrete d. Hollow post in sites reinforced concrete.		

PROGRAMME: HND BUILDING TECHNOLOGY			
COURSE :Construction Technology I		COURSE CODE: BLD 303	CONTACT HRS: 2-0-3
Course Specification: Practical Content			
10-15	1.4 Carry out the construction of solid reinforced Concrete and hollow pot in-situ reinforced concrete floors.	• Provide materials for the • Construction work.	• Cement • Gravels Sand, steel • Reinforcement, vibrators, • cube moulds crushing machine.

Construction Technology II

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology II		COURSE CODE: BLD 304	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the Techniques, Materials and Procedures involved in sheet Piling, Underpinning and Under- watering and the Construction of Retaining Walls.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 Define Sheet piling 1.2 Describe the circumstances in which sheets piles are used. 1.3 Sketch a section of an interlocking steel sheet pile 1.4 Describe how steel sheet piles may be used to form a rectangular cofferdam around an excavation including the method of driving.	• Use question and answer to discuss. • Explain the implications of the methods.	• Chalk board, • Design Studio
2	1.5 Describe a method of extracting steel sheet piles. 1.6 Explain the procedure to be adopted to remove particularly stubborn piles.	- do -	- do -
3	1.7 State the primary functions of retaining walls. 1.8 Show by means of a sketch the various forces acting on a retaining walls. 1.9 Sketch typical reinforced concrete retaining walls explaining how the building of water pressure behind may be prevented. 1.10 Sketch typical cantilever retaining walls that may be constructed where there is both sufficient and restricted working space behind the walls.	• Demonstrate with approved working drawings. • Use question and answer to discuss	- do -
4	1.11 Define under-pinning 1.12 Describe with sketches the continuous method of under-pinning to lower the level of an existing strip foundation supporting a wall. 1.13 Sketch a system of raking shores and a typical flying shore. 1.14 State the precautions that are necessary to prevent damage to an existing structure when carrying out an underpinning operation. 1.15 Carry out under-pinning operation.	• Use question and answer to discuss underpinning. • Show examples of underpinning process. • Explain the implication of inadequate precaution.	• Chalk board, • Design Studio.

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology II		COURSE CODE: BLD 304	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
5	1.16 Know the principal construction techniques, and procedures involved in Scaffolding and Glazing. 1.17 State the circumstances in which the following types of scaffolding are used; Putlog, Independent; Mobile Tower. 1.18 Draw a line diagram to represent a mobile tower summarizing the precautions, which should be taken when using such a scaffold. 1.19 Draw line-diagrams of putlogs and independent scaffolds. 1.20 Describe the erection procedures of 1.19 above. 1.21 List safety requirements related to the use of scaffolding. 1.22 Explain the requirements of ladders used in scaffolding.	• Explain the relative advantages of the types. • Engage the students to produce well-annotated sketches. • Explain safety precautions.	- do -
6	1.23 Sketch the following standard steel section indicating the range of serial or normal sizes in which they are manufactured; universal columns, universal beams, standard angles, channels. 1.24 Sketch six different types of butt welds and a section of a fillet weld. 1.25 Describe method of connecting steel member together with black, turned and high strength friction grip bolts. 1.26 Outline the situations in which members in 1.25 are used.	• Demonstrate with simple sketches. • Explain the differences between butt and filet welds. • Engage students to make detail sketches.	• Chalk board, • Design Studio.
7	1.27 Sketch a detail of universal column to concrete base by means of holding down bolts ensuring that a column is accurately positioned to the correct line and level. 1.28 Sketch two details of forming each of the following structural steel connection; a. Beams to webs and flanges to columns. b. Column splices. c. Beams to beams.	- do -	- do -

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology II		COURSE CODE: BLD 304	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
	General Objective 2.0: Steel, timber, Reinforced concrete frames and glazing		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
8	2.1 Describe the erection procedure for steel frame for a building up to four storeys high. 2.2 Describe with sketches the conventional method of providing fire resistance to structural steel	• Explain step by step the erection procedure.	• Chalk board, • Design Studio
9	2.3 Draw a detail of reinforced concrete columns and base. 2.4 Outline the method of positioning the reinforcement during its construction. 2.5 Describe with sketches details of reinforced concrete beam to column and reinforced concrete ground beam, ground floor slab construction with particular reference to the fixing of the reinforcement.	• Demonstrate with good sketches. • Engage students to carry out detailed sketches.	• Chalk board, • Design Studio, • Working drawings.
10	2.6 Describe with sketches the construction of a non-load bearing brick panel. 2.7 Illustrate two methods of attaching a brick panel to a reinforced concrete frame.	- do -	- do -
11	2.8 Sketch the construction of a timber framed infill panel illustrating how the external cladding may be made weather proof, the internal cladding fire resistant showing the position of a vapour barrier and thermal insulation.	- do -	- do -
12	2.9 Describe by means of sketches how a coated steel window may be fixed to a concrete lintel, a concrete sill and at the jambs to a brick panel wall.		
13	2.10 Sketch sections through an aluminum window to illustrate the methods of fixing within a concrete frame. 2.11 Explain what is meant by patent glazing	- do -	- do -
14	2.12 Sketch a detail of aluminum patent glazing showing the method of fixing vertical glazing bars to concrete, glass to the glazing bars and the method of weather proofing the head and sill. 2.13 Fix vertical bars to concrete, glass to glazing bars etc.	• Use working drawings to show how it is in practice • Use available samples.	• Chalk board, • Design Studio • Working drawing and samples of the products.

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology II		COURSE CODE: BLD 304	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
	General Objective 3.0: Dewatering		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
15	3.1 List the reasons for dewatering the sub-soil of an excavation. 3.2 Describe the "pumping from sumps" method of dewatering.	Use question and answer to discuss dewatering	Chalk board
	Assessment: Coursework: 20% Course test: 20% Practical: 20% Examination 40% **Competency:** Student should be familiar with the techniques involved in solving sub-structural problems and erection of frames. **References**: (i) Fullertion, R.L., "Building Construction in Warm Climates". (ii) King, H., "Building Techniques".		

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology II		COURSE CODE: BLD 304	CONTACT HRS: 2-0-3
Course Specification: Practical Content			
	General Objective: Know the techniques involved in solving substructural problems and erection of frames.		
WEEK	Specific Learning Outcomes	Teachers Activities	Resource
2 - 14	1.1 Sketch the following: a. Typical reinforced concrete retaining wall. b. Typical cantilever retaining wall. c. Sheet piling project. d. Forces on retaining walls. 1.2 Carry out underpinning operation. 1.3 Draw line diagrams of the following: a. mobile tower b. putlogs & independent scaffolds 1.4 Sketch the following: a. universal steel column b. beams, c. angler and d. channels e. six type of butt welds f. beams towels g. flanges to columns h. column splices i. beams to beams. 1.5 Sketch a timber construction. 1.6 Sketch sections through an aluminum window, detail aluminum patent glazing. 1.7 Fix vertical bars to concrete, glass to glazing bars etc.	• Show students examples.	• Chalkboard, drawing • Instruments. • Charts drawings.

Construction Technology III

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology III		COURSE CODE: BLD 403	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
	General Objective 1.0: Know Preliminary Works and Preparation of Large and Restricted Sites.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 Outline general principles of construction and scope of building bye-laws and regulations governing the construction of large buildings. 1.2 Describe ways and uses of preliminary site investigation.	• Use question and answer to discuss. • Involve students in the discussion	• Chalk board, • Building Regulation and bye-laws.
2	1.3 Identify problems of ground water and adjacent property 1.4 Describe the methods of solving the above problems. 1.5 Explain setting out, shoring underpinning, access roads storage, and temporary buildings as preliminary activities on site.	• Give practical case studies. • Use question and answer to discuss	• Chalk board
	General Objective 2.0: Understand Statutory Regulations Statutory Regulations		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
3	2.1 Interpret statutory regulations 2.2 Vet building/architectural drawing using the knowledge of statutory regulations. 2.3 Explain public health acts town and country planning acts, building regulations and factory acts. 2.4 Ensure that buildings are erected in compliance with statutory regulations.	• Demonstrate with typical case studies. • Use question and answer.	• Chalk board • Building Regulation, Bye-laws, and approved working drawings.

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology III		COURSE CODE: BLD 403	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
	General Objective 3.0: Understand the Production of Concrete and Its Placement Concrete Work		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
4	3.1 Describe the materials used in concrete production. 3.2 Explain the factors affecting the mix ratio of concrete. 3.3 Explain the different mix proportioning methods.	• Demonstrate with examples. • Solve some examples	• Chalk board
5	3.4 Demonstrate the influence of voids on concrete through experiment 3.5 Outline principles of mixing concrete identifying water content, mixing cycle, and introduction of admixtures etc. 3.6 Describe various transportation and placing of concrete techniques.	- do -	- do -
6	3.7 Illustrate compaction of concrete using different methods 3.8 Describe: a. Plain concrete, b. Reinforced c. Precast concrete d. In-situ concrete e. Pre-stressed concrete.	• Demonstrate with example	- do -
	3.9 Describe type and quality of reinforcement used in reinforced concrete and the method of placement.	• Use question and answer to discuss.	• Chalk board

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology III		COURSE CODE: BLD 403	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
	General Objective 4.0: Understand prefabricated Components and Plant Requirements. Prefabrication and Plant Requirements		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
7 - 13	4.1 Explain the development and use of prefabricated component and units 4.2 Determine the plant requirements for handling and production of fabricated components 4.3 Describe tolerance and jointing methods 4.4 Explain portal frame, space frame, tension structures, and air structures 4.5 Describe various materials in use in the production of prefabricated units. 4.6 Explain the problems, advantages and disadvantages of prefabricated unit	• Give Practical Examples • Give practical examples • Cite existing case	- do - Chalk board
	Assessment: Coursework: 20% Course test: 20% Practical: 20% Examination 40% **Competency:** The Student should understand statutory regulation, preliminary works, concrete work, pre-fabrication and plant requirements. **References**: 1.0 Mauson, K., "Building law for students". 2.0 Maxwell -Cook, J.C., "Structural notes and details thought; Cement and concrete".		

Construction Technology IV

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology IV		COURSE CODE: BLD 404	CONTACT HRS: 2 - 0-3
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the Construction of Drainage, Flexible and Rigid Pavement, and Construction of Surface Water Drainage.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 Explain the procedure for laying pipes under the following heading; Trench Excavation, bedding Piles, Testing and Backfilling 1.2 Describe with sketches trapped and untrapped gully pots used for the collection of surface water drainage from roads, stating their different applications. 1.3 Explain how the construction of a manhole may be tested for water tightness.	• Use questions and answers to discuss. • Show students the actual work on site (site Visit)	Chalk board, Design Studio.
2	1.4 Explain with the aid of a sketch the construction of a deep concrete manhole. 1.5 State when a backdrop manhole is used sketch the details that makes it different to a standard manhole construction. 1.6 Describe safety precautions to be exercised in surface water and foul drainage systems under the following headings; collapse of excavations; guardrails; breathing equipment and flooding	- do -	- do -
3	1.7 Distinguish between the construction of flexible and rigid pavements 1.8 Summarize the functions of the various layers of construction of the types of pavement 1.9 Carry out external works and services in building.	- do -	- do -

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology IV		COURSE CODE: BLD 404	CONTACT HRS: 2 - 0-3
Course Specification: Theoretical Content			
	General Objective 2.0: Understand railway construction		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
4	2.1 Recognise all types of rail tracks. 2.2 Explain the foundation requirements of railway. 2.3 Describe ballast, ties, tieplaes, tail joints, anchors, welded rails, switches and crossings	• Use questions and answers to discuss site visit.	• Chalk board, • Design studio
5	2.4 Describe the materials used for the support of rail tracks. 2.5 Outline various defects and failures on railway tracks and how to correct them. 2.6 Explain how to maintain railway tracks.	- do -	- do -
	General Objective 3.0: Understand Airport Construction		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
6	3.1 List the functional requirements of airport. 3.1 Describe classes and standards for airports. 3.2 Explain airport drainage and grading 3.3 Define airport lighting, beacons, wind indicators, railway lights, light controls, heliport, air traffic control, threshold lighting, sequenced.	- do -	- do -
7	3.4 Describe the differences between airport and road pavements. 3.5 Explain the precautions to be taken in the construction of airport pavements.	• Use questions and answers to discuss	• Chalk board, • Design Studies
	General Objective 4.0: Know simple Tunneling		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
8	4.1 Describe simple tunnels. 4.2 Describe methods of support in tunneling 4.3 Solve excavation and underground water problems.	• Make good sketches and explain in detail	- do -
9	4.4 Describe methods of excavating tunneling. 4,5 Describe ways of removing mud from tunnels. 4.6 Explain the various principles of shaft and chimney construction.	- do -	- do -

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Construction Technology IV		COURSE CODE: BLD 404	CONTACT HRS: 2 - 0-3
Course Specification: Theoretical Content			
	General Objective 5.0: Know the Construction of Reinforced Concrete, Prestressed Concrete and Precast Concrete Work.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
10 - 15	5.1 Describe types of reinforcements and their qualities 5.2 Differentiate ordinary reinforced concrete, prestressed concrete and precast concrete. 5.3 Describe methods of fixing; cover spacing, lapping bending, etc 5.4 Describe systems of pre-tensioning and post-tensioning. 5.5 Identify types of equipment used in prestressed concrete. 5.6 Participate in Railway and Airport construction in your area of operation.	• Engage students in the discussion	• Chalk board, • Design Studio.
	Assessment: Coursework: 20% Course test: 20% Practical: 0% Examination: 60% **Competency:** The Student should understand the construction of transformation and drainage facilities. **References:** 1. Mesaw, T.M., "Tunnels: Planning, design, and construction". 2. Newman, N., standard structural details for building construction".		

Building Services and Maintenance Courses

Building Services & Equipment I

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: BUILDING SERVICES & EQUIPMENT I		COURSE CODE: BLD 309	CONTACT HRS: 2 – 0-3
Course Specification: Practical Content			
	General Objective: Understand statutory regulation, preliminary works, concrete work, pre-fabrication and plant Requirements.		
WEEK	Specific Learning Outcomes	Teachers Activities	Resource
1-15	1.5 Carry out soil compaction. 1.2 Carry out: a. plain concreting, b. reinforced concrete, c. pre-cast concreting, d. In-situ concrete, e. Pre-stressed concreting operations. 1.3 Determine plant requirements for handling and Production of fasticated components. 1.4 Identify types of equipment used in pre-stressed Concrete. 1.5 Construct a chimney.	• Prepare materials for the various tests. • Provide the three standards of compaction test.	• Compaction apparatus bricks, • Blocks cement sand etc.

COURSE: Services I		COURSE CODE: BLD 309	CONTACT HRS: 1-1-0
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the principles and techniques of water supply to buildings		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
1	1.5 Describe the main sources of water supply 1.2 Sketch and explain methods of treatment and storage of water supply.	• Use questions and answers techniques.	• Chalkboard charts.
2	1.3 Sketch and explain distribution methods 1.4 Sketch and explain supply to multi-storage buildings and problems associated with this. 1.5 Sketch and describe types of sanitary fittings in buildings.	• Lecture • Give assignments • Use drawings	• Drawings

COURSE: Services I		COURSE CODE: BLD 309	CONTACT HRS: 1-1-0
Course Specification: Theoretical Content			
	General Objective 2.0: Know the contractor's procedures prior to submission of tenders.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
4 - 5	2.1 Explain the design requirements for efficient system. 2.2 Describe the cause of loses of trap seals together with precaution to avoid this 2.3 Describe pipes and pipe fittings in use. 2.4 Assess the relative merit and demerits of different soil and waste systems. 2.5 Explain methods of testing drainage.	• Lecture • Give assignments • Use drawings	• Chalkboard, diagrams
	General Objective 3.0: Know the various methods of disposing wastes from building.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
6	3.1 State the methods of waste disposal biological processes, land processes, incineration etc. 3.1 Describe the methods for 3.1	-do-	-do-
7	3.2 Outline the basic methods of sewage and waste disposal. 3.3 Describe the design considerations of sewage treatment plant.	-do-	-do-
8	3.4 Describe a treatment plant and the treatment process 3.5 State the regulation code of practice that govern its functionality 3.6 State methods of providing fresh air to sewage lines	-do-	-do-
	General Objective 4.0: Understand the supply a methods and distribution of gas into buildings.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
9	4.1 State the sources of gas. 4.2 Describe the statutory law and building regulations that govern the supply and use of gas 4.3 Compare its merits and demerits over electricity.	-do-	-do-

COURSE: Services I		COURSE CODE: BLD 309	CONTACT HRS: 1-1-0
Course Specification: Theoretical Content			
	General Objective 5.0: Know the various equipment used for moving people in high rise building.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
10	5.1 List different types of mechanical movements requirement in high rise buildings 5.2 Explain the factors governing selection for different situations	-do-	-do-
	General Objective 6.0: Understand refuse disposal system and their incorporation in building.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
11	6.1 Explain domestic, commercial and industrial refuses and possible hazard arising from them.	- do -	- do -
12	6.2 Describe common domestic refuse installation in building, e.g., Refuse clute, grinder, garchey.	- do -	- do -
13	6.3 Describe site suitable for tipping of refuse controlled and uncontrolled tipping sites.	- do -	- do -
	Assessment: Coursework: 20% Course test: 20% Practical: 0% Examination 60% **Competency:** The student should be familiar with the techniques of water supply, waste water and refuse disposal and gas supply to buildings. **References:** 1. Mcguiness, W. J. "Building technology: Mechanical and electrical system". 2. Hall, F, " plumbing: Cold water supplies, drainage".		

Building Services & Equipment II

COURSE: BUILDING SERVICES & EQUIPMENT II		COURSE CODE: BLD 310	CONTACT HRS: 2 - 0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Know the basic electrical installation in building and on the site		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 State the I.E.E regulation with respect to domestic installation 1.2 State consumer distribution system 1.3 State the uses and sizes of fuses, circuit, breakers and lightening conductors	• Lecture and give examples	• Fuse, circuit - breakers
2	1.4 Describe the phase system used in domestic and industrial installation 1.5 Explain the installation consideration of conduit and surface systems of wiring.	• Lecture	-do-
3	1.6 Describe the types of main distribution system suitable for small sites. 1.7 List the safety precautions necessary when using electrical fittings.	- do -	Chalkboard and related items-
	General Objective 2.0: Know the provisions required for fire prevention		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
4	2.1 List the different first aid fire equipment used in buildings 2.2 Describe fixed and movable fire fighting equipment, stating their merits and demerits	- do - Show samples	-do-
5	2.3 Explain the design consideration required for fire protection in buildings.	Lecture, Give diagrams Lecture	-do-
6	2.4 Explain the methods of flame and fire test to building materials. 2.5 Cite the building regulation and statutory laws that govern the safety of lives and property in relation to fire protection in buildings.	- do-	-do-

COURSE: BUILDING SERVICES & EQUIPMENT II		COURSE CODE: BLD 310	CONTACT HRS: 2 - 0-0
Course Specification: Theoretical Content			
	General Objective 3.0: Understand natural and mechanical methods of ventilation		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
7	3.1 Describe natural and mechanical methods of ventilation.	-do-	-do-
8	3.2 State the application of the method to different situation. 3.3 State building regulations on ventilation requirements form building.	-do-	-do-
9	3.4 Describe the principle of air-conditioning 3.5 State the types and uses of air-conditioning systems		
10	3.6 Describe the installation on provision for air conditioning unit. 3.7 Calculate the capacity of air-conditional unit in a predetermined space.	-do-	-do-
	General Objective 4.0: Know the various mechanical plants in the construction process		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
12 - 14	4.1 State the need for mechanical plants in the construction process 4.2 Describe the types and uses of mechanical plant such as lifts, hoists, excavators, earth moving plants, dumpers etc 4.3 Explain the methods of assessing performance of plants and their cost implication	• Lecture • Conduct a site visit	-do-
	Assessment: Coursework: 20% Course test: 20% Practical: 0% Examination 60% **Competency:** The student should be familiar with the electrical, fire prevention and ventilation services in building. They should be familiar with mechanical plants in construction. **References:** 1. Entwisle, F D, " Building regulation practice and procedure. 2. McGuinness W. J. "Building technology: Mechanical and electrical system".		

Maintenance Technology

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Maintenance Technology		COURSE CODE: BLD 409	CONTACT HRS: 2-0-2
Course Specification: Theoretical Content			
	General Objective: 1.0: Know the various Materials, and Processes for Carrying out Maintenance Work in Buildings and Infrastructural Facilities		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
1	1.1 Identify the various materials used for maintenance works. 1.2 State the utility life-span of the various structural finishing materials used in construction works. 1.3 Explain the advantages and disadvantages of allowing structural materials to serves as finishing materials to maintenance works.	• Use examples and samples to show to students. • Explain using examples - do -	• Maintenance tools and equipment • Charts, drawings, pictures, video.
2	1.4 Determine the uses of the materials identified above 1.5 Enumerate the various stages in maintenance works	• Demonstrate using examples and case studies	OHP
3	1.6 Interpret, state the importance of and prepare maintenance manual, schedule of Dilapidation and work alterations, works programme and Final Account of maintenance work.	- do -	- do -
	General Objective 2.0: Understand the Nature of Deterioration In Common Building Materials and Components that are caused by External and Internal Agents.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
4	2.1 State the various types of deterioration that occur in building materials. 2.2 Determine the causes of these types of deterioration in building materials. 2.3 Protect these building materials against deterioration before and after use.	• Use examples and case studies • Assign student to case studies to report back -do-	-do-
5	2.4 Identify the factors affecting the selection of these materials for use, i.e. thermal insulation, impermeability, durability, compatibility etc	• Use case studies and work out examples	

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Maintenance Technology		COURSE CODE: BLD 409	CONTACT HRS: 2-0-2
Course Specification: Theoretical Content			
	General Objective 3.0: Know the Types and Causes of Failures in Building and in Infrastructural Facilities.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
6	3.1 Enumerate the various types of failures in construction works, e.g. Foundation failure, material failure, design failure, poor workmanship, structural failures, weathering, failure done to wrong usage, etc. 3.2 Explain the causes of these various types of failure	• Show using case studies and examples	- do -
7	3.3 State the impact of good design and construction works in minimizing maintenance problems. 3.4 Analyse the contributory factors affecting ageing and obsolesce in construction works 3.5 Detect the various types of failures enumerated above. 3.6 Correct these failures whenever detected	- do - - do -	- do - - do -
	General Objective 4.0: Understand the peculiar Maintenance Problems Associated with High rise Buildings, Industrial Buildings and Their specialist work.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
8	4.1 Analyse the peculiar problems of high rise and complex communal buildings due to size, height, construction technique, structural modes, etc. 4.2 Analyse the particular problems associated with industrial buildings due to industrial processes, heavy traffic, vibration, etc.	• Use case studies to explain and assign students to carry out assessment	
9	4.3 Analyse the particular problems associated with special works such as hospitals, laboratories, military installations functional requirements, location, equipment etc. 4.4 Propose solutions to the problems analysed in 4.1 - 4.3 above	- do -	
10	4.5 Carry out maintenance works in respect of any of the given problems above.	• Use case studies to explain and assign student to carry out assessments.	

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Maintenance Technology		COURSE CODE: BLD 409	CONTACT HRS: 2-0-2
Course Specification: Theoretical Content			
	General Objective 5.0: Understand the peculiar Maintenance Problems Associated with Estate Roads and Infrastructural Works.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
11	5.1 Explain the importance of maintaining estate roads and other infrastructures. 5.2 Analyse the relationships between design, construction, performance, and maintenance cost of estate roads.	• Demonstrate and explain using case studies and examples.	
12	5.3 Enumerate the various types of defects or failures that are associated with estate roads. 5.4 Described the methods of detecting defects or failures of estate roads. 5.5 Propose solutions to the defects or failures detected in estate roads.	- do -	
13	5.6 State the cause of high maintenance costs of estate and township roads. 5.7 Propose methods of reducing the maintenance costs of estate and township road.	- do - -do-	-do-
14	5.8 Enumerate the various failure that are associated with infrastructures such as electricity supply, water supply in buildings, sewage disposal, drainages, etc. 5.9 Describe methods of detecting the failure in services supply above.	- do -	-do-
15	5.10 Propose remedial actions to the failures detected in services supply to buildings. 5.11 Carry out maintenance operations for the infrastructures associated with a given building or minor civil engineering works.	- do -	-do-
	Assessment: Coursework: 20% Course test: 20% Practical 0% Examination 5%. **Competency:** The student should be familiar with causes of building materials failure and the technology of maintenance of buildings and infrastructures. **References:** 1. Nobbs, A. W. "Building Craft Science". 2. Perkins, P., "Repair, protection and water proofing of concrete structures".		

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Maintenance Technology		COURSE CODE: BLD 409	CONTACT HRS: 2-0-2
Course Specification: Practical Contents			
	General Objective: Conduct Practicals to improve understanding of Theoretical Component		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
1 - 15	1.1 Identify deterioration's and failure in buildings and Estate roads in the State. 1.2 List correction required in 1.1 above. 1.3 Carry out maintenance on 3 No buildings. 1.4 Prepare cost for maintenance. 1.5 Prepare schedule of maintenance on building.	- Conduct site visits - Supervise works	Sand, gravel, cement, bitumen, working tools

Maintenance Management

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Maintenance Management		COURSE CODE: BLD 410	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the Importance of Planned, Preventive and Organized Maintenance and Improvement Projects.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 Define Maintenance Management. 1.2 Explain the purpose of Maintenance Management. 1.3 Analyse the processes involved in Maintenance and improvement Management.	• Explain and demonstrate using case studies and examples.	• Chalkboard • Video • OHP
2	1.4 Prepare maintenance plan for a given project. 1.5 Develop maintenance programme for a given project.	- do -	-do-
3	1.6 Interpret the following: a. Maintenance Manual b. Schedule of dilapidation and work alteration c. Work programme for maintenance works. 1.7 Propose strategies for effective maintenance of an estate.	- do -	-do-
4	1.8 Interpret the following for a given project:- a. Scheme design b. Detailed design c. Specifications d. Maintenance plan	- do -	-do-
5	1.9 Check the effectiveness of the following in relation to 1.8 above: a. Control line b. Cost and quality. c. Compliance with Statutory requirements. d. Management and funding. 1.10 State the effects of factors in 1.8 and 1.9 on the maintenance and use - conversion of the project.	- do -	
6	1.11 Use the items in 1.6 in carrying out maintenance work.		-do-

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Maintenance Management		COURSE CODE: BLD 410	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 2.0: Know how to Plan, Prepare contract Documents and Programme for Maintenance and Improvements Works.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
7	2.1 Interpret the standard forms of contract 2.2 Determine the suitability of the various forms of contract for improvement, Maintenance and refurbishment projects.	• Explain and demonstrate using case studies and examples	-do-
8	2.3 Prepare contract documents to include the following:- a. The preliminaries and general conditions. b. The specification of materials and workmanship. c. The schedule of works d. Day works and rate	- do -	
9	2.4 Prepare work programme for a given maintenance or safurbishment projects. 5.10 Prepare estimate and cost budget for executing the project in 2.3 above. 5.11 Prepare final account.	- do -	
	General Objective 3.0: Know the Essential of Estate Management.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
10	3.1 Define estate management. 3.2 Explain the functions of estate managers. 3.3 State their relationship with allied professions.	• Explain and demonstrate using case studies and examples	-do-
11	3.4 Analyse the responsibilities of an estate surveyor in respect of buildings.	- do -	-do-
12	3.5 Relate 3.4 above to user requirements in managing residential, commercial and industrial buildings.	- do -	-do-
13	3.6 Describe the characteristics of leases and landlord service in the building industry	- do -	-do-
14	3.7 Undertake a case study on an aspect of maintenance management.	- do -	

PROGRAMME: BUILDING TECHNOLOGY HND		
COURSE: Maintenance Management	COURSE CODE: BLD 410	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content		
	Assessment: Coursework: 20% Course test: 20% Practical 0% Examination 60% **Competency:** The students should for familiar with management of maintenance works and essentials of estate management. **References:** 1. LEE, R, "Building Maintenance Management". 2. Reginalds, LEE, "Building Maintenance",	

Civil Engineering Courses

Structural Design and Detailing I

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Structural Design and Detailing I		COURSE CODE: BLD 305	CONTACT HRS: 1-1-3
Course Specification: Theoretical Content			
	General Objective 1.0: Know Codes of Practice used in Structural Design		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 Explain the object of Limit State Design. 1.2 Observe BS 8110, CP 110, CP 114, CP 115 and CP 116. 1.3 Explain BS 449 for Steel Design. 1.4 Explain BS 5950 for Steel Design.	• Show the relevant codes and B.S.	• Chalk board, Relevant Codes and B.S.
	General Objective 2.0: Understand the process of design		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
2	2.1 Explain the steps in good design practice as follows: a. Full Clients brief b. Liaising with all other members of the design team. c. Preliminary Investigation. d. Adequacy of Preliminary Design for the purpose of initial reliable estimate. e. General arrangement of drawings. f. Final Design - Working Drawings. 2.2 Interpret each in item in the design Practice.	• Use questions and answers to discuss	• Chalk board.

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Structural Design and Detailing I		COURSE CODE: BLD 305	CONTACT HRS: 1-1-3
Course Specification: Theoretical Content			
	General Objective 3.0: Understand and apply limit state characteristic material strengths and safety and design loads.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
3	3.1 Explain ultimate limit State as a probabilistic approach to design. 3.2 Explain characteristic loads and wind loads. 3.3 Explain dead loads, imposed loads and wind loads. 3.4 Explain partial factors of safety and global factors of safety.	• Use question and answer to discuss	• Chalk board.
4	3.5 Calculate design load for ultimate and serviceability limit state. 3.6 Explain serviceability limit state in terms of deflection, cracking, durability, fire resistance, vibration and fatigue.	-do-	• Chalk board • BS 8110
	General Objective 4.0: Understand stress-strain relationships for concrete and steel.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
5	4.1 Explain short-term design stress-strain Curve for concrete in compression. 4.2 Explain short-term design stress-strain curve for reinforcement. 4.3 Explain creep of concrete, shrinkage of concrete. 4.4 Illustrate bar shape and sizes, grades and strength of concrete and reinforcement.	• Use question and answer to discuss	• Chalk board, Design Studio
	General Objective 5.0: Know the design methods of reinforced concrete rectangular beams.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
6	5.1 Explain the behaviours of a reinforced concrete beam section. 5.2 Carry out preliminary analysis and member sizing. 5.3 Calculate the moment of resistance for a singly reinforced section. 5.4 Design for bending.	• Use questions and answers to discuss. • Use the appropriate code to design for bending.	• Chalk board, • BS 81110

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Structural Design and Detailing I		COURSE CODE: BLD 305	CONTACT HRS: 1-1-3
Course Specification: Theoretical Content			
7	5.5 Design for shear, bond anchorage and check for deflection. 5.6 Calculate minimum amount of longitudinal bars and stirrups. 5.7 Explain Bar Spacing rules. 5.8 Illustrate standard detailing practice. 5.9 Draw beam section and elevation.	• Use appropriate code to design for shear and amount of reinforcements. • Use question and answer to discuss. • Use the appropriate code to design for bending.	• Chalk board • BS 81110
8	5.10 Calculate moment of resistance for a double reinforced section. 5.11 Calculate the compression steel reinforcement.	- do -	- do -
9	5.12 Design a continuous beam. 5.13 Use Design graphs.	- do -	- do -
10	5.14 Calculate effective width of flanged beam for T and L sections. 5.15 Calculate moment of resistance of a flanged beam 5.16 Design a flanged beam (T-Section). 5.17 Carry out reinforcement detailing. 5.18 Describe curtailment of bars.	• Use questions and answers to discuss. • Use the appropriate code to design for • bending.	• Chalk board • BS 8110
	General Objective 6.0: Know how to design solid slabs and stairs.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
11	6.1 Carry out preliminary sizing of slabs using span-effective depth ratio. 6.2 Calculate shear, punching shear, local bond and distribution steel.	- do -	- do -
12	6.3 Design slabs spanning in two directions. 6.4 Calculate shear, punching shear, local bond and distribution steel.	- do -	- do -
13	6.5 Describe stairs spanning horizontally. 6.6 Design a stair slab spanning horizontally.	- do -	- do -
14	6.7 Describe a stair spanning longitudinally. 6.8 Design a stair slab spanning longitudinally.	- do -	- do -
15	6.9 Detail staircase.		- do -

PROGRAMME: BUILDING TECHNOLOGY HND		
COURSE: Structural Design and Detailing I	COURSE CODE: BLD 305	CONTACT HRS: 1-1-3
Course Specification: Theoretical Content		
	Assessment: Coursework: 20% Course test: 20% Practical 20% Examination 40% **Competency:** The Students should be familiar with relevant codes of practice and be able to carry out design and detailing the beams and slaps **References:** 1. Newman, N, "Standard Structural details for building construction". 2. Oladipo, I. O. "Fundamentals of the design of concrete structure".	

PROGRAMME: BUILDING TECHNOLOGY			
COURSE: Structural Design and Detailing		COURSE CODE: BLD 305	CONTACT HRS: 1-1-3
Course Specification: Practical Content			
	General Objective: 1.0. Know Codes of Practice used in Structural Design		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
1-15	1.1 Draw various structural elements. 1.2 Design a continuous beam. 1.3 Carry out reinforced cement detailing of the various elements. 1.4 Carry out detailing of a staircase.	- Give sketches	- drawings, chalk board and related items

Structural Design and Detailing II

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Structural Design and Detailing II		COURSE CODE: 306	CONTACT HRS 2-0-3
Course Specification: Theoretical Content			
	General Objective 1.0: Understand The Design Of Short And Slender Columns		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
1	1.1 Differentiate between short and Slender columns. 1.2 Design short columns.	• Lecture and demonstrate with example.	• Relevant design codes such as BS8110 etc. • Design studio
2	1.3 Design slender columns.	- do-	• Relevant design codes such as BS 8110 etc. • Design studio
3	1.4 Describe reinforcement details.	• Demonstrate using practical examples. • Carry out a detailing exercise.	- do -
	General Objective 2.0: Know method of design of isolated footings		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
4	2.1 Calculate the preliminary (plan) size of an isolated footing using the permissible bearing pressure and the column load.	• Demonstrate using practical examples.	• Relevant design codes such as BS 8110 etc; • Design studio.
5	2.2 Determine the minimum thickness of the Base.	• Give more practical design examples.	- do -
6	2.3 Determine the reinforcement required to resist bending.	• Demonstrate using practical design examples.	- do -
7	2.4 Check for punching shear, local bond stress and shear stress.	•	- do -
8	2.5 Describe the reinforcement of pad footings.	• Demonstrate using practical design examples. • Carry out a detailing exercise.	- do -

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Structural Design and Detailing II		COURSE CODE: 306	CONTACT HRS 2-0-3
Course Specification: Theoretical Content			
	General Objective 3.0: Know method of design of Retaining Walls		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
9	3.1 State types of retaining walls.		• Chalk Board
10	3.2 Design a retaining wall checking the stability of the wall.	• Demonstrate with practical example	• Relevant design codes such as BS 8110 etc. • Design Studio
11	3.3 Determine the bearing pressure and bonding reinforcement.	• Demonstrate with example • Carry out structural detailing exercise.	- do -
	General Objective 4.0: Understand the principles and method of prestressed concrete design.		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
12	4.1 Described principles of pre-stressing.	• Use question and answer to discuss.	• Chalk Board
13	4.2 Describe method of pre-stressing.	Give sketches	Drawings, chalkboard
14	4.3 State advantages and disadvantages of prestressed concrete over reinforced concrete.	Lectures	-do-
	Assessment: Coursework: 20% Course test: 20% Practical 20% Examination 40%. **Competency:** The student should be able to carry out design of Reinforced columns, Reinforced concrete pad or isolated footing and R.C. retaining wall. **References:** 1. Optiomum, "Structural design; theory and application". 2. Wilby, C.B,. "Restreessed concrete beams design and logical analysis.		

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Structural Design and Detailing II		COURSE CODE: 306	CONTACT HRS 2-0-3
Course Specification: Practical Content			
	General Objective:		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resources
1-3	1.1 Design short columns.		
4-6	1.2 Design slender columns.		
7-11	1.3 Design a retaining wall.		
12-15	1.4 Prepare reinforcement detailing of 1.1 to 1.3 above.		

Structural Design and Detailing III

PROGRAMME: BUILDING ENGINEERING TECHNOLOGY HND			
Course: Structural Design & Detailing III		**Course Code: BLD 405**	**Contact Hours: 1 - 0 - 3**
Course Specification: Theoretical Content			
	General Objective: 1.0 Understand the limit state design philosophy of Reinforced Concrete Structures		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
1	1.1 Explain the philosophy of limit states and define the various limits. 1.2 State the appropriate safety factors used in design of reinforced concrete elements	Explain, State	O/H Projector, chalkboard, Writing tools.
2	1.3 Design a singly reinforced rectangular section in bending.	Derive equations	
3	1.3 Design a rectangular section with compression reinforcement at the ultimate state. 1.1 Design a flanged section in bending at the ultimate state.	- do -	Plus correct codes of practice
4	1.2 Design a short column at the ultimate state. 1.3 Design a slender column at the ultimate state.	- do -	- do -
5	1.8 Design pad foundation.	- do -	- do -
6-7	1.8 Produce a structural layout of a typical floor and use it to carry out the design of the following elements: (a) a one way continuous slab (b) a continuous beam (c) an axially loaded short column (d) an axially loaded pad foundation (e) Detail (a) - (d) above	Draw, explain Illustrate and supervise the comprehensive design of a 3 - storey frame.	Drawing board, Pens, Paper, Design Packages.

PROGRAMME: BUILDING ENGINEERING TECHNOLOGY HND			
Course: Structural Design & Detailing III		**Course Code: BLD 405**	**Contact Hours: 1 - 0 - 3**
Course Specification: Theoretical Content			
	General Objective: 2.0 Understand the yield line theory.		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
8	2.1 Explain the collapse mechanism and yield line. 2.2 Analyse 2-way reinforced concrete slabs using the yield line theory. 2.3 Design 2-way reinforced concrete slab.	Explain, analyse	O/H Projector, Chalkboard, Writing tools.
	General Objective 3.0: Understand the limit state of serviceability.		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
9-10	3.1 Explain the serviceability Limit States of fatigue, fire, impact, damage, (crack) and deflection.	Present, Explain	- do -
	General Objective 4.0: Know the importance of torsion, shear and flexure in structures.		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
11	4.1 Analyse for torsion, shear and flexural centres in structures.	Analyse	- do -
12	4.2 Design for the above condition. 4.3 Design simple bolted, welded and friction connections.	Lecturer	- do -
	4.4 Design bolted, welded and friction connections for plate girders and rigid joined frames 4.5 Design for continuity at all joints and connections.	Design	- do -
	General Objective 5.0: Know masonry structures.		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
13 - 14	5.1 Design load bearing structures in brickwork, masonry, mass concrete e,g retaining wall, dam, arches, tall chimneys, abutments and piers.	Design	Drawing board, Plus, paper and accessories.

PROGRAMME: BUILDING ENGINEERING TECHNOLOGY HND		
Course: Structural Design & Detailing III	**Course Code: BLD 405**	**Contact Hours: 1 - 0 - 3**
Course Specification: Theoretical Content		
	Assessment: Coursework 20%; Course test 20%; Practical 0%; Examination 60% Competency The student shall have adequate knowledge of designing safe structures using professional codes and classical analytical methods. References: 1. Whilby, C.B. "Structural Concrete", Butterworths Co. Ltd. 2. Kalamkaror, A.L. "Composite and Reinforced elements of Construction," John Wiley.	

Structural Design and Detailing IV

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Structural Design and Detailing IV		COURSE CODE: BLD 406	CONTACT HRS: 1-0-3
Course Specification: Theoretical Content			
	General Objective 1.0: Understand General Arrangement of Drawings, Working Drawings and Standard Methods of Detailing.		
WEEK	Specific Learning Outcomes	Teachers Activities	Resources
1	3.8 Demonstrate the use of conventions, size of lines, lettering, dimensioning and scales. 1.2 Explain the general arrangement of drawings to show formats.	• Demonstrate typical drawing cases • Explain how to produce good working drawings using drawings.	• Chalk board • Design studio • Approved working drawings
	General Objective 2.0: Undertake design and detailing of a building structure not more than 3 floors		
WEEK	Specific Learning Outcomes	Teachers Activities	Resources
2	2.1 Analyse the frame structure		
3	2.2 Design the reinforcement of one panel of the floor. 2.3 Detail 2.2 above	• Explain the design procedure • Demonstrate the detailing.	• Chalk board • Design studio
4	2.4 Design a main floor beam and one of the columns. 2.5 Detail 2.4 above	- do -	- do -
	General Objective 3.0: Understand the use of structural steel in building and working stresses, design of tension and compression members, riveted, welded and bolted joints connections.		
WEEK	Specific Learning Outcomes	Teachers Activities	Resources
5	3.1 Describe the structural steel in building. 3.2 Explain the purpose of BS 5950 for the design of structural steel. 3.3 Apply working stresses and sections.	• Compare BS 449 and BS 5950. • Use question and answer to discuss. • Show examples.	Chalk board BS 5950
6	3.4 Design beams for bending, shear, buckling, bearing and deflection	- do -	- do -
7	3.5 Identify cased and uncased sections. 3.6 Design cased and uncased columns to carry a known axial load.	• Demonstrate with existing approved working drawings.	• Chalk board, Design studio, BS 5950
8	3.7 Design tension member. 3.8 Design riveted, welded and bolted joints.	• Demonstrate with practical example.	• Chalk board, Design studio, BS 5950

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Structural Design and Detailing IV		COURSE CODE: BLD 406	CONTACT HRS: 1-0-3
Course Specification: Theoretical Content			
	General Objective 4.0: Understand the principles and design of timber structural members.		
WEEK	Specific Learning Outcomes	Teachers Activities	Resources
9	4.1 Identify classes of timber. 4.2 Identify stress grading, irregularities, sizes, direction of grain, allowance for defects.	- do -	Chalk board
10	4.3 Design timber section in bonding, shear and deflection.	• Use question and answer to discuss and design.	• Relevant design codes
11	4.4 Calculate bearing stresses.		
12	4.5 Apply working stresses.		
13	4.6 Identify standard truss forms.	• Lecture.	• Chalkboard
14	4.7 Design joints in trusses and timber framing.	• Lecture & demonstrate with example	- do -
15	4.8 Design horizontal and vertical shuttering.	• Lecture & demonstrate with example	- do -
	Assessment: Coursework: 20% Course test: 20% Practical 2% Examination 40% **Competency:** The student should be able to carry out design and structural detailing of 2 storey buildings, simple steel and timber structures **References:** 1. Bresler, B., "Design of steel structures". 2. Parkers, H., "Simplified design of structural steels".		

PROGRAMME:			
COURSE: Design of Structural Elements		COURSE CODE: BLD 405	CONTACT HRS: 0-1-3
Course Specification: Practical Content			
	General Objective 1.0: Understand the limit state design philosophy		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
2-3	1.1 Design reinforced rectangular sections.	Provide Code of practice CP 110 CP 8110 BP 3550	Charts Code of Practice

PROGRAMME:			
COURSE: Design of Structural Elements		COURSE CODE: BLD 405	CONTACT HRS: 0-1-3
Course Specification: Practical Content			
4-6	1.3 Design columns.	Give sketches	Drawings, design, studio, chalkboard and related items
7-9	1.4 Design a 2 - way reinforced concrete slab.		
10-12	1.5 Design Steel joints.		
13-15	1.6 Design mansory structures in load bearing.		

Theory of Structures I

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Theory of Structures I		COURSE CODE: BLD 301	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
	General Objective 1.0: Understand types of structural elements and joints in a framed structure.		
Week	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 Define the term structure. 1.2 Describe primary types of structure and primary structural elements.	• Use Question and Answer to discuss the term structure. • Explain to the students primary types of structure and also primary structural elements. • Give examples of each type.	• Chalk Board
2	1.3. Draw types of Joints. 1.4 Explain each type of Joint	• Show the students types of Joints e.g Fixed or Roller Joints and Pin Joints.	- do -
	General Objective 2.0: Understand Analytical Graphical methods for determining Reactions and Force in the Members of Statically Determinate Structures.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
3	2.1 Explain statically determinate structures. 2.2 State Equations of Equilibrium.	• Use Question and Answer to discuss statically determinate structures. • Explain to the students equations of Equilibrium for plane and space structures.	• Chalk and Board
4	2.3 Explain supports, reactions and free body diagrams. 2.4 Apply sign Conventions. 2.5 Calculate bending moment and shear Force.	• Discuss supports, reactions and free body diagrams using Questions and Answer. • Sketch types of supports and free body diagrams • State the sign conventions to be used. • Show the students how to calculate bending moment and Shear Force.	
6	2.6 Draw Bending Moment and Shear force diagrams.	• Show the Students how to draw Bending moment and shear force diagrams.	Chalk and Board
7	2.7 State relationship between Load, shear force and Bending Moment.	• Derive equations relating Load, Shear force and Bending • Moments	- do -

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Theory of Structures I		COURSE CODE: BLD 301	CONTACT HRS: 2-0-3
Course Specification: Theoretical Content			
8- 12	2.8 Analyse beams on two supports and Beams with hinges. 2.9 Analyse a Cantilever Beam. 2.10 Analyse plane frames, space frames three hinged articles, fixed arch, and two hinged arch. 2.11 Analyse plane frames, space frames three hinged articles, fixed arch, and two hinged arch. 2.12 Use graphical methods of determination of reactions, Shear force and Moment	• Show the students how to analyse Beams on two supports and with hinges. • Demonstrate to the students how to analyse a cantilever • Demonstrate to the students how to analyse a cantilever Beam • Show the students how to analyse plane frames, space frames, three hinged arches, fixed arch, and two hinged arch. • Demonstrate how to use graphical method in determining reactions, shear force and moments	- do -
	General Objective 3.0: Understand the use of Influence lines to determine Bending Moment Shear & Reactions, in a simple supported Beam by a moving Load.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
13	3.1 Derive influence lines for reactions, Shear force and bending Moment for simple Supported beam.	• Show the students how to derive influence lines for reactions, shear force and bending moment for simple supported beam.	• Chalk and Board
14	3.2 Explain various loading system. 3.3 Calculate bending moment and shear force due to simple and uniformly distributed moving load.	• List various types of loading systems. Uniformly • Distributed Load (UDL), point load etc. • Determine bending moment and shear force due to single and UDL moving load.	- do -
15	3.4 Calculate Maximum bending moment and Shear Force due to a single/point/concentrated Moving Load.	• Determine bending moment and shear force due to a single/point/concentrated Moving Load.	- do -
	Assessment: Coursework: 20% Course test: 20% Practical 20% Examination 40% **Competency:** The Student should understand nature of joints and be able to analyse simple determinate structure **References:** 1. Moffatt, W. G. "Structure". 2. Optimum, "Structural design " theory and application".		

Theory of Structures II

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Theory of Structures II		COURSE CODE: BLD 302	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Understand Statically Indeterminate Structures		
Week	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 Distinguish between statically determinate and statically indeterminate structures.	• Explain the term statically determinate structures. • Give examples of such structures. • Explain the term statically indeterminate structures. • Give examples of such structures.	• Chalk Board
2	1.2 Calculate the degree of Indeterminacy of some structures.	• State the equation for the calculation of degree of Indeterminacy or redundancy. • Apply for use the equation to determine degree of Indeterminacy of structural samples.	• Chalk Board
	General Objective 2.0: Understand The Application Of Flexible Methods To Solve Sampler Indeterminate Problems		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
3	2.1 Analyse simpler redundant structures, beams and frames.	• Reduce the structure to simpler forms. • Determine degree of Indeterminacy of Beams. • Carry out analysis of the Beam using the force method.	• Chalk Board
4 - 5	2.2 Analyse simpler redundant structural frames.	• Reduce the structural frame to simpler forms. • Determine the degree of indeterminacy of the frame. • Carry out analysis of the frame using the force method.	• Chalk Board

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Theory of Structures II		COURSE CODE: BLD 302	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 3.0: Understand The Analysis Of Simpler Statically Indeterminate Structures By The Moment Distribution Method		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
6	3.1 Analysis simple statically Indeterminate Structures by the moment distribution method.	• Explain the method of analysis i.e Moment distribution method. • Explain terms like distribution factor, carryout factor, etc. • State the Rules to be observed in the application of the method. • Apply the method of moment distribution to solve statically Indeterminate structures. • Solve other simpler structural samples.	• Chalk Board
	General Objective 4.0: Understand The Use Of Three Moment And Slope Deflection Methods In Indeterminate Structures.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
7 - 8	4.1 Apply three moment equations to solve indeterminate structure.	• Explain moment equation.	• Chalk Board
9 - 10	4.2 Draw the shear force and bending moments.	• Lecture and solve problems.	• Chalk Board
11 - 12	4.3 Analyse indeterminate beams and frames using slope deflection methods.	• Show the students how to fully analyse a simple Beam or frame structure using slope deflection Method.	• Chalk Board
13 - 14	4.4 Compare the methods in 4.1 and 4.4.	• Highlight the merits and de-merits of both methods.	• Chalk Board
	Assessment: Coursework: 20% Course test: 20% Practical 10% Examination 50% **Competency:** The Student should be able to analyse indeterminate structures using moment distribution, three moment equation and slope deflection methods **References:** 1. Timoshewco, S. P., "Theory of structural engineering". 2. Zaitseiv Yu V., "Design and erection of reinforced concrete structure".		

Theory of Structures III

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Theory of Structure III		COURSE CODE: BLD 401	CONTACT HRS: 1-1-0
Course Specification: Theoretical Content:			
	General Objective 1.0: Deflection of Beams in Structure.		
Week	Specific Learning Outcome	Teachers Activities	Resource
1-2	1.1 Calculate deflection by direct Integration; Maculay's method	• Show/demonstrate to students how deflection of a beam can be calculated using the Integration method. • Calculate deflection of cantilever propped cantilever simply supported Beams using the Integration method.	• Chalk and Board
3-4	1.2 Calculate deflection by Moment-area method.	• Show the students how to determine deflection using the moment-area method. • Calculate deflection of cantilever simply supported Beams using the moment area method.	• Chalk-Board and Graph
5-6	1.3 Compute deflection of simple framed structures by Willot Mohr diagram	• Show the students how deflection of a framed structure can be determined using the Willot-Mohr diagram. • Calculate deflection of various simple framed structure using the Willot-Mohr diagram.	• Chalk - Board and Graph
	General Objective 2.0: Understand the Plastic Theory of Bending		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
7 -9	2.1 Explain the stages in the elastic and plastic bending of a rectangular Mild-steel beam.	Show the students the behaviour of a rectangular mild steel under gradual loading.	Chalk - Board and Graph
10 - 12	2.2 Calculate Moments of resistance of rectangular section, the collapse load, the shape factor in a fully plastic state	• Demonstrate to the students how to determine moment of resistance of rectangular section. • Calculate Moment of resistance of rectangular section Beam. • Calculate collapse load, shape factor for a mild-steel of rectangular section in a fully plastic state.	• Chalk - Board and Graph

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: Theory of Structure III		COURSE CODE: BLD 401	CONTACT HRS: 1-1-0
Course Specification: Theoretical Content:			
13	2.3 Determine Plastic Moment of Portal Frames	• Show the students how to determine the Plastic Moment of Portal frames.	• Chalk - Board
14-15		• Calculate Plastic Moment for various Portal frames.	• Chalk - Board
	Assessment: Coursework: 20% Course test: 20% Practical 20% Examination 40% **Competency:** The Student should be able to solve problems involving deflection of structures and carry out plastic analysis of structures. **Reference:** Rogers, P., " Reinforced concrete design for buildings".		

Computer Applications in Project Management

PROGRAMME: INFORMATION AND COMMUNICATION TECHNOLOGY FOR ENGINEERS			
COURSE: COMPUTER APPLICATIONS IN PROJECT MANAGEMENT		Course Code: BTC 301	Contact Hours: 0/0/3
Course Specification			
	General Objective 1.0: Understand the role of Project Management for Corporate effectiveness		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
1	1.1. Define Project Management 1.2 List its Components 1.3 Discuss types of Project Management software available 1.4 Discuss the merits and demerits of using computer - based Project Management	• Use various real life Management environments to explain so as to enable students to appreciate corporate Management.	• LCD Projector • Magic Board • Personal Computer systems installed with current Projector. • Management Package (Software).
	General Objective 2.0: Understand the working environment of MS_Project 2000 and the use of each component:		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
2 - 3	2.1 Explain how to set a calendar 2.2 Generate Network Diagram 2.3 Enter Project Data 2.4 Work on task usage table 2.5 Draw Tracking Gantt 2.6 Draw Resource Graph 2.7 Measure Resource Usage 2.8 Enter tasks into the task form	• Navigate the Software File, View, Insert, Format, Tools, Project, Window and Help. • Assist the students to take part in the exploration. • Give students practical question to apply all the facilities on the Project Management Package.	-do-
	General Objective 3.0: Understand how to work in different views.		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
4 - 6	3.1 Use Bar Rolling 3.2 Explore calendar 3.3 Explain Descriptive Network Diagram 3.4 Explain Detail Gantt Chart 3.5 Explain Leveling Gantt 3.6 Explain Milestone Data Rollup 3.7 Explain Relationship Diagram	• Give students practical questions to demonstrate all the capabilities of the package.	-do-

PROGRAMME: INFORMATION AND COMMUNICATION TECHNOLOGY FOR ENGINEERS			
COURSE: COMPUTER APPLICATIONS IN PROJECT MANAGEMENT		Course Code: BTC 301	Contact Hours: 0/0/3
Course Specification			
	General Objective 4.0: Understand the use of Work Breakdown Structures in Task Creation.		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
7-9	4.1 Explain how work programmes are broken into milestones. 4.2 Explain How Milestone are broken into Tasks. 4.3 Explain how Tasks are broken into Subtasks. 4.4 Explain the allocation of Time and Resources to tasks and subtasks.	• Take up a typical project and use WBS to detail the Project into: • Milestone • Tasks • Subtasks • Ask students to allocate Time and Resources to Tasks and subtasks.	-do-
10-11	5 Understand Task Relationship. - Start to finish. - Start to Start. - Finish to Start. - Finish to Finish.	• Ask students to produce the task relationship for a given project.	
	General Objective 6.0: Understand Baseline Schedule.		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
12-15	a. Enter Milestone, Task and subtask for a given Project. b. Enter Project start and finish Dates. c. Enter Task and subtask starts and finish Dates. d. Enter Task and subtask Resource Usage. e. Produce a Baseline schedule.	• Ask students to enter the milestone, task and subtasks. • Ask students to enter start and finish Dates. • Ask students to enter Resources Usage. • Ask students to generate Base Line Schedule using • GNATT Chart • PERT Chart	-do-
	Assessment: Course Work - 10%, Course Test - 10%, Practical - 40%, Examination - 40% **Competency:** The student should be able use computer for project management. **Reference:** Bougham J., "Mastering Data Processing". McMillan Edc. Ltd. 1986.		

Management & Mathematical Courses

Construction Management I

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: CONSTRUCTION MANAGEMENT I		COURSE CODE: BLD 411	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the processes of contract documentation and forms of contract and tendering processes		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1-3	1.1 Know what is a valid contract. 1.2 List and explain the conditions for a valid contract. 1.3 List standard form of contract. 1.4 State the different types of Building contract. 1.5 Explain the various types of Building contract.	• Demonstrate and show documents and different forms of contracts using examples.	• Chalk and Board.
4-5	1.1 List tender documents. 1.2 Know what is tendering. 1.3 Explain the various forms of tendering. 1.4 State the conditions under which you will tender for a contract.	• Show typical tendering procedures and use case studies.	• Chalk and Board
	General Objective 2.0: Understand the application of scientific management processes to high rise buildings.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
6-7	2.1 Prepare plant, material and labour schedules from overall programme. 2.2 Use Management process to monitor such schedules to economic ends.	• Carry out case studies in resource management of a given building operation.	
8-9	2.3 Use critical path analysis, bar-chart and line of balance methods to programme building activities on site. 2.4 Identify causes of delay from such programmes, updating and controlling them to meet estimated project cost and time.	• Use case studies to demonstrate the techniques mentioned. • Give assignment on all cases.	

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: CONSTRUCTION MANAGEMENT I		COURSE CODE: BLD 411	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 3.0: Understand the process of management as they apply to building operation and coordination on site, i.e. sub-contractors nominated suppliers and the like.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
10-11 12	3.1 Formulate site policy and procedure. 3.2 Describe site organizations, coordination, and relationships. 3.3 Organize group workforce using Macgregor's theory of X and Y. 3.4 State the purpose of site meetings. 3.5 Describe the procedure, records and communication involved in site meeting process. 3.6 Explain how to coordinate the activities of specialists and nominated suppliers to achieve overall programme efficiency.	• Show with examples different structures. - do -	• Chalk and Board - do -
13-15	3.7 Explain the procedure for programming for construction works. 3.8 Prepare pre-tender programming and method statement. 3.9 Demonstrate gang size balancing and use sequence studies on high rise buildings to achieve economic utilization of available resources.	• Demonstrate with examples using case studies	• Chalk & Board programme of works.
	Assessment: Coursework: 20% Course test: 20% Practical 0% Examination 60% **Competency:** The Should be should be familiar with contract documentation, management processes and allocation of resources to building operations. **References:** 1. Frank Haris Rumcaffer, "Modern construction Management" 2. Authory Walker, "Project Management in construction".		

Construction Management II

PROGRAMME: BUILDING TECHNOLOGY - HND			
COURSE: Construction Management II		COURSE CODE: BLD 412	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Understand workstudy as Management Technique and its Application in the Management of the Construction Industry.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
1-2	1.1 Define work-study i.e. objectives of and procedures for method study. 1.2 Define and explain recording techniques of method study, process of charting diagram, multiple activity charting.	• Demonstrate using examples and case studies.	• Chalk board, charts and models.
3-4	1.3 Define and Describe work measurement technique. 1.4 Describe time study procedure, timing and rating, standard time, use of synthetic data, activity sampling and application of standard times.	- do - • Demonstrate using examples and case studies. Give Assignments to students to practice.	- do - - do -
5	1.5 Undertake workstudy techniques in a given project.	• Assign case studies to students to execute and report back.	• Sites, Drawing sheets and instruments, stopwatches and clicks chalk and board.
	General Objective 2.0: Understand Work study as a Management Technique and its application in the Management of the Construction Industry.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
6	2.1 Describe productivity techniques i.e. operations research techniques applied to manufacturing and construction and linear programming.	• Demonstrate and Explain using examples and case studies.	• Chalk board, • Charts and Models.
7	2.2 Define sequencing and rescheduling estimating or elapsed time.	- do -	- do -
8	2.3 Define resources allocation and leveling cost optimization, work flow, queuing theory, flow.	- do -	- do -
9	2.4 Provide work and examples and appropriate graphs in each case.	- do -	- do -

PROGRAMME: BUILDING TECHNOLOGY - HND			
COURSE: Construction Management II		COURSE CODE: BLD 412	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 3.0: Know the different focus of motivation in The Construction Industry, their Techniques And Applications in the Management of Building Project.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
10	3.1 Define motivation and describe the effect of incentive (financial and non-financial) to production and the procedure for determining targets for agreement concerning distribution of savings.	• Demonstrate and explain using examples and case studies.	• Chalk board
11	3.2 List relationships between incentive payments and standard wage rates	- do -	- do -
	General Objective 4.0: Know the Nature and Processes of Production Planning and Control and Its Application In the Manufacturing And the Construction Industry.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
12	4.1 Describe factory production planning techniques (on and off site), relationship of the product and manufacturing process to the factory layout.	• Demonstrate using examples and case studies	• Chalk and board • Charts and models
13	4.2 Define and explain quality control techniques, organization control of stock of raw components.	- do -	- do -
	General Objective 5.0: Know the Meaning and Methods of Preparing Interim Valuation and Final Account.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
14 15	5.1 Prepare a typical monthly interim valuation.. 5.2 Prepare a typical final account of a project	• Demonstrate using examples and case studies	• Chalk and board
	Assessment: Coursework: 20% Course test: 20% Practical 0% Examination 60% **Competency:** The student should be conversant with workstudy as a management tool and be able to prepare interim valuations and final account **References** 1. O. Rowings, "Construction Project Schedule" 2. Wainninght, W. H., "Variation and final account procedure".		

Management Principles and Practice

PROGRAMME: BUILDING TECHNOLOGY - HND			
COURSE: MANAGEMENT PRINCIPLES AND PRACTICE		COURSE CODE: BLD 314	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Know the historical background of management in the construction industry in relation to industrial development:		
Week	Specific Learning Outcome	Teachers Activities	Resource
1	1.1 Define the industrial revolution in relation to the building industry in Nigeria and U.K 1.2 Describe the industrial process in relation to the development of the building industry with particular reference to Nigeria.	- Lecture - Give examples and assignment	• Chalk and Board
	General Objective 2.0: Know the contribution of some early pioneers in the field of management		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
2	2.1 Summarise the historical background of the following people: Taylor, Gaunt, Gilbert, Mnegregor, Hertiberg.	• Explain using examples, questions and answers	• Chalk - Board
3	2.2 Identify the contributions of the following Taylor, Gaunt, Gilbert, in the field of Management.	• Explain using examples	- do -
4	2.3 Identify the contribution of the following - Fyol, Mayo, Renold and Rowntree in the field of Management.	- do -	
5	2.4 Identify the contributions of the following - Migregor, Hertzberg in the field of management	- do -	- do -
6	2.5 Define management 2.6 Explain the following principles of management: a. Planning, b. Organizing, c. Staff, d. Leading, e. Controlling, f. Coordinating, g. Communicating	• Use of examples, questions and case studies	- do -

PROGRAMME: BUILDING TECHNOLOGY - HND			
COURSE: MANAGEMENT PRINCIPLES AND PRACTICE		COURSE CODE: BLD 314	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 3.0: Understand Span of control and types of Relationships that exists in a large firm.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
8	3.1 Define Span Control 3.2 Summarise the different opinions of experts on span of control	• Demonstrate using examples and case studies	• Chalk - Board
9 10	3.3 List and explain the various factors that affect span of control 3.5 Explain Delegation, Authority and accountability. 3.6 Identify and describe the different types of relationships in an organization	- do -	- do -
	General Objective 4.0: Understand the essence of Communication and how to communicate in an organisation		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
11	4.1 Define effective communication 4.2 Identify the channels of communication in a construction firm. 4.3 Identify the things to be communicated in a firm. 4.4 Explain the barriers to effective communication. 4.5 Explain how to communicate and the various mediums available	• Demonstrate using examples and case studies.	• Chalk - Board
	General Objective 5.0: Understand management functions that must be performed in the building industry		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
12	5.1 Describe the Authority of the Building Owner, Architect, and other Design Team and their representatives and others concerned with the conduct and execution of the works. 5.2 List specialists, subcontractors and main contractors, activities, contractual obligations and responsibilities.	• Demonstrate using flow Diagram and Case studies.	• Chalk - Board
13	5.3 Define site meetings; purpose and procedures; site, records.	- do -	- do -

PROGRAMME: BUILDING TECHNOLOGY - HND			
COURSE: MANAGEMENT PRINCIPLES AND PRACTICE		COURSE CODE: BLD 314	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 6.0: Understand the basic concepts and applications of operations research in the management of building Industry		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
14 15	6.1 Describe productivity techniques i.e Operations Research Technique, applied to manufacturing construction, and linear programming. 6.2 Define sequencing and scheduling estimating or elapsed time. 6.1 Define resource allocation and leveling, cost optimization works flow quenching theory, flow graphs optimum size. 6.2 Provide worked examples and appropriate graphs in each case.	• Demonstrate using examples and case studies. • Assignment should be given	• Chalk - Board
	Assessment: Coursework: 20% Course test: 20% Practical 0% Examination 60% **Competency:** The student should be conversant with the principles of management and operational research **Reference:** Wole Adewumi, "Business Management - An Introduction", McMillan Nig. Ltd. Lagos 1988.		

Budgeting & Financial Control I

PROGRAMME: BUILDING TECHNOLOGY - HND			
COURSE: Budgeting & Financial Control I		COURSE CODE: BLD 413	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the basic principles of finance.		
Week	Specific Learning Outcome	Teachers Activities	Resource
1-3	1.1 Outline steps taken in the formation of a company. 1.2 Differentiate various kinds of associations such as limited liability companies, partnerships, sole traders, etc. 1.3 Interpret the balance sheet, trading accounts, and profit and loss accounts. 1.5 Distinguish shares, dividends profits, depreciation, taxation and reserves.	• Use questions and answers techniques. • Give assignments. • Demonstrate with examples.	• Charts • Video • OHP • Chalkboard
	General Objective 2.0: Understand the basic Principles of Budgeting		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
4-7	2.1 Describe cash flow principles and factors affecting financial yield. 2.2 Compile full and marginal costing different types of fixed and variable costs. 2.3 Analyse 2.2 above.	• Lecture	-do-
	General Objective 3.0: Understand some aspect of personnel and its cost implication.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
8	3.1 Define functions of various personnel in a construction organization. 3.2 Explain cost implications of personnel services.	-do-	-do-
	General Objective 4.0: Understand the element of Profitability		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
9-12	4.1 Justify cost on capital return on investments. 4.2 Explain various taxes on earnings. 4.3 Explain principles of discounted cash flow. 4.4 Prepare a discounted cash flows.	-do-	-do-
	General Objective 5.0: Understand basic aspects of cash flow information flows and conditions of contract		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
13-15	5.1 Illustrate information flow and labour, material and plant availability to profitability. 5.2 Describe clearly aspects of contract control.	-do-	-do-

Budgeting & Financial Control II

PROGRAMME: BUILDING TECHNOLOGY - HND			
COURSE: Budgeting & Financial Control II		COURSE CODE: BLD 414	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Understand Legal requirement regarding books of accounts.		
Week	Specific Learning Outcome	Teachers Activities	Resource
1-2	1.1 Prepare books of accounts such as the balance sheet, profit and loss account and trading account. 1.2 Analyse 1.1 above. 1.3 State the details of the law regarding books of accounts. 1.8 Formulate financial policy and capital release. 1.9 Recognise different types of assets, shares, bonds, and liabilities.	• Lecture • Use questions and answers • Techniques. • Give assignments. • Provide examples.	• Chalkboard • Charts • OHP
	General Objective 2.0: Understand the principles of budgeting and budgetary control.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
3-6	2.1 Prepare a few budgets. 2.2 Lead up from 2.1 to master budget. 2.3 Define practical problems in budgeting and budgetary control. 2.4 Solve the problems in 2.3 above.	-do-	-do-
	General Objective 3.0: Understand cost control and planning.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
7-8	3.1 Describe buying policies. 3.2 Design buying documents. 3.3 Solve problems in statistical analysis and forecasting. 3.3 Examine policy and facilities available. 3.4 Explain appraise capital and capital interest.	-do-	-do-
	General Objective 4.0: Understand Personnel Management and available personnel.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
9-10	4.1 Compare personnel functions of various categories of staff in some construction firms. 4.2 Evaluate personnel cost to construction firms. 4.3 Draw up some organizational structures.	-do-	-do-

PROGRAMME: BUILDING TECHNOLOGY - HND			
COURSE: Budgeting & Financial Control II		COURSE CODE: BLD 414	CONTACT HRS: 2-0-0
Course Specification: Theoretical Content			
	General Objective 5.0: Understand Profitability and Profitability index.		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
11-14	5.1 Compute cost on capital returns on investments. 5.2 Describe discounted cash flow and profitability index. 5.3 Analyse profitability and profitability index. 5.4 Compare tax methods or systems in Nigeria. 5.5 Predict economic life of capital items.	-do-	-do-
	General Objective 6.0: Know cash flow, costing, buying documents and incentives		
WEEK	Specific Learning Outcome	Teachers Activities	Resource
15	6.1 Analyse cash flow in various aspects of costing. 6.2 Outline the principles of retention fees and incentives	-do-	-do-
	Assessment: Course Work- 20%, Course Test - 20%, Practical - 0%, Examination - 60%. **Competency:** The student should be able to prepare single budget and financial control of a project. **References:** 1. Baathurs, P. E., "Building Cost Control techniques and economics" 2. Roy D., "Project Cost Control in construction".		

Industrial Management

PROGRAMME: HND BUILDING			
Course: Industrial Management		**Course Code: GNS 413**	**Contact Hours: 2/0/0**
Course Specification: Theoretical Content			
	General objective 1.0: Comprehend private and state control of enterprises		
WEEK	**Specific Learning Outcomes**	**Teacher Activities**	**Resources**
1	2.10 Identify types of enterprises: sole proprietor, limited liability, co-operative societies, public corporation, partnership. 2.10 Explain the objectives of a business organization. 2.10 Explain the business environment (e.g political, economic etc) 2.10 Examine private enterprises 2.10 Evaluate the public enterprise 2.10 Appraise the effect of private control of business. 1.7 Analyse the implications of state control of enterprises.	Treatment of 1.1 should include the structure, functions, advantages and disadvantages of each type of business organization.	
	General Objective 2.0: Understand the methods of management		
WEEK	**Specific Learning Outcomes**	**Teacher Activities**	**Resources**
2 – 3	2.1 Define management 2.2 Explain the functions of management planning, organizing, controlling, staffing, directing. 2.3 Explain the purpose of managing money, men, material and machines. 2.4 Examine the concept of authority and responsibility. 2.5 Appraise management by objectives. 2.6 Analyse the roles of the Chief Executive and Board in policy formulation and implementation. 2.7 Explain motivation. 2.8 Explain the concepts of Theory X and Y 2.9 Evaluate management control 2.10 Examine problems of leadership in organization.		

PROGRAMME: HND BUILDING			
Course: Industrial Management		Course Code: GNS 413	Contact Hours: 2/0/0
Course Specification: Theoretical Content			
	General Objective 3.0: Know elements of marketing		
WEEK	Specific Learning Outcomes	Teacher Activities	Resources
4	3.1 Define "marketing" and "market" 3.2 State the marketing mix-product, price, place, promotion. 3.3 Explain product differentiation. 3.4 Explain market segmentation. 3.5 Differentiate the industrial market from the consumer market.		
5	3.6 Define a product. 3.7 Identify the stages of the product life cycle - introductory, growth, maturity, decline. 3.8 State the features of each stage in (3.7) above. 3.9 Describe the different ways a company can develop a new product - e.g improving existing products, seeking new products from external sources, inventing a new product. 3.10 Identify the different channels of distribution of a product. 3.11 Choose the most appropriate channel of distribution for a given product. 3.12 State the features of each channel in (3.11) above.		

PROGRAMME: HND BUILDING			
Course: Industrial Management		Course Code: GNS 413	Contact Hours: 2/0/0
Course Specification: Theoretical Content			
	General objective 4.0: Understand Personnel Development		
WEEK	Specific Learning Outcomes	Teacher Activities	Resources
6 - 7	4.1 Explain the concept of personnel management 4.2 Define recruitment 4.3 Explain the selection and engagement procedures. 4.4 Appraise evaluation and merit rating. 4.5 Explain the importance of education, training and development. 4.6 Explain following: skill training, attitude training, technical training, management training. 4.7 Examine the relevance of industrial training to productivity in an organization. 4.8 Examine critically different types of conditions of service. 4.9 Define trade unionism, collective bargaining, joint consultation, conciliation, arbitration. 4.10 Explain the roles of the Industrial Arbitration Panel, the Industrial Court and the Ministry of Labour in maintaining industrial harmony in Nigeria. 4.11 Explain labour's share in the organisation's income.		

PROGRAMME: HND BUILDING			
Course: Industrial Management		Course Code: GNS 413	Contact Hours: 2/0/0
Course Specification: Theoretical Content			
	General Objective 5.0: Comprehend Quantitative Management Techniques		
WEEK	Specific Learning Outcomes	Teacher Activities	Resources
	5.1 Identify types of management decisions 5.2 Explain the modern quantitative decisions techniques. 5.3 Appraise operation research.		
8	5.4 Apply the use of decision trees, diagrams, programme evaluation review techniques (PERT), critical path model, etc in operation research. 5.5 Examine the structure of linear programming problems. 5.6 Chart some linear programming problems. 5.7 Examine the simplex method in solving linear programming problems.		
	General Objective 6.0: Understand maintenance schedules and replacement strategies		
WEEK	Specific Learning Outcomes	Teacher Activities	Resources
9	6.1 Explain purchasing 6.2 Analyse storage and stock ordering 6.3 Calculate the economic order quantity (EOQ) 6.4 State the importance of production in an organization 6.5 Evaluate production planning and control. 6.6 Appraise production scheduling 6.7 Explain quality control 6.8 Analyse replacement strategies 6.10 Define the following terms; preventive planned, corrective, breakdown, running and shutdown as used in maintenance 6.10 Critically examine maintenance culture in Nigeria. 6.11 Estimate depreciation and scrap value.		

PROGRAMME: HND BUILDING			
Course: Industrial Management		Course Code: GNS 413	Contact Hours: 2/0/0
Course Specification: Theoretical Content			
	General Objective 7.0: Understand money and the financial institutions		
WEEK	Specific Learning Outcomes	Teacher Activities	Resources
10	7.1 Define money 7.2 Explain the functions of money 7.3 Explain the functions of the Central Bank 7.4 Analyse the functions of a commercial bank. 7.6 Explain the functions of other financial institutions: the Merchant Bank, Mortgage Bank, Insurance Organisation, etc. 7.7 Enumerate types of insurance policy - e.g life policy, fire, marine, etc.		
	General Objective 8.0: Appreciate Investment management		
WEEK	Specific Learning Outcomes	Teacher Activities	Resources
11- 13	8.1 Define investment 8.2 Explain investment objectives and decisions 8.3 Explain methods of investment forecast, e.g payback period, internal rate of return, net present value, etc.		
	8.4 Critically examine the company's finance e.g cash, balance sheet, income statement, budgetary control, cash flow 8.5 Analyse project planning. 8.6 Explain risk and uncertainty in a project. 8.7 Explain project evaluation. 8.8 Analyse types of business costs e.g fixed cost, variable cost and total cost. 8.9 Analyse contract costing. 8.10 Explain the break-even point 8.11 Calculate the break-even point 8.12 Chart the break-even.		

PROGRAMME: HND BUILDING			
Course: Industrial Management		Course Code: GNS 413	Contact Hours: 2/0/0
Course Specification: Theoretical Content			
	General Objective 9.0: Understand data management		
WEEK	Specific Learning Outcomes	Teacher Activities	Resources
14	9.1 Explain the purpose of report writing 9.2 Explain the importance of literature review 9.3 Examine methods of data collection 9.4 Explain data measurement 9.5 Apply the use of tables and graphs in data presentation. 9.6 Examine methods of data interpretation. 9.7 Evaluate oral presentation of information.		
	General Objective 10.0: Understand the industry and national economy		
WEEK	Specific Learning Outcomes	Teacher Activities	Resources
15	10.1 State the importance of industry to human development. 10.2 List the factors necessary for the location of an industry. 10.3 Explain the main features of Nigeria's industrial policy. 10.4 Explain the different types of economic systems 10.5 State the importance of the national income 10.6 Examine the national economy.		

Advanced Calculus

PROGRAMME: HND IN BUILDING TECHNOLOGY			
Course: ADVANCED CALCULUS		Course Code: MTH 312	Contact Hours 2HRS/WK
Course Specification: Theoretical Content			
	General Objective 1.0: Understand Lap lace transform		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
1 - 2 3 - 4	1.1 Define Laplace transform 1.2 Obtain Laplace transform of simple functions 1.3 Define the inverse Laplace transform 1.4 Obtain the inverse Laplace transform of simple functions 1.5 Evaluate some partial fractions with: a. linear denominator b. quadratic 1.6 Express the derivative in Laplace transform 1.7 Express unit step, impulse Driac delta and ramp functions in Laplace transform 1.8 Apply Laplace transform to differential equation e.g solve by Laplace transform the $\frac{\partial u}{\partial t} = \frac{4\partial^2 u}{\partial x^2}$ boundary - value problem u(O,t) = 0, u(3,t) = O u(x,O) = 10 sin 2x - 6 sin 4x 1.9 Apply Laplace transform to suitable engineering problems e.g use Laplace transform to find the charge and current at anytime in a series circuit having an inductance L, capacitance C, Resistance R, emf E, assume charge and current are zero	• The teacher to illustrate with good examples and make notes where necessary • Ask the students to: • define Laplace transform and apply in simple functions • evaluate some partial fractions as indicated in 1.5 and express the derivative in Laplace transform. • Assess the students	• Recommended textbook, chalkboard, chalk, lecture notes, etc

PROGRAMME: HND IN BUILDING TECHNOLOGY			
Course: ADVANCED CALCULUS		Course Code: MTH 312	Contact Hours 2HRS/WK
Course Specification: Theoretical Content			
	General Objective 2.0: Understand Fourier series and apply it to solve engineering problems		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
5 - 6	2.1 Define Fourier series 2.2 Explain the periodic function 2.3 Explain the non-periodic function 2.4 Identify even and odd functions 2.5 Explain even and odd functions using graphical representation 2.6 Explain the characteristics of even and odd functions 2.7 Derive the Fourier coefficients in both polar and rectangular forms 2.8 Expand simple functions in Fourier series e.g a. simple linear algebraic functions b. trigonometric and logarithmic functions 2.9 Derive the Fourier series for a trigonometric function using the half range approach 2.10 Expand functions with arbitrary period 2.11 State the Euler's formula 2.12 Establish a complex Fourier series 2.13 Evaluate the integration of Fourier series 2.14 Apply Fourier series to suitable engineering problems	• The teacher to illustrate with good examples -and make notes where necessary. • Ask the students to: • define Fourier series, explain the periodic and non periodic functions, identify even and odd functions and explain them using graphical representation • Assess the students. • Ask the students to derive the Fourier coefficients in both the polar and rectangular forms • Assess the students. • Ask the students to: • expand simple functions in Fourier series as indicated in 2.8 • derive Fourier series for trigonometric functions using the half range approach, and expand functions with arbitrary period • state Euler's formula and establish a complex Fourier series • evaluate the integration of Fourier series and apply Fourier series to solve engineering problems • Assess the students.	• Recommended textbooks, Chalkboard, Chalk, Lecture note, etc.

PROGRAMME: HND IN BUILDING TECHNOLOGY			
Course: ADVANCED CALCULUS		Course Code: MTH 312	Contact Hours 2HRS/WK
Course Specification: Theoretical Content			
	General Objective 3.0: Understand the methods of solving second - order differential equations		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
7 - 8	3.1 Identify a homogeneous linear equation of the second order 3.2 Establish the second order differential equation with constant coefficients viz: $\frac{a(d^2y)}{dx^2}+\frac{b(dy)}{dx}+Cy=O$ 3.3 Find the real and distinct, equal and complex roots for 3.2 above 3.4 Solve the fundamental system of general solution, given initial values 3.5 State Caudiy's equation 3.6 Explain the existence and uniqueness of solutions to 2nd Order differential equations problems 3.7 Explain the homogeneous linear equations of higher order constant coefficients 3.8 Solve non-homogeneous differential equations 3.9 Solve simple simultaneous differential equations	• The teacher to illustrate with good examples and make notes where necessary • Ask the students to: establish 2nd Order D.E with constant coefficients viz: $\frac{a(d^2y)}{dx^2}+\frac{b(dy)}{dx}+Cy=O$ and find the real and distinct, equal and complex roots for the equation above. solve the fundamental system of general solution, given initial values and also to state Caudiy's equation. • Assess the students • Ask the students to: • explain the existence and uniqueness of solutions to 2nd Order differential equations problems and homogeneous linear equations of higher order constant coefficients • solve many problems on non-homogeneous differential equations, and simple simultaneous differential equations • Assess the students	

PROGRAMME: HND IN BUILDING TECHNOLOGY			
Course: ADVANCED CALCULUS		Course Code: MTH 312	Contact Hours 2HRS/WK
Course Specification: Theoretical Content			
	General Objective 4.0: Understand methods of solving simultaneous linear differential equations		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
9 - 10	4.1 Explain linear differential equation 4.2 Identify special cases of solving first - order differential equations 4.3 Apply the method of exact equations, separable variable to solve differential equation problems 4.4 Apply knowledge of linear differential equation to suitable engineering problems	• The teacher to illustrate with good examples and make notes where necessary • Ask the students to: • explain linear differential equation and identify special cases of solving first-order differential equations • apply the equation, separable variable to solve differential quation problems and apply it in suitable engineering problems • Assess the students	
	General Objective 5.0: Understand the methods of solving partial differential equations and their uses		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
11 - 12	5.1 State partial differential equation of order 2 5.2 Solve partial differential equation using "variable separable" 5.3 Apply D' Alembert's solution of the wave equation to partial differential equation problems 5.4 Apply the Laplacian concept in polar coordinates to partial differential equation problems	• The teacher to illustrate with good examples and make notes where necessary • Ask the students to: • state 2nd - order partial differential equation and solve many problems on it using "variable separable" method • apply D'Alembert's solution of the wave equation and Laplacian concept in polar coordinates to partial differential equation problems • Assess the students	

PROGRAMME: HND IN BUILDING TECHNOLOGY			
Course: ADVANCED CALCULUS		Course Code: MTH 312	Contact Hours 2HRS/WK
Course Specification: Theoretical Content			
	General Objective 6.0: Understand the principles of functions of several variables and their uses		
WEEK	Specific Learning Outcome	Teachers Activities	Resources
13 - 15	6.1 Explain limits and continuity of given functions 6.2 Explain mean-value theorem using total differentials 6.3 State Taylor's formula for functions of several variables 6.4 Derive maxima and minima of functions of several variables including possible saddle points 6.5 Establish the constrained maxima functions of several variables 6.6 Define a line integral in a plane 6.7 Explain the path of integral 6.8 Evaluate line integral problems 6.9 Define the green's theorem in a plane 6.10 Apply green's theorem to solve line integral problems 6.11 Apply double integral to line integrals 6.12 Apply change of variables in triple integrals 6.13 Evaluate the differentiation under the integral sign 6.14 State stoke formula 6.15 Apply stoke formula to line integrals in space 6.16 Apply stoke's formula to suitable engineering problems	• The teacher to illustrate with good examples and make notes where necessary • Ask the students to: • explain limits, continuity of given functions, and mean value theorem using total differentials. • State Taylor's formula, derive maxima and minima of functions of several variables including possible saddue points • Establish the constrained maxima functions of several variables, define a line integral in a plane and explain the path of integral • Assess the students • Ask the students to: • evaluate line integral problems • define green's theorem in a plane and apply it to solve line integral problems • apply double integral to line integral and change of variable in triple integrals • evaluate differentiation under the integral sign, state stokes formula and apply it to line integrals in space • how stoke's formula is applied to solve engineering problems • Assess the students	• Recommended textbooks, chalkboard, chalk, lecture notes etc.

Geo-Informatic and Quantity Surveying Courses

Engineering Surveying I

PROGRAMME: HND BUILDING			
Course: Engineering Surveying I		Course Code: SUG 208	Contact Hours: 1 - 0 - 3
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the basic principles and scope of engineering surveying.		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
1	1.1 List the types and scales of plans required for constructions. 1.2 Describe the general procedure of setting out engineering works. 1.3 Describe the general procedure of "as built" surveys. 1.4 List the methods of surveying for construction. 1.5 State examples of engineering surveys where photogrammetry may be used. 1.6 Apply the uses of modern computational methods in engineering surveys. 1.7 Apply the uses of modern survey instruments in engineering surveys.	• Lecture	• Chalkboard • OHP • Charts • Picture • Video • Maps
	General Objective 2.0: Understand the basic principles of geometric design of routes.		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
2	2.1 List the types and scales of plans required for route design. 2.2 Identify the geometrical elements of routes especially roads. 2.3 Distinguish between geometric design requirements of roads, railways, pipelines, electric power lines, etc.	Ditto	• Maps • Drawings • Pictures
	General Objective 3.0: Know how to set out routes consisting of straight and circular curves		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
3	3.1 Describe the process of setting out long straight lines. 3.2 Derive mathematical relationships between circular curve elements. 3.3 Solve the problem of setting out the circular curve if there are obstructions to sighting the deflection angles. 3.4 Run through the chainage in a route comprising straight and circular curves.	• Lecture	• Total Station • Theodolite

PROGRAMME: HND BUILDING			
Course: Engineering Surveying I		**Course Code: SUG 208**	**Contact Hours: 1 - 0 - 3**
Course Specification: Theoretical Content			
4	3.5 Derive necessary formulae to set out circular curves by deflection angles.	• Lecture	- Ditto -
5	3.6 Describe other methods of setting out circular curves. 3.7 Utilise the tabulated deflection angles when occupying successive instrument stations along circular curves. 3.8 Set out a long circular curve by deflection angles using successive instrument stations.	- Ditto -	- Ditto -
	General Objective 4.0: Understand the methods of running, calculating plotting and drawing longitudinal sections and cross sections.		
WEEK	**Specific Learning Objective:**	**Teachers Activities**	**Resources**
6	4.1 Describe the basic principles of sectioning. 4.2 Distinguish between longitudinal sections and cross sections. 4.3 Range and set out cross sections. 4.4 Describe the methods of leveling the longitudinal section. 4.5 Illustrate methods of booking sectional observation. 4.6 Reduce the levels of all points and plot longitudinal section and cross sections. 4.7 Explain the essential difference between the plot of longitudinal section and cross section. 4.8 Explain why in practice cross sections are usually taken at intervals.	- Ditto -	• Digital levels • Engineer's level
7	4.9 Carry out ranging, leveling, calculation, plotting and drawing of longitudinal section and cross sections at 30m intervals of a proposed road alignment.	• Lecture with examples.	- Ditto -
	General Objective 5.0: Understand methods of area computations		
WEEK	**Specific Learning Objective:**	**Teachers Activities**	**Resources**
8	5.1 Distinguish between rectilinear and irregular areas. 5.2 Describe the methods of obtaining the area using formulae for geometric figures. 5.3 Use the planimeter.	• Lecture	• Planimeter
9	5.4 Calculate areas by the trapezoidal and by Smpson's rules. 5.5 Compare the methods of area calculations.	• Lecture with examples	- Ditto -

PROGRAMME: HND BUILDING			
Course: Engineering Surveying I		Course Code: SUG 208	Contact Hours: 1 - 0 - 3
Course Specification: Theoretical Content			
	General Objective 6.0: Understand methods of volumes computations.		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
10	6.1 Explain the need for calculation of volumes of earthworks. 6.2 Derive the trapezoidal and prismoidal formulae.	• Lecture	- Ditto -
11	6.3 Calculate volumes from 6.2 above. 6.4 Calculate volumes from contour lines. 6.5 Calculate volumes from spot heights.	• Lecture, give examples.	- Ditto -
	General Objective 7.0: Understand the process of setting out structures.		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
12	7.1 Explain how setting out differs from ordinary surveying. 7.2 Describe the forms of horizontal and vertical controls needed by the setting out process. 7.3 Determine plans required for setting out. 7.4 Describe all the stages of setting out engineering structures. 7.5 Set out buildings.	Ditto	• Total Station • Digital theodolite
	General Objective 8.0: Understand the specialized aspects of "as built" surveys.		
WEEK	Specific Learning Objective:	Teachers Activities	Resources
13	8.1 Explain the need for "as built" surveys. 8.2 Identify the requirements of as "built" surveys. 8.3 Carry out the methods of surveying for existing and new works as finally constructed.	Ditto	- Ditto -
	Revision Week 14 & 15 **References** Engineering Surveying (1993) Schotiell, Poultarwrith-Heimm. **Assessment:** Coursework 20%, Course test 20%, Practical 20%, Examination 40%. **Competency**: The student should be able to undertake minor engineering surveys and complete all necessary calculations.		

Measurement of Civil Engineering Works I

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Measurement of Civil Engineering Works I		**Course Code: QUS 316**	**Contact Hours: 1-0-3**
Course Specification: Theoretical Content			
	General Objective: 1.0 Understand the Principles and format of CESMM		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
1 - 5	1.1 Explain the arrangement and format of the CESMM 1.2 Analyse the section sin the CESMM i.e a. Definitions b. General principles c. Application of work classification d. Coding and numbering of items e. Preparation of the bill of quantities f. Completion and pricing of the bill of quantities g. Working classification	• Explain the concept of CESMM • Give assignment on CESMM coding	• Chalk board, duster, CESMM
6 - 7	1.3 Explain the method of coding in the CESMM 1.4 Use the coding of civil engineering works 1.5 Explain the method of deriving bill of quantities items, applying the horizontal and vertical divisions and notes applicable to each work class.	• Lectures • Give assignments	- do-
	General Objective: 2.0 Understand the concept of method related changes		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
8 - 9	2.1 Explain method related charges 2.2 Identify the reason for providing for method related charges	• Lecture • Give assignment in the utilization of method related changes	• Chalk board, duster
9-10	2.3 State the advantages and disadvantages of method related charges 2.4 Write method related changes for inclusion in bills of quantities.		

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Measurement of Civil Engineering Works I		**Course Code: QUS 316**	**Contact Hours: 1-0-3**
Course Specification: Theoretical Content			
	General Objective: 3.0 Understand the measurement code and measure works and some selected areas		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
11-13	3.1 Measure work sunder general items 3.2 Measure works under site investigation 3.3 Measure works under geotechnical and other specialist processes 3.4 Measure works under demolition and site clearance	• Give working examples • Give assignment • Visit new site	• -ditto- • Drawings, CESMM
	Assessment: Coursework: 20% Course test: 20% Practical: 20% Examination: 40% **Competency:** The students should be able to measure special civil engineering works, and understand preparation of method related changes in civil engineering, bills of quantities. **Reference:** Ivor, H. Sceley, Civil Engineering Quantities 5th Edition.		

Course: Measurement of Civil Engineering Works I		**Course Code: QUS 316**	**Contact Hours: 1-0-3**
Course Specification: Practical Content			
	General Objective 1.0: Understand the principles and format of CESMM in some selected items		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
1 - 7	1.1 Apply the sections and coding in the CESMM in the measurement of the following a) General items b) Demolition and site clearance	• Give assignment	Chalk, chalk board, duster during CSMM
	General Objective 2.0: Understand the concept of method related changes		
WEEK	**Specific Learning Outcome**	**Teachers Activities**	**Resources**
8 - 13	2.1 Write method related changes for inclusion in bills of quantities	- do -	- do -

Advanced Measurement of Construction Works I

PROGRAMME: HIGHER NATIONAL DIPLOMA BUILDING TECHNOLOGY			
Course: Advanced Measurement of Construction Work I		Course Code: BLD 307	Contact Hours: 2-0-2
Course Specification: Theoretical Content			
	General Objective: Know how to measure from drawings and by reference to specifications of more complex building construction		
WEEK	Special Learning Objective:	Teachers Activities	Resources
1 - 4	- Measure substructure work for complex and special foundations. 1.2 Measure floor-solid, suspended, ground floor slab and associated reinforcement and form work 1.3 Measure walls of brickwork, blockwork of solid cavity and hollow nature, together with associated features.	• Lecture • Give assignment • Ditto	• Typical drawings of details for building.
8	1.4 Measure doors, windows and associated frames and iron mongery including adjustment for openings 1.5 Measure roof construction and roof covering-reinforced concrete roofs, steel trusses tiles, felt asbestos, corrugated sheet, ead, zinc, copper and aluminum.	Ditto	- do -
15	1.6 Measure staircase timber, reinforced concrete including finishing. 1.7 Measure fittings and fixture-cupboards, shelving, skirting, architrave's picture rails, pelmets, dadoes etc. 1.8 Measure frames-structural steel, reinforced concrete beams.	Ditto	- do -
	Assessment: Course work 20% Course Test 20% Practical - 20% Examination - 40%. **Competency:** The student should be able to prepare measurements from drawings in a standard form. **Reference:** Emmanuel C. Oborch, Agele Olufolai "Advance measurement of Building works"		

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Advanced Measurement of Construction Works I		Course Code: BLD 307	Contact Hours: 2-0-2
Course Specification: Practical Content			
	General Objective. Know how to Read from building drawings and preparing specifications and schedules of more complex building construction.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resources
1 - 6	1 Know how to read drawings for substructure work for complex and specification of more complex building construction of traditional class and simple industrial buildings of two stories.	• Give practical examples and supervise assignment	Drawings, chalkboard and related items
7 - 13	2 Provide and read drawing substructure for complex and special foundations. 3 Prepare specification and schedules of suspended, ground floor slab of building drawings. 4 Prepare doors, and windows schedules for a complex building.	• Give practical examples and supervise assignment.	

Advanced Measurement of Construction Works II

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Advanced Measurement of Construction Works II		Course Code: BLD 308	Contact Hours: 2-1-0
Course Specification: Theoretical Content			
	General Objective 1.0: To prove student with an Advanced knowledge of the Measurement of Construction works		
WEEK	Special Learning Objective:	Teachers Activities	Resources
1-8	1.1 Measure drainage - explanation pipework, manholes, inspection chambers, soak away pits, septic tanks. 1.2 Measure water supply and sanitary appliances 1.3 Measure external works paths roads, flower and tree planting, turfins, fencing and gates.	• Use illustrative diagrams to explain • Provide more practical exposure. • Create site visit	• Calculator, chalkboard, Duster, chalk
	General Objective 2.0: Know how to prepare examples of different methods of the processing dimensions billing and preparing schedules		
WEEK	Special Learning Objective:	Teachers Activities	Resources
9-15	2.1 Process dimension - abstracting art and shuffle, billing direct. 2.2 Prepare different bill formats explaining their uses:- a. Work section bill b. Elemental bill c. Sectionalized Trade bill d. Operational bill e. Activity bill 2.3 Prepare schedules for finishing, reinforcement, openings (doors and windows), iron mongery, sanitary appliances and drainage	• Ditto • Give a practical project.	• Ditto • Drawing of building and civil engineering works
	Assessment: Coursework 20% Course test 20% Practical 20% Examination 40% **Competency**: The students would be able to compare accurate talk from drawing and to arrange detailed schedules **References**: 1. I. H. Seeley, "Advanced Building Measurements". 3rd Ed. 2. 1. H. Seeley", Quantity Surveying Practice" 2nd Ed.		

Contract Laws and Arbitration

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Contract Law and Arbitration		**Course Code: QUS 313**	**Contact Hours: 2-0-0**
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the Law of contract of employment		
Week	**Specific Learning Outcomes:**	**Teachers Activities**	**Resources**
1-3	1.1 Define (a) employee (b) employer and distinguish between the two 1.2 Explain: a. express terms of employment contract b. implied terms of employment contract 1.3 Cite example statutes which have effect on labour Decree 1970 1.1 State the duties of the employer/employee 1.2 Explain the termination of employment contract 1.3 Explain redundancy	• Use practical examples to elaborate on terms • Cite relevant and practical examples • Cite practical examples	• Chalkboard, chalk, duster
	General Objective 2.0: Understand the law governing labour or trade unions		
WEEK	**Specific Learning Outcomes:**	**Teachers Activities**	**Resources**
4-5	2.1 Write about the origin and development of trade unions and the right of works to participate in trade unionsm 2.2 Define trade dispute 2.2 Describe the settlement of trade dispute as given in the trade dispute Act 1976 and later amended in 1977 2.3 Cite relevant cases in (1) above	• Explain the significance of trade unions to: an individual nation building • Define dispute • Highlight on the trade dispute concept • Explain principles of the trade dispute Acts. • Give extensive practical examples	• Chalkboard, chalk, duster

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Contract Law and Arbitration		**Course Code: QUS 313**	**Contact Hours: 2-0-0**
Course Specification: Theoretical Content			
	General Objective 3.0: Understand voluntary and compulsory liquidation		
WEEK	**Specific Learning Outcomes:**	**Teachers Activities**	**Resources**
6-8	3.1 Define liquidation, bankruptcy in-solvency and winding-up 3.2 Explain voluntary liquidation 3.3 Explain compulsory liquidation 3.4 Give example of control bankruptcy and distribution of assets to creditors e.g bankruptcy Act 1914, Bankruptcy Act/Amendment 1926, companies Act 1968 etc	• Cite relevant practical examples • Treat and discuss each concept and Acts, citing relevant practical applications	• Chalkboard, chalk, duster
	General Objective 4.0: Understand the responsibilities and obligations of all the parties to a contract		
WEEK	**Specific Learning Outcomes:**	**Teachers Activities**	**Resources**
9-10	4.1 Explain the relationship between the client and nominal sub-contractor and suppliers 4.2 Differentiate between the contractor and sub-contractors and nominated sub-contractor 4.3 Interpret the indemnity classes as they affect the clients, main contractors and nominated subcontractors and suppliers 4.4 State the role of client agents	• Identify the role of each on contractual relationship • Cite relevant examples • Use the relevant JCT to explain the practical interrelationship between the parties	Ditto
	General Objective 5.0: Understand the liabilities of the professionals in the construction industry		
WEEK	**Specific Learning Outcomes:**	**Teachers Activities**	**Resources**
11	2.1 Explain the liabilities of professionals in construction in industry 2.2 Determine their respective roles	• Define: • responsibility • liabilities and • Discuss each as applied in the JCT	Ditto

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Contract Law and Arbitration		**Course Code: QUS 313**	**Contact Hours: 2-0-0**
Course Specification: Theoretical Content			
	General Objective 6.0: Understand how contract can be discharged and remedied		
WEEK	**Specific Learning Outcomes:**	**Teachers Activities**	**Resources**
12-13	6.1 Explain the following method of discharge by performance a. discharge by performance b. discharge under conditions c. discharge by renunciation d. discharge by fresh agreement e. discharge by frustration f. discharge by determination 6.2 Propose appropriate remedies for breach of contract including their classifications 6.3 Cite relevant case	• Cite relevant and practical examples	Ditto
	General Objective 7.0: Know the meaning application and procedures of arbitration in the building industry		
WEEK	**Specific Learning Outcomes:**	**Teachers Activities**	**Resources**
14-15	7.1 Define arbitration and arbitration agreement 7.2 State the merits and demerits of arbitration 7.3 Describe how arbitrators and appointed 7.4 State the duties of arbitrators	• Give relevant examples • Expose the students to various arbitration cases	
	Assessment: Coursework 20% Course test 20% Practical 0% Examination 60% **Competency:** The students would be familiar with current laws governing employment, labour and the responsibility involved in contract laws. **References**: Agua Gkroup, "Contract administration for architects and quantity Surveyors; Glough, R. H., "Construction Contracting".		

Conditions of Contract

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Conditions of Contract		Course Code: QUS 314	Contact Hours: 2-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Provide the students with advanced knowledge of the application of JCT classes in project execution.		
Weeks	Specific Learning Outcome:	Teachers Activities	Resources
1 - 9	1.10 Analyse clause by clause, the JCT 1963/1977, or the JCT 1980 (both private and with quantities) 1.11 Identify the differences between the condition studied above and the following standard forms a. The Federal Ministry of Work (FMW) standard form b. The JCT 1963/1977 or JCT 1980 (private without quantities) c. State government d. The I.C.E conditions of agreement and bond e. Form GC/Works/1 1.12 Detect flaws in standard contract clauses 1.13 Suggest modifications to standard contract forms to svit unusual condition or situations 1.14 Appraise practical problems and legal technicalities in construction contract.	• Provide all copies of the JCT • Use question and answer techniques. • Give more assignment	• Copies of all the JCT, chalk, duster, chalkboard.

PROGRAMME: HND BUILDING TECHNOLOGY			
Course: Conditions of Contract		Course Code: QUS 314	Contact Hours: 2-0-0
Course Specification: Theoretical Content			
	General Objective 2.0: Understand in details the various standard forms for subcontract works and relate them to the main contract forms.		
Weeks	Specific Learning Outcome:	Teachers Activities	Resources
10-13	2.1 Analyse the clause by clause the JCT 1963/1977 or JCT 1980 standard subcontract form 2.2 Identify the relationship of the subcontract clause to those in the main contract 2.3 Interpret these clauses to those in the main contract 2.4 Apply them to construction work	- ditto -	- Ditto -
	Assessment: Coursework 20% Course test 20% Practical 0% Examination 60% **Competency**: Student would be familiar with and understand the JCT form of contract and be able to interpret the course. **References:** 1. Glugh R. H., "Construction Contracting". 2. Entwisle, "F. D., "Building regulation practice and procedure.		

Estimating and Price Analysis I

PROGRAMME: Higher National Diploma in Building Technology			
Course: Estimating and Price Analysis I		**Course Code: BLD 407**	**Contact Hours: 1-1-0**
Course Specification: Theoretical Content			
	General Objective 1.0: Know how to build-up unit Rates for complex building works and civil engineering works including preliminary items.		
WEEK	**Specific Learning Outcome:**	**Teachers Activities**	**Resources**
1 - 8	1.1 Carry-out build-up unit prices of a given complex building and civil engineering works 1.2 Appreciate the use of Data files for materials labour and plant. 1.15 Know how to make an approximate estimate by various Unit, cube superficial or floor Area, Storey enclosure and Approximate quantities.	• Build-up unit prices and analyse rate for all materials require for complex building and Civil Engineering Works. • Price preliminary items for building and civil engineering works. • Price temporary works and services for civil engineering works • Prepare and discuss cost Data Bank. • Explain when it is beneficial or advantageous to either hire or buy a plant.	• FMW&H Form of contract • S.M.M & S • Three Coluum Cash booksheets
	General Objective 2.0: Know how to make up approximate estimate by various unit, cube superficial or floor Area, Storey enclosure and approximate quantities.		
WEEK	**Specific Learning Outcome:**	**Teachers Activities**	**Resources**
9 - 12	2.1 Define and discuss the following various methods a. Unit b. Cube c. Superficial d. Storey enclosure e. Approximate quantities 2.2 Illustrate and Demonstrate items 2.1 (I-v) above	• Lectures • Guve practical examplesengineering works. - do -	Drawings, Chalkboard and related items

PROGRAMME: Higher National Diploma in Building Technology			
Course: Estimating and Price Analysis I		Course Code: BLD 407	Contact Hours: 1-1-0
Course Specification: Theoretical Content			
	General Objective 3.0: Know factors affecting cost or tenders.		
WEEK	Specific Learning Outcome:	Teachers Activities	Resources
13 - 15	3.1 Show how the various factors on a given construction project affect the cost of tenders.	• Explain and compute the contractual effects of the following materials, labour plant on-site cost, site location, profit Head office overheads, fluctuation clause, claims on tenders.	
	Assessment: Coursework: 20% Course test: 20% Practical 0% Examination 60%; **Competency:** The student should know how to build up unit rates and make estimates for complex and civil engineering works.; **Reference:** Ayeni J. O., " Principles of tendering and estimating".		

Estimating and Price Analysis II

PROGRAMME: Higher National Diploma in Building Technology			
COURSE: Estimating and Price Analysis II		COURSE CODE: BLD 408	CONTACT HRS: 1-1-0
Course Specification: Theoretical Content			
	General Objective:		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
1-15	1. Appreciate the various types of above. 2. Relate each type to a given project. 3. Appreciate the interpretation of Drawings, Specifications and Bills of Quantities. 4. Appreciate the Value and Necessity of Tender Documents.	• Describe the different tendering procedures: • Negotiation • Selective • Open • Explain the different types of building contracts: • Fixed price • Cost reimbursement • Target • Management • Turn key • Explain and Discuss the duties and responsibilities of Top Management. • Illustrate the determinates of Overheads and Profit Margin of a Construction Organization. • Describe Tender documents.	• Chalk board, • JCT/FMW&H form SMM&S 3-Column Cash Book
	Assessment: Coursework: 20% Course test: 20% Practical 0% Examination 60% **Competency:** The students should be familiar with the different tendering methods and types of contract. **Reference:** Roy, "Project Cost Control in Construction". Smith, R. C. "Estimating and tendering for building work".		

Technical Report Writing

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: TECHNICAL REPORT WRITING		COURSE CODE: BLD 312	CONTACT HRS: 1-0-0
Course Specification: Theoretical Content			
	General Objective 1.0: Understanding the content of a technical report.		
WEEK	Special Learning Objective	Teachers Activities	Resource
1	1.1 Explain the meaning of technical report 1.2 Identify the purpose of technical reports	Lecture and give examples	Chalkboard
2	1.3 Explain types and uses of technical reports		
	General Objective 2.0: Understanding the methodology and sequence of writing technical reports		
WEEK	Special Learning Objective	Teachers Activities	Resource
3-6	2.1 Discuss the following in technical reports: a. determination of topic and title b. justification of title c. abstract or synopsis of the report d. aim and objectives of the report e. classification of data f. scope and limitation of project g. data analysis (graphical, tabular and descriptive methods) h. presentation of data (use of appendices).	- do -	- do -
7	2.2 Explain how technical reports should be made clear and correct.		
8	2.3 Understand the information that is required in technical report writing. 2.4 Information required in technical report writing. 2.5 Explain the various types of information that would be required in reports. 2.6 Determine the factors that influence solutions.	- do -	- do -
9	2.7 Advance building technology conclusion arising from factors 2.8 Select criteria required in case studies.		
10	2.9 Determine critical analysis of case studies 2.10 Produce summary		

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: TECHNICAL REPORT WRITING		COURSE CODE: BLD 312	CONTACT HRS: 1-0-0
Course Specification: Theoretical Content			
11	2.11 Make propositions (Author's summary) 2.12 Develop conclusion to a technical report.		
12	2.13 write a bibliography in standard format 2.14 Explain terms of reference in report 2.15 Explain the difference between facts and opinions.	• Lecture • Conduct a site visit	
13	2.16 Explain how fact and opinions may be distinguished in writing reports		
14	2.17 Write reports on selected technical matters 2.18 Re-write the abstrat		
	Assessment: Coursework: 20% Course test: 20% Practical: 0% Examination 60% **Competency:** The student should be able to write a good technical report.		

Project

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: PROJECT		COURSE CODE: BLD 402	CONTACT HRS: 0-1-6
Course Specification: Theoretical Content			
	General Objective 1.0: Understand the importance of Project to the Programme		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
1	1.1 Explain what is meant by project. 1.2 State the need for project in the HND Building Technology programme.	• Guide the students • Use questions and answers techniques. • Show examples.	• Chalkboard
	General Objective 2.0: Know How to Identify Problems in Practice Identification of Problems in Practice.		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
2 - 5	2.1 Identify the typical problems in Building Construction Practice. 2.2 State the causes of these problems. 2.3 Explain the need to find solutions to these problems. 2.4 Deduce solution to these problems.	-do-	-do-
	General Objective 3.0:Know How to Collect and Use Data for Analysis. Data Collection and Analysis		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
6 - 9	3.1 Enumerate the various methods of data collection for project works. 3.2 Explain the use of the collected data. 3.3 Describe the kind of analysis which such data can sustain. 3.3 Analyse the data collected. 3.4 Solve given Building Construction problems using the analysed data in 3.4 above. 3.5 Explain the basic for the choice of the alternative applied in 3.5.	-do-	-do-

PROGRAMME: BUILDING TECHNOLOGY HND			
COURSE: PROJECT		COURSE CODE: BLD 402	CONTACT HRS: 0-1-6
Course Specification: Theoretical Content			
	General Objective 4.0: Know How to Present Project		
WEEK	Specific Learning Outcomes:	Teachers Activities	Resource
10	4.1 Prepare an abstract for the project dissertation.		
11 - 13	4.2 Write an outline of the dissertation. 4.3 Analyse the outline for consistency, unity, coherence and clarity. 4.4 Write in detail all the process undertaken in the course of the project work and the deductions made following the analysed outline. 4.5 Prepare footnotes. 4.6 List references/bibliography correctly stating a. Author's name b. Title of Book or journal c. Publishers d. Name; place and date published. 4.7 Revise the written project dissertation 4.8 Type the written project dissertation 4.9 Proof-read after typing 4.10 Produce the completed work neatly to the required number of copies (at least 3) 4.11 Bind the dissertation into book form (preferably A4 size) 4.12 Represent the project works with dissertation to designated assessors.	• Guide the students -do-	-do- -do-
	Assessment: Coursework: 20%, Defense marks: 40%, Readers mark: 20% Final 20%. **Competency:** The student should be able to use the knowledge and skills acquired in the various courses to present a project report.		

Guidelines for Assessment of Project

Supervisor Assessment Part A

TITLE OF PROJECT	
NAME OF STUDENT	
REGISTRATION NUMBER	
COURSE	

GENERAL ASSESSEMENT

			MAXIMUM SCORE	ACTUAL SCORE
1	Has the student understood the problem and pursued it?	(Fully) (Partly) (Not at all)	4	
2	To what extent has the student shown self reliance in determining the outcome of work?	(Greatly) (Slightly) (Not at all)	3	
3	What original work has the student contributed to the problem? e.g. experimental technique, mathematical derivation, an ingenious design.	(A considerable amount) (A little) (Nothing)	3	
4	Do you consider that the student has done more than just about or less than what are required by the objectives	(A reasonable) (Just amount of work) (Not much)	4	
5	Is the summary (a) concise	REPORT ASSESSMENT (Absolutely clear?) (Moderately clear?) (Not clear?)	3	
6	Is the summary (b) complete	(Adequately complete?) (Not complete?)	3	

			MAXIMUM SCORE	ACTUAL SCORE
7	Is the presentation of the report good and in conformity with the standard format in: building quality, typing quality, minimal errors and corrections, topics layout numbering system, acceptable number of words?		3	
8	Is the quality of English (sentence construction, grammar, spelling?) satisfactory		2	
9	How is the survey of literature. (Has relevant references being omitted? Is the appraisal critical enough?).		2	
10	Were results discussed? (in the case of literature survey, results may be replaced by contents of literature such as assumptions, leading statement, supporting experiments).		3	
11	How are diagrams presented and cross-referencing carried out? Are references made correctly?		3	
12	Does the report read as an integrated whole? (e.g details of work should be put in appendices, padding should be penalised).		2	
13	Has the problem been presented to the reader.		2	
14	How is the conclusion?		3	
		TOTAL	40	

Brief Remarks: _____

_____

_____

Name of Supervisor: _____ Date: _____

Panel Assessment (Oral Defence) Part B

TITLE OF PROJECT	
NAME OF STUDENT	
REGISTRATION NUMBER	
COURSE	

		MAXIMUM SCORE	ACTUAL SCORE
1	Abstract (summary)	2	
2	Clear Presentation of Problem	2	
3	Literature Survey (Adequacy of)	2	
4	Results Discussion (Through or Not)	2	
5	Diagrams, Referencing and Cross-Referencing)	2	
6	Overall flow and Cohenrency of the Report	2	
7	Conclusions	2	
8	Quality of English	2	
9	Overall Presentation and Quality of Report	2	
10	Amount of Work done by the Student	2	
11	Overall Presentation		
	a) Confidence in Presentation	4	
	b) Understand one of Subject Matter	4	
	c) Response to Technical Question	4	
	d) Command of English Language	4	
	e) Overall Performance	4	
	TOTAL	40	

Brief Remarks: _____

_____

_____

PANEL MEMBERS:

S/N	NAME	SIGNATURE	DATE
1.			
2.			
3.			
4.			
5.			
6.			

Reader Assessment Part C

TITLE OF PROJECT	
NAME OF STUDENT	
REGISTRATION NUMBER	
COURSE	
NAME OF SUPERVISOR	

			MAXIMUM SCORE	ACTUAL SCORE
1.	Abstract (summary)	(Absolutely clear?) (Moderately clear?) (Not clear)	1	
		(Adequate?) (Moderately?) (Comprehensive?) (Inadequate?)	1	
2.	Has the problem been presented.	(Clearly?)	2	
3.	Is the survey of Literature.	(Satisfactory?) (Moderately Good?) (Unsatisfactory?)	2	
4.	Were results discussed?	(Thoroughly) (A little?) (Not at all?)	2	
5.	How are diagrams presented and cross-referencing carried out? Are references made correctly?	(Well) (Moderately Well?) (Not at all?)	2	
6.	Does report read as an integrated whole?	(Yes) ((Party) (No)	2	
7.	Are conclusion in body of report	(Precise) (Moderately clear)	2	
8.	Is the quality of English (Sentence construction, grammar, spelling.	(Good) (Moderate) (Bad)	2	

			MAXIMUM SCORE	ACTUAL SCORE
9.	Is the presentation of the report good in conformity with the standard format in: binding quality, typing quality, errors and corrections, topic layout, numbering system etc.		2	
10.	Do you consider the student has done more than, just about or less than.	(A reasonable amount of work?	2	
		TOTAL	40	

Brief Remarks: _____

_____

_____

Name of Reader: _____

Signature: _____ Date: _____

Guidelines for Text Book Writers

NATIONAL DIPLOMA AND HIGHER NATIONAL DIPLOMA

The following guidelines are suggestions from the Engineering Committees to the writers of the textbooks for the new curricula. They are intended to supplement the detailed syllabuses which have been produced, and which define the content and level of the courses.

Authors should bear in mind that the curriculum has been designed to give the students a broad understanding of applications in industry and commerce, and this is reflected in the curriculum objectives.

1. One book should be produced for each syllabus
2. Page size should be A4
3. The front size should be 12 point for normal text and 14 point where emphasis is needed
4. Line spacing should be set to 1.5 lines
5. Headings and subheadings should be emboldened
6. Photographs, diagrams and charts should used extensively throughout the book, and these items must be up-to-date
7. In all cases the material must be related to industry and commerce, using real life examples wherever possible so that the book is not just a theory book. It must help the students to see the subject in the context of the 'real word"
8. The philosophy of the courses is one of an integrated approach to theory and practice, and as such the books should reflect this by not making an artificial divide between theory and practice.
9. Illustrations should labeled and numbered.
10. Examples should drawn from Nigeria wherever possible, so that the information is set in a country context.
11. Each chapter should end with student self-assessment questions (SAG) so that students can check their own master of the subject
12. Accurate instructions should be given for any practical work having first conducted the practical to check that the instructions do indeed work
13. The books must have a proper index or table of contents, a list of references and an introduction based on the overall course philosophy and aims of the syllabus.
14. Symbols and units must be listed and a unified approach used throughout the book
15. In case of queries regarding the contents of the books and the depth of information, the author must contact the relevant curriculum committee via the National Board for Technical Education
16. The final draft version of the books should be submitted to Nigerian members of the curriculum working groups for their comments regarding the content in relation to the desired syllabus.

List of Equipment for the National Diploma in Quantity Surveying Programme

1. LABORATORIES

STRUCTURES/Strength of Materials

1. Two-hinged arch apparatus	1
2. Continuous beam apparatus	1
2. Deflection of beam apparatus	
3. Bending moment & shearing force apparatus	1
4. Elastic beam apparatus	1
5. Elastic deflection of frames	1
6. Struts buckling apparatus	1
7. Plastic bonding of portal frames	1
8. Perfect or redundant trusses apparatus	1

2. Material Science Laboratory

1. B & K sound level units octave filter	3
2. Micro-computers	1
3. Planimeter	3 sets
4. Stop watches	10
5. Daylight factor units	3 sets
6. Sound Pressure meter	3
7. Accelerometer for vibration analysis	2

3. Soil Mechanics

1. Consistency limits test apparatus	10
2. Compacting core machine	1
3. Compacting factor testing machine	1
4. Particle size distribution lost apparatus	5
5. Compaction test apparatus	1
6. Core penetrometer	1
7. Moisture content test apparatus	6
8. Specific gravity test apparatus	10
9. Density test apparatus	10
10. Le Chateller test apparatus	5
11. Augers and rigs	6
12. V-B consistometer test apparatus	1
13. Drying ovens	3
14. Sample collecting trays and sample containers	10
15. 150mm cube moulds	30
16. 150mm cylindrical moulds	30
17. Balances	2 of each
18. Vicat apparatus	2
19. Thermometers	5 of each
20. Cement lineness test apparatus	2
21. Measuring cylinders	5
22. Soil hydrometers	5
23. Crucibles, spatulas, filter papers funnel and vernier calipers	Assorted
24. Desiccators	6
25. Curing tank	
26. Stop watches	10
27. Beam moulds	4
28. Crushing machine	1

List of Participants

UNESCO-NIGERIA PROJECT IN SUPPORT OF REVITILISATION OF TECHNICAL AND VOCATIONAL EDUCATION IN NIGERIA

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REVIEW OF ND AND HND BUILDING TECHNOLOGY CARRIED OUT BETWEEN 2001

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