

Carpentry and Joinery - National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC)

Advanced National Technical Certificate Curriculum and Module Specifications in Carpentry and Joinery

Building Science I	2
Building Science II	8
Building Drawing II.....	16
Advanced Joinery	20
Advanced Carpentry	29

Building Science I

POGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING SCIENCE - I		Module Code: CBC - 20	Contact Hours: 3hrs Theory
Course Specification: THEORETICAL CONTENT			
General Objective: 1.0: Understand The Basic Principles Of Thermal Movement In Building And Building Materials.			
Week	Specific Learning Outcome:	Teachers Activities	Resources
1-7	<p>1.1 Define the following terms: thermal conductivity thermal resistivity heat transmittance coefficient or "U" value. Thermal emissivity Thermal absorptivity.</p> <p>1.2 State the factors which determine the magnitude of the above terms for a structural unit or building materials.</p> <p>1.3 Explain the variation of the amount of heat transmitted between the surface of a slab of building material of uniform thickness and composition.</p>	<ul style="list-style-type: none"> • Compute the 'u' and 'k' values for structural units or building materials from given data. • Ask students to explain all the thermal terms. • Give note. 	<ul style="list-style-type: none"> • Lesson note • Different building materials

POGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE - I	Module Code: CBC - 20	Contact Hours: 3hrs Theory
-------------------------------------	------------------------------	---------------------------------------

Course Specification: THEORETICAL CONTENT

General Objective 2.0: Know The General Principles Of Sound Transmission And Control.			
Week	Specific Learning Outcome:	Teachers Activities	Resources
3-4	2.1 Explain the general principles of sound transmission. 2.2 Explain the following terms. a. air born sound b. structure-born sound c. sound reflection, reverberation and reverberation time. d. Impact sound 2.3 Explain the general principles and methods of sound control.	<ul style="list-style-type: none"> • Measure sound transmission level (intensity) in decibels. • By visiting an acoustic building describe the general principles and methods of sound control (Insulation and absorption) in buildings e.g. • Principle of discontinuity • Mass law • Sound reduction at source, etc. 	<ul style="list-style-type: none"> • Lesson notes
General Objective 3.0: Understand The Basic Principles Of Lighting			
Week	Specific Learning Outcome:	Teachers Activities	Resources
5-6	3.1 State the general functions of lighting. 3.2 Define the following terms: a. illumination b. luminous flux c. illuminance d. luminance e. day light factor 3.3 Distinguish between disability glare and discomfort glare. 3.4 State ways by which glare is controlled in buildings.	<ul style="list-style-type: none"> • Explain the general functions of lighting e.g • To illuminate the internal envelope and contents; • To illuminate task (reading, working with equipment etc). to the extent appropriate to optimal functioning of the eye. • Emphasize the following ways of controlling glare in buildings. • Types, sizes, number and position of openings 	

POGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING SCIENCE - I		Module Code: CBC - 20	Contact Hours: 3hrs Theory
Course Specification: THEORETICAL CONTENT			
General Objective 3.0: Understand The Basic Principles Of Lighting			
	<p>3.5 Determine the intensity of illumination due to a given source of light.</p> <p>3.6 Calculation of day light factor.</p> <p>3.7 Describe the main classes of lighting.</p> <p>3.8 State the uses of the main classes of lighting.</p> <p>3.9 Explain the interdependence of color and lighting in buildings.</p>	<ul style="list-style-type: none"> • Colour and texture of building surfaces. • Types of lighting fittings • Structure of internal envelope etc. • Calculate day-light factor from given date and by direct measurement. • Emphasize the following classes of lighting. <ul style="list-style-type: none"> • Direct lighting • Indirect lighting • General lighting • Luminous lighting 	<ul style="list-style-type: none"> • Lesson note • Chalk board
General Objective 4.0: Understand The Principles Of Electricity Supply Inn Buildings			
Week	Specific Learning Outcome:	Teachers Activities	Resources
7-8	<p>4.1 State the difference between alternating current and direct current.</p> <p>4.2 Explain the construction and working principles of generators, motors and transformers.</p> <p>4.3 Explain with the aid of experiments the heating, lighting, magnetic and chemical effects of electric current.</p> <p>4.4 Calculate the power and energy consumption in simple circuits.</p> <p>4.5 Explain the function of earning in electrical circuits.</p> <p>4.6 State the purpose and explain the functioning of circuit breakers and fuses.</p> <p>4.7 Illustrate the correct method of distributing electrical power from the mains to socket outlets and lighting points in house wiring systems.</p> <p>4.8 Compute total electrical load for a given load for a given house wiring.</p> <p>4.9 Calculate fuse capacity for house wiring system.</p> <p>4.10 Identify dangers of electricity and essential safety measures against them.</p>	<ul style="list-style-type: none"> • Carry out experiments to demonstrate the heating, lighting, magnetic, and chemical effects of electric current. • Mathematical calculation of power and energy consumption in simple circuit. • Identify earthing in an electrical circuit. E.g in a bungalow. • Identify circuit breakers and fuses in a building. • Emphasize the correct method of distributing electrical power from the mains (NEPA line or stand by generator) to socket outlets and lighting points in house wiring systems. • Interpret electrical installation drawing of a small bungalow or two-storey building. • Emphasis the danger associated with electricity and enumerates the essential/necessary safety measures to be observed. 	<ul style="list-style-type: none"> • Simple electric circuits • Electric heater • Solenoid • circuit breakers • fuses

POGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE - I	Module Code: CBC - 20	Contact Hours: 3hrs Theory
-------------------------------------	------------------------------	---------------------------------------

Course Specification: THEORETICAL CONTENT

General Objective 5.0: Know The Basic Principles Of Plant Installation In Buildings.:

Week	Specific Learning Outcome:	Teachers Activities	Resources
	5.1 Explain the working principles of lift and escalators. 5.2 Outline the essential safety principles for lifts and escalators. 5.3 Explain the general principles of air-conditioning.	<ul style="list-style-type: none"> • Visit a building with escalators and or lift. • Explain the maintenance principles for lifts and escalators. 	
9-10	5.4 Describe various mechanical methods of ventilation. 5.5 Explain the principle of mechanical ventilation. 5.6 Outline the general installation requirements for central and room air conditioning equipment, 5.7 Define the following: <ul style="list-style-type: none"> a. relative humidity b. dew point 5.8 Explain the occurrence of condensation in buildings. 5.9 Describe methods of control of condensation.	<ul style="list-style-type: none"> • Explain the principle of an conditioning in building. • Define condensation and explain how it could be controlled in building. 	<ul style="list-style-type: none"> • Lesson note • Chalk Board
	5.10 Explain the principles of turbulent and non-turbulent flow. 5.11 Explain the followings terms and state their importance in the design and installation of piped water supply system: <ul style="list-style-type: none"> a. static head of water b. velocity head c. friction head d. pressure head e. water hammer f. coefficient of velocity g. coefficient of discharge. 	Calculate the flow of water from given dates. Calculate the	

POGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE - I	Module Code: CBC - 20	Contact Hours: 3hrs Theory
-------------------------------------	------------------------------	---------------------------------------

Course Specification: THEORETICAL CONTENT

General Objective 6.0: Analyse Forces In Simple Building Structures And Structural Frame Work.

Week	Specific Learning Outcome:	Teachers Activities	Resources
11-12	<p>6.1 State the laws of static equilibrium.</p> <p>6.2 Explain with illustrative examples the laws of static equilibrium e.g.</p> <p style="padding-left: 40px;">$(V) = 0$</p> <p style="padding-left: 40px;">$(H) = 0$</p> <p style="padding-left: 40px;">$(M) = 0$</p> <p>6.3 Determine the magnitude and position of the resultant of a simple system of coplanar forces.</p> <p>6.4 Analyse forces in simple pin-jointed - framed-work.</p>	<ul style="list-style-type: none"> • Determine the magnitude and position of the resultant of a simple system of coplanar forces by: - graphical method. • Method of resolution experiment. • Experiment. • Analyze forces in simple pin - jointed-framed -work • by method of resolution of force diagram method • method of section 	<ul style="list-style-type: none"> • Charts • Model of simple pin-jointed frame work.
	<p>6.5 Identify common loading systems for various building structures</p> <p>6.6 Determine beam reaction, shear force and bending moments in simple supported beams under various loading systems using.</p> <p style="padding-left: 40px;">a. Link polygon system</p> <p style="padding-left: 40px;">b. method of resolution</p> <p style="padding-left: 40px;">c. experiments.</p> <p>6.7 Define the following properties of structural sections.</p> <p style="padding-left: 40px;">a. centre of gravity</p> <p style="padding-left: 40px;">b. moments of inertia</p> <p style="padding-left: 40px;">c. radius of inertia</p> <p style="padding-left: 40px;">d. radius of gyration</p> <p style="padding-left: 40px;">e. section modules</p>	<ul style="list-style-type: none"> • Emphasize the following common loading systems concentrated load on beams, straddling and nodes in frame-works. • Knife - edge load on partitions or walls. • Uniformly distributed load such as self-weight or wind load. • Distributed load with linear variation, triangular load such as block-work over opening. • Calculate beam reactions under various loads. 	<ul style="list-style-type: none"> • Model • beam • sections

POGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE - I

Module Code: CBC - 20

**Contact Hours:
3hrs Theory**

Course Specification: THEORETICAL CONTENT

General Objective 6.0: Analyse Forces In Simple Building Structures And Structural Frame Work.		
11-12	6.8 State the general theory of simple bending i.e. $E/R = M/F = F/Y$	<ul style="list-style-type: none">• Determine the value of the following for a given section.• Centre of gravity• Moments of inertia• Radius of gyration• Section modulus• Determine maximum bending stress and moment of resistance of beam sections.
13	Examinations	

Building Science II

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING SCIENCE II		MODULE CODE: CBC 21	Contact Hours: 3hrs theory & 1 Hr. practical
MODULE Specification: TEORETICAL CONTENT			
General Objective 1.0: Know The General Process Of Manufacture, Properties And Uses Of Different Types Of Cement.			
Week	Specific Learning Outcome:	Teacher Activities	Resources
1	1.1 Outline the manufacturing process, basic composition properties and uses of the following types of cement: <ul style="list-style-type: none"> a. ordinary Portland cement b. rapid hardening Portland c. extra rapid hardening Portland d. low heat Portland cement e. blast-furnace Portland cement f. super-sulphuted cement g. high alumina-cement h. colored Portland cement i. hydrophobic cement j. pozzolana - cement 	<ul style="list-style-type: none"> • Describe the manufacturing process of cement. • Name the different types of cement and explain uses and areas of application. • State the unit and delimit of each cement 	<ul style="list-style-type: none"> • Chalk board. • Lesson note. • Different types of cement specimen

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE II	MODULE CODE: CBC 21	Contact Hours: 3hrs theory & 1 Hr. practical
------------------------------------	----------------------------	---

MODULE Specification: TEORETICAL CONTENT

General Objective 1.0: Know The General Process Of Manufacture, Properties And Uses Of Different Types Of Cement.

<p>1.2 State factors they may influence setting time, strength and hardness of ordinary Portland cement.</p> <p>1.3 Describe the test procedure and carry out standard tests to determine:</p> <ol style="list-style-type: none"> a. strength b. soundness c. setting time d. hardness <p>of ordinary Portland cement.</p> <p>1.4 State and justify the essential precautions in the storage and use of cements in 1.1 above.</p>	<ul style="list-style-type: none"> • Explain the main features of each type of cement. • Explain the factors that influence the setting time, strength and hardness of Portland cement. • Carry out tests/experiments to determine the above properties. 	<ul style="list-style-type: none"> • Lesson note. • Cement specimens. • Chalk board.
---	---	---

General Objective 2.0: Know The Manufacture, Properties And Uses Of Lime And Gypsum Plasters.

Week	Specific Learning Outcome:	Teacher Activities	Resources
2	<p>2.1 Explain the differences in the manufacture and composition of lime and gypsum plasters.</p> <p>2.2 State the classifications and uses of lime and gypsum plasters.</p> <p>2.3 Describe the method of application of lime and gypsum and state essential precautions.</p>	<ul style="list-style-type: none"> • Define: “Lime”; “Gypsum” and explain their uses in building construction processes. • Discuss the manufacturing, properties, and uses of lime and gypsum. • Explain the methods of application of these materials. 	<ul style="list-style-type: none"> • Lesson note • Chalk board Posters • Specimen of lime and gypsum.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING SCIENCE II		MODULE CODE: CBC 21	Contact Hours: 3hrs theory & 1 Hr. practical
MODULE Specification: TEORETICAL CONTENT			
General Objective 3.0 Carry Out Stand Tests To Determine The Quality Of Aggregates.			
Week	Specific Learning Outcome:	Teacher Activities	Resources
3	<p>3.1 Describe procedure of sieve analysis and determine aggregate grading by sieve analysis.</p> <p>3.2 Describe the procedure for silt content test and carry out laboratory tests to determine silt content of given sample of aggregates.</p> <p>3.3 Describe the test procedure and carry out the test to determine the crushing values of a given sample of aggregate.</p> <p>3.4 Describe the procedure for bulking test and carry out bulking test.</p>	<ul style="list-style-type: none"> • Define “aggregate” • Explain methods of grading of aggregates • Conduct silt content, crushing value and bulking tests and guide the students to perform similar tests. 	<ul style="list-style-type: none"> • Aggregates • Lesson notes • Posters • Samples of Aggregates • Apparatuses
General Objective 4.0: Know Different Types Of Mortar And Their Application.			
Week	Specific Learning Outcome:	Teacher Activities	Resources
4	<p>4.1 Outline the general desirable properties of mortar e.g. good workability and water retentivity, adequate cohesion and adhesion, strength, durability, tolerable shrinkage, etc.</p> <p>4.2 Name different types of mortar, their properties, typical mix proportions to be taken in the proportioning and mixing of mortar.</p> <p>4.3 Explain the precautions to be taken in the proportioning and mixing of mortar.</p> <p>4.4 State the basic considerations in the choice of mortar e.g. weather characteristics, appearance, type of job, etc.</p> <p>4.5 Describe the procedure and carry out an experiment to determine the air content of plasticised mortar.</p>	<ul style="list-style-type: none"> • Define “Mortar” • State the properties of mortar and typical mix proportion. • Demonstrate the procedures for determining air content of plasticised mortar. 	<ul style="list-style-type: none"> • Mortar • Lesson notes • Charts • Mortar. • Lesson notes. • Posters.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE II	MODULE CODE: CBC 21	Contact Hours: 3hrs theory & 1 Hr. practical
------------------------------------	----------------------------	---

MODULE Specification: TEORETICAL CONTENT

General Objective 5.0: Know The Process Of Manufacture, Properties And Uses Of Different Clay Products.

Week	Specific Learning Outcome:	Teacher Activities	Resources
5	<p>5.1 Name and state the properties and uses of different clay products in the building industry. e.g. clay-bricks (engineering bricks, facing bricks, common bricks, and specials), clay blocks, clay roofing tiles, clay floor tiles and quarries, vitrified clay pipes, etc.</p> <p>5.2 Outline the process of manufacturing of the products in 5.1 above.</p> <p>5.3 Determine hardness, compressive strength, porosity and permeability of given sample of bricks by laboratory methods.</p>	<ul style="list-style-type: none"> • Define “Clay” and State the properties of clay. • Discuss the process of manufacturing clay bricks blocks, tiles etc. • Demonstrate how to determine hardness, compressive strength, porosity and permeability test of bricks. 	<ul style="list-style-type: none"> • Clay. • Clay Products. • Lesson note. • Chalkboard. • Clay bricks. • Apparatuses/Instruments.

General Objective 6.0: Know Different Types Of Building Rocks Their Sources And Uses.

Week	Specific Learning Outcome:	Teacher Activities	Resources
6	<p>6.1 Classify natural rocks and igneous, sedimentary and metamorphic rocks.</p> <p>6.2 Describe the characteristics and uses of different types of rocks of commercial value in the construction industry under the classification in 6.1 above.</p> <p>6.3 Describe the sources of rocks in 6.2 and their quarrying methods. e.g.</p> <ol style="list-style-type: none"> a. igneous rocks b. sedimentary rocks: c. metamorphic rocks d. granites e. sands, limestone f. marble, slate. 	<ul style="list-style-type: none"> • Show samples of building stones and explain their characteristics. • Name sources of building stone. 	<ul style="list-style-type: none"> • Lesson note. • Posters. • Chalkboard. • Charts

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE II	MODULE CODE: CBC 21	Contact Hours: 3hrs theory & 1 Hr. practical
------------------------------------	----------------------------	---

MODULE Specification: TEORETICAL CONTENT

General Objective 7.0: Understand The Production And Use Of Concrete As Structural Material

Week	Specific Learning Outcome:	Teacher Activities	Resources
	<p>7.1 Outline the desirable qualities of the ingredients of mass and reinforced concrete.</p> <p>7.2 Explain the effects of aggregate grading, water cement ratio compaction and curing on the compressive strength of concrete.</p> <p>7.3 Describe methods of proportioning and mixing concrete materials and placing compacting, curing and protecting green concrete.</p>	<ul style="list-style-type: none"> • Define concrete and describe the composition of concrete. 	<ul style="list-style-type: none"> • Concrete. • Aggregates. • Lesson note concrete cube. • Equipment.
7	<p>7.4 Carry out slump and cube test and interpret results.</p> <p>7.5 Carry out permeability test on given sample of concrete.</p> <p>7.6 Estimate from project drawings the quantities of concrete materials required for the executive of the project.</p> <p>7.7 Compute the quantities of batch materials from prescribed or designed mix.</p> <p>7.8 Explain the general principles in the reinforcement of beams, columns, floor slabs, walls, retaining walls, concrete tanks, and designed mix.</p>	<ul style="list-style-type: none"> • Demonstrate how to conduct slum and permeability tests. 	- do -

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE II	MODULE CODE: CBC 21	Contact Hours: 3hrs theory & 1 Hr. practical
------------------------------------	----------------------------	---

MODULE Specification: TEORETICAL CONTENT

General Objective 8.0: Know The Characteristics, Methods Of Conversion And Uses Of Different Types Of Timber In The Building Industry.

Week	Specific Learning Outcome:	Teacher Activities	Resources
8	<p>8.1 Classify timber as hard-wood and soft-wood and state the distinguishing characteristics.</p> <p>8.2 Describe the structure of timber and state the functions of the parts.</p> <p>8.3 Describe different methods of timber conversion and state the merits of each method.</p> <p>8.4 Explain the purpose of seasoning timber and describe various methods of seasoning and preserving timber,</p> <p>8.5 Identify nature of defects in timber and explain their causes.</p> <p>8.6 Identify various causes of deterioration in converted timber and state necessary precautions.</p> <p>8.7 Explain the BS system of grading timber.</p> <p>8.8 Identify various type of manufactured boards and sheet and explain their characteristics and uses.</p> <p>8.9 Carry out cleavage test, static bending test and hardness test on given specimen of timber.</p>	<ul style="list-style-type: none"> • Explain the sources of timber in Nigeria. • Discuss the uses of timber in the building industry. • Explain the structure of timber. • Explain the process of timber production up to point of use. • Explain the causes of timber deterioration and how these could be controlled. • Demonstrate how to conduct hardness test bending test, etc. <p style="text-align: center;">- do -</p>	<ul style="list-style-type: none"> • Lesson note. • Specimens of different types of timber. • Chart. • Instruments/Apparatuses <p style="text-align: center;">- do -</p> <p style="text-align: center;">- do -</p>

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.

MODULE: BUILDING SCIENCE II	MODULE CODE: CBC 21	Contact Hours: 3hrs theory & 1 Hr. practical
------------------------------------	----------------------------	---

MODULE Specification: TEORETICAL CONTENT

General Objective 9.0: Understand The Characteristics Various Metals Used In The Building Industry.

Week	Specific Learning Outcome:	Teacher Activities	Resources
9	<p>9.1 Identify various metals used as structural components in building and state their mechanical properties. E.g. brass, aluminum, mild steel, galvanized iron, copper, lead, stainless steel, wrought iron, cast iron, medium carbon steel.</p> <p>9.2 Explain the process of corrosion of the metals in 9.1 above and describe the necessary preventive measures.</p>	<ul style="list-style-type: none"> List the various kinds of metal - ferrous and non-ferrous metals. Define corrosion and explain its process and effect on metal. 	<ul style="list-style-type: none"> Samples of metals. Lesson note. Charts.

General Objective: 10.0: Know The Properties And Application Of Various Types Of Paints And Varnishes

Week	Specific Learning Outcome:	Teacher Activities	Resources
10	<p>10.1 Describe the basic constituents of paints.</p> <p>10.2 Name types of paints and explain their composition, properties and uses.</p> <p>10.3 Explain the functions of primer, under-coat and finishing paints.</p> <p>10.4 Identity paint schemes for various building surfaces: e.g. wood, block-work, brick-work, steel, etc.</p> <p>10.5 Estimate the quantity of paint required for a given house painting job.</p> <p>10.6 Carry out experiments to determine spreading power, drying times and permeability of a paint sample.</p> <p>10.7 Carry out experiment to demonstrate the effect of alkali on a given sample of oil paint.</p>	<ul style="list-style-type: none"> Define "Vanish" and "Paint" Explain the basic components of paints Use question and answer technique to explain the functions of primer and under-coat in painting. Describe the various surface preparation on different materials for painting. <p style="text-align: center;">- do -</p>	<ul style="list-style-type: none"> Specimens of Vanish and Paints. Lesson note.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING SCIENCE II		MODULE CODE: CBC	Contact Hours: 3hrs theory & 1 Hr. practical
		21	
MODULE Specification: TEORETICAL CONTENT			
General Objective: 10.0: Know The Properties And Application Of Various Types Of Paints And Varnishes			
	10.8 Explain the occurrence of defects in painting and state the necessary precautions. 10.9 Explain the need for surface preparation before painting.		
General Objective 11.0: Understand The Manufacture, Properties And Uses of Plastics In Building.			
Week	Specific Learning Outcome:	Teacher Activities	Resources
11	11.1 Explain the basic chemical process of plastics manufacture. 11.2 Distinguish between thermoplastics and thermosetting plastics. 11.3 Name different types of plastics in use in the building industry, and describe their characteristics and uses. e.g. PVC, PVA, Polystyrene, silicones, etc.	<ul style="list-style-type: none"> • Define "Plastic". • Explain the use of plastic materials in the construction industry. 	<ul style="list-style-type: none"> • Specimen of plastic materials. • Lesson note. • Chalk board.
General Objective 12.0: Understand The Properties And Uses Of Adhesives In The Building Industry.			
Week	Specific Learning Outcome:	Teacher Activities	Resources
12	12.1 Name different types of adhesives in the building industry, and describe their characteristics and uses. E.g. animal glue, casein glue, aminoresins, epoxy resin, etc. 12.2 Explain the action of adhesives and the need for surface preparation before application. 12.3 Explain factors to be considered in the selection of adhesive for use. 12.4 Explain with illustrative examples, the use of sealants and mastics in the building industry. 12.5 Describe the test procedure and carry out standard test to determine the dry and wet strengths of given specimen of adhesive.	<ul style="list-style-type: none"> • Define "Adhesive". • Explain the use and importance of adhesives in construction work. • Give notes for students to copy. • Carry out test to determine the strength of adhesives. <p style="text-align: center;">- do -</p>	<ul style="list-style-type: none"> • Samples of adhesives • Lesson note. • Chalk board.
13	Examinations: Practical = 60% Theory = 40%		

Building Drawing II

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING DRAWING II		MODULE CODE: CTD 23	CONTACT HOURS: 3hrs Theory
Course Specification Theoretical Content/Practical			
General Objective: 1.0: Understand The General Principles Of Design Of A Two-Storey House.			
Week	Specific Learning Outcome:	Teachers Activities	Resources
1-2	<p>1.1 Explain the importance of and relationship between function, form and beauty in building design.</p> <p>1.2 Describe the basic structural differences between a bungalow and a storey building.</p> <p>1.3 Explain the principles of balance and harmony as used in the design of elevations and general exterior of buildings.</p> <p>1.4 Describe the basic considerations in the planning of a storey residential house.</p> <p>1.5 Describe the characteristics of a given plot plan (i.e. solar orientation, direction of prevailing winds, size of plot, access road, services, etc.) and explain their influence on the pattern of design.</p> <p>1.6 Prepare a preliminary sketch design of a two storey building suitable for the plot in 1.5.</p> <p>1.7 Justify the choice of materials for the proposed house in 1.6.</p>	<ul style="list-style-type: none"> • State and describe the relationship between function, form and beauty in building design. • List the basic structure differences between a bungalow and a storey building. • List the principles of balance and harmony used in design of elevations and exterior building. • Explain the basic considerations in planning of storey/residential house. • List characteristics of a given plot plan e.g. <ul style="list-style-type: none"> • solar orientation • size of plot • access road • services etc. • Explain the influence of 1.5 above on the pattern of design. • Sketch design of a two storey building suitable for 1.5 m plot. • Explain the choice of materials for the proposed house in 1.7. and give assignment. 	<ul style="list-style-type: none"> • Lesson note • Pictures • Posters • Drawings/sketches

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING DRAWING II		MODULE CODE: CTD 23	CONTACT HOURS: 3hrs Theory
Course Specification Theoretical Content/Practical			
General Objective 2.0: Draw The Site And Floor Plans, Elevations And Sections Of A Specified Two Story Building.			
Week	Specific Learning Outcome:	Teachers Activities	Resources
3-4	<p>2.1 Draw presentation floor plans. (Presentation floor plans should show furniture arrangement as well as landscaping).</p> <p>2.2 Prepare the floor plan to suitable scale</p> <p>2.3 Determine and draw to suitable scale essential sections. (use may be made of-set and part sections)</p> <p>2.4 Draw the elevations to suitable scale (Elevations may include front, side, left, and right).</p> <p>2.5 Draw the site plan. (site plan should indicate the drainage system, building line and access, landscaping, etc.)</p>	<ul style="list-style-type: none"> • Draw sample of floor plans indicating; • furniture arrangement • landscaping • Draw floor plans to scale i.e. ground and first floor. • Draw elevations to scale i.e. front, side, left and right. • Draw site plan showing. • Drainage system • Building live • Access road • Landscaping etc. 	<ul style="list-style-type: none"> • Chalkboard • Drawing/instruments And materials
General Objective 3.0: Prepare Essential Detail Drawing Of Components.			
Week	Specific Learning Outcome:	Teachers Activities	Resources
5-6	<p>3.1 Draw to suitable scales, essential details of components (Details may include: floor, stairs, screen walls, boundary wall, plumbing system, floor slabs, etc.)</p> <p>3.2 Prepare working drawings of the septic tanks and soak aways suitable for the house.</p> <p>3.3 Draw the interior elevations and sections of the kitchen and utility room.</p> <p>3.4 Draw details of the kitchen and utility room cabinets workshop.</p>	<ul style="list-style-type: none"> • Draw to scales details of components. i.e. floor stairs, and screen walls. • Make a working drawing of septic tank and soak aways. • Draw the interior elevations. • Draw sections of kitchen. • Draw section of utility room. • Draw details of • Kitchen • Utility room • Cabinets workshop 	<ul style="list-style-type: none"> • Charts • Posters • Drawing board • Papers • Tee squares • pencils

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING DRAWING II		MODULE CODE: CTD 23	CONTACT HOURS: 3hrs Theory
Course Specification Theoretical Content/Practical			
General Objective 4.0: Draw Detail Plan Of The Electrical Services			
Week	Specific Learning Outcome:	Teachers Activities	Resources
7-8	1.1 Use the presentation floor plan to determine the type and allocation of electrical services. 1.2 Draw the electrical services plan	<ul style="list-style-type: none"> • Determine the type of allocation of electrical services on a floor plan. • Sketch electrical services plan. • Draw to scale the electrical services on a plan. 	<ul style="list-style-type: none"> • Charts • Pictures • Drawing board • Tee square • Set square • Pencil
General Objective 5.0: Prepare Schedules			
Week	Specific Learning Outcome:	Teachers Activities	Resources
9-10	5.1 Prepare the following schedules: a. doors b. windows c. electrical installation d. plumbing e. painting f. reinforcement schedule.	<ul style="list-style-type: none"> • Prepare doors schedule • Prepare windows schedule • Prepare electrical installation schedule. • Prepare plumbing schedule • Prepare painting schedule • Prepare reinforcement schedule. 	<ul style="list-style-type: none"> • Charts • Drawing papers • Drawing board • Tee square • Set square • Pencil
General Objective 6.0: Understand The Principles And Be Able To Prepare And Interpret Simple Structural Drawings.			
Week	Specific Learning Outcome:	Teachers Activities	Resources
11-12	6.1 Interpret and apply conventional representation of structural elements. 6.2 Interpret simple structural design data E.g. design data for the two storey project drawing in this module. 6.3 Prepare structural detailed drawing from given design data. 6.4 Prepare and interpret bending schedules. 6.5 Trace and reproduce structural drawings.	<ul style="list-style-type: none"> • List conventional ways of representing structural elements. • Explain simple structural design data for two storey building project. • Prepare detail structural drawing from • Given data and sketch • Prepare and interpret bending drawings • Trace structural drawings. 	<ul style="list-style-type: none"> • Charts • Drawing papers • Drawing board • Tee square • Set square • Pencil • Reproduction equipment. etc.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.			
MODULE: BUILDING DRAWING II		MODULE CODE: CTD 23	CONTACT HOURS: 3hrs Theory
Course Specification Theoretical Content/Practical			
General Objective 6.0: Understand The Principles And Be Able To Prepare And Interpret Simple Structural Drawings.			
11-12		<ul style="list-style-type: none"> • Reproduce structural drawings. • Guide students to produce detailed. • Structural drawing to specification 	
13	Examination: Practical 60% theory 30%		

Advanced Joinery

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY & JOINERY

Module: Advanced Joinery

MODULE: CCJ 21

GOAL: To provide trainees with the theory and skills of a master joiner who is capable of undertaking the construction and installation of all types of joinery items in the wood and building industry.

General Objectives:

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

1. Read the blue prints of joinery construction in building/architectural drawings and produce working drawings, rods or route sheets for mass production of items.
2. Estimate any given joinery items.
3. Understand the techniques and processes of mass production and mass produce joinery items of any types.
4. Design and construct specialized items of joinery furniture for public and domestic use.
5. Understand the basic geometry of handrailing, and the production and installation of wreathed handrails for quarter and half turn stairs.
6. Undertake the construction of joinery involving geometry of single curvature.

PRACTICAL COMPETENCES

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

- 1) Produce route sheets, jigs and templates
- 2) Carry out mass production of marketable joinery items
- 3) Design a work plan for mass production
- 4) Design, a stair produce working drawing, prepare template, cut and produce stair components ready for assembly
- 5) Produce bull's eye window and other window/door with shaped head.
- 6) Design and construct form work

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

Module: ADVANCED JOINERY	Module Code: CCJ 21	Contact Hours: 2hrs Theory and 8hrs Practical
---------------------------------	----------------------------	--

Module Specification: THEORETICAL CONTENT

General Objective: 1.0 Read Blue Prints And Specifications Of Joinery In A Drawing And Produce Working Drawing Route Sheets/Rods For Mass Production Work.

TERM 1 WEEK	Specific Learning Objective:	Teachers Activities	Learning Resources
1-2	<p>1.1 Explain symbols used for various items of joinery, furniture and other building components in architectural drawings.</p> <p>1.2 Write and interpret specifications of any joinery item/work.</p> <p>1.3 Compare and contrast the use of route sheets and workshop rod in the production process.</p> <p>1.4 Describe the advantages and disadvantages of route sheets and rods in the production of joinery.</p> <p>1.5 Make exploded sketch/drawing of any joinery items from design sketch or architects working drawings and write out part list/cutting list.</p>	<ul style="list-style-type: none"> • List and explain symbols used for various items of joinery, furniture and other building components in architectural drawings. • Choose a joinery item and prepare specifications for its constructions. • With the aid of sketches, compare and contrast the use of route sheet and workshop rods in production process of joinery items and state their advantages and disadvantages. • Prepare preliminary sketches of joinery items. Ask the students to develop them into working drawings and prepare cutting lists. 	<ul style="list-style-type: none"> • Lesson note • Chalk board • Charts • Model of a joinery item. • Drawing • Materials • Plywood

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

Module: ADVANCED JOINERY	Module Code: CCJ 21	Contact Hours: 2hrs Theory and 8hrs Practical
---------------------------------	----------------------------	--

Module Specification: THEORETICAL CONTENT

General Objective 2.0: Estimate And Cost Joinery Projects.			
TERM 1 WEEK	Specific Learning Objective:	Teachers Activities	Learning Resources
3-4	<p>2.1 Explain the terms 'estimating' and 'costing' and state their significance in a joinery manufacturing business.</p> <p>2.2 State the basic elements of an estimate/cost: e.g.</p> <ul style="list-style-type: none"> a. materials b. labour c. overhead d. profit, and <p>Explain why labour is the most difficult item to estimate for.</p> <p>2.3 Determine completion time and cost of materials for a project to be mass produced.</p> <p>2.4 Cost a typical joinery item and compare the unit cost of a custom and a mass produced joinery item.</p> <p>2.5 Extract from a bill of quantities all joinery and related items.</p> <p>2.6 Measure from working drawing and produce a bill of quantities for a specified joinery item.</p> <p>2.7 Price the joinery item in a bill of quantities using current rates.</p>	<ul style="list-style-type: none"> • Define the terms "Estimating" and "Costing" and state their significance in joinery works. • Ask the students to choose a joinery item and estimate the cost of materials, labour, overhead and profit. • Explain the method of determining time and cost of materials for a project to be custom and mass produced. • Choose a joinery item and compare the unit cost of a custom and a mass produced job. • Ask the students to choose a working drawing of a joinery item or building project, study it with specifications and prepare its bill of quantities. 	<ul style="list-style-type: none"> • Lesson note • Chalk board • Charts • Lesson note • Chalk board • Charts • Chalkboard • Charts • Current price list of building materials. • Working Drawings • Lesson note

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY			
Module: ADVANCED JOINERY		Module Code: CCJ 21	Contact Hours: 2hrs Theory and 8hrs Practical
Module Specification: THEORETICAL CONTENT			
General Objective 3.0: Understand The Techniques And Process Of Mass Production And Be Able To Mass Produce Joinery Items Of All Types.			
TERM 1 WEEK	Specific Learning Objective:	Teachers Activities	Learning Resources
5-12	3.1 Describe mass production and outline its history. 3.2 Explain the basic principles of mass production - work layout, production flow, equipment layout, etc. 3.3 Explain the difference between designs and working drawings for customary and mass production. 3.4 Describe production tooling and its importance in mass production work. 3.5 State the importance in mass production of interchangeability of parts and how this can be easily achieved. 3.6 Explain the concept of interchangeability. 3.7 Explain the need for tolerance in terms of interchangeability functions and cost.	<ul style="list-style-type: none"> • Use question and answer method to explain mass production concept. • Use question and answer techniques to differentiate between designs and working drawings. • Explain the sequence of operations and layout of machine and equipment to ensure uninterrupted flow of operation in mass production work. • Discuss the importance in mass production, the interchangeability of parts and how this can be easily achieved. 	<ul style="list-style-type: none"> • Lesson note • Chalk board • Charts • Hand tools • Equipment • Materials.
13	Examinations: Practical 70% Theory 30%		

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY			
Module: ADVANCED JOINERY		Module Code: CCJ 21	Contact Hours: 2hrs Theory and 8hrs Practical
Module Specification: THEORETICAL CONTENT			
General Objective 4.0: Design And Construct Specialised (High Class) Items Of Joinery Furniture For Public And Domestic Use.			
TERM 1 WEEK	Specific Learning Objective:	Teachers Activities	Learning Resources
1-6	<p>4.1 Explain the special characteristics of high class joinery items.</p> <p style="padding-left: 40px;">a. exhaustive and classical designs such as mouldings, etc.</p> <p style="padding-left: 40px;">b. high class finish etc.</p> <p>4.2 Describe the main features of special joinery items in public buildings such as:</p> <p style="padding-left: 40px;">(a) Church furniture - pews, pulpit, priest chair and desk and chair stall</p> <p style="padding-left: 40px;">(b) Office furniture - reception counters, writing desks, etc.</p> <p style="padding-left: 40px;">(c) Shop-fittings - display counter for various items such as jewelry, watches, etc.</p> <p>4.3 Cost the job for any of the items above relating actual cost to the current rate.</p> <p>4.4 Explain the importance of finishing the tops and fronts of counters with such materials as marble, laminated plastic covering or glass.</p>	<ul style="list-style-type: none"> • Use question and answer approach to explain the special characteristics of high-class joinery. • Use question and answer/sketches to explain the main features of special joinery items in public buildings. • Ask the students to cost the job of a given joinery item using current rates. • Sketch and explain the importance of finishing tops and front of a counter with different types of materials. 	<ul style="list-style-type: none"> • Lesson note • Chalk board • Charts • Models

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY			
Module: ADVANCED JOINERY		Module Code: CCJ 21	Contact Hours: 2hrs Theory and 8hrs Practical
Module Specification: THEORETICAL CONTENT			
General Objective 5.0: Understand The Techniques And Procedures Of Producing Formwork For Stair Case.			
TERM 1 WEEK	Specific Learning Objective:	Teachers Activities	Learning Resources
7-9	5.1 Sketch/draw detail of formwork for straight flightstair including detail at landing. 5.2 Determine the height of rise and width of treads. 5.3 Explain the advantages of manufactured board in formwork. 5.4 Mark out string.	• Explain to students the basic principle of formwork for stair case construction.	• Lesson note • Chalk board • Charts • Drawing Instrument.
General Objective 6.0: Undertake The Construction Joinery Involving Geometry Single Curvature.			
TERM 1 WEEK	Specific Learning Objective:	Teachers Activities	Learning Resources
10-12	6.1 Define single curvature and list examples of the items of joinery so classified, e.g. a. bull's eye window-glazed or louvered b. Doors and windows with shaped head c. Shaped mirror frame.	• Use drawing to explain single curvative of a specified joinery items.	• Lesson note • Chalk board • Charts. • Models
13	Examinations: Theory 30% Practical - 70%		

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY			
Module: ADVANCED JOINERY		Module Code: CCJ 21	Contact Hours: 2hrs Theory and 8hrs Practical
Module Specification: PRACTICAL CONTENT			
General Objective 1.0: Read Blue Prints And Specifications Of Joinery In A Drawing And Produce Working Drawing, Route Sheets/Rods For Mass Production Work.			
Week	Specific Learning Outcome	Teachers Activities	Learning Resources
1-4	<p>1.0 Make route sheets/workshop rod as appropriate and cutting list required for joinery project.</p> <p>1.2 Make jigs and templates and production tooling for mass production work.</p>	<ul style="list-style-type: none"> • Prepare preliminary sketches of joinery items. Ask the students to develop them into working drawings and prepare cutting lists. • Explain possible difficulties that the students may encounter in jigs and templates production process 	<ul style="list-style-type: none"> • Drawing • Materials • Plywood • Cutters
General Objective 3.0: Using Mass Production Techniques, Produce Joinery Items As Specified.			
Week	Specific Learning Outcome	Teachers Activities	Learning Resources
5-12	<p>3.1 Design and draw a specified joinery item suitable for mass production.</p> <p>3.2 Determine a work plan for mass producing joinery/wood work - to include work required and lay-out of machines and equipment to ensure uninterrupted flow of production work.</p> <p>3.3 Carry out production tooling for the mass production of components of a chosen joinery/wood work item, e.g.</p> <p style="padding-left: 40px;">a. jigs and fixtures for repetition works;</p> <p style="padding-left: 40px;">b. making of templates.</p> <p>3.4 Mass produce a specific marketable items of joinery involving frame and carcass construction and various finishings, e.g. panel door, flush door..</p>	<ul style="list-style-type: none"> • Ask the student to design and produce the working drawing of a joinery item. • Explain the sequence of operations and layout of machine and equipment to ensure uninterrupted flow of operation in mass production work. • Supervise mass production work being undertaken by students either in the workshop or local factory 	<ul style="list-style-type: none"> • Hand tools • Equipment and Machines • Materials. • Jigs • Working Drawing
13	Examinations: Practical 70% Theory 30%		

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

Module: ADVANCED JOINERY	Module Code: CCJ 21	Contact Hours: 2hrs Theory and 8hrs Practical
---------------------------------	----------------------------	--

Module Specification: PRACTICAL CONTENT

General Objective 3.0: Design And Construct Specialised (High Class) Items Of Joinery Furniture For Public And Domestic Use.

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
1-6	<p>3.1 Design and draw details of a specified high class joinery item including detailed specification of materials, method of construction, finishing and installation. Construction, finishing and installation.</p> <p>3.3 Construct at least one specialized item of furniture either as a group project or as an individual project to industry standard. Such items as: - church Pew, Shop counter, lectern, pulpit, conference table, etc. May be considered.</p>	<ul style="list-style-type: none"> • Ask the students to select any high class joinery item in public building, prepare the detailed working drawing, cutting list, specification of materials and sequence of operations. • Ask the students to construct the selected item of furniture to specified standard of finish.. 	<ul style="list-style-type: none"> • Working Drawing • Tools • Cutting list • Jigs/Templates • Rod/Route sheet

General Objective 4.0: Construct Formwork For Straight Flight Stairs

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
7-9	<p>4.1 Design formwork for stairs</p> <p>4.2 Calculate pitch and rise</p> <p>4.3 Determine tread and riser</p> <p>4.4 Produce working drawings</p> <p>4.5 Prepare cutting list</p> <p>4.6 Produce template for string</p> <p>4.7 Cut and produce components for formwork.</p> <p>4.8 Assemble components ready for pouring of concrete.</p>	<ul style="list-style-type: none"> • Guide the students on the design, preparation and assembly of unit components of formwork for straight flight stair-case • Guide students to produce formwork for strength flight staircase. 	<ul style="list-style-type: none"> • Tools and Equipment • Materials and fixings

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

Module: ADVANCED JOINERY	Module Code: CCJ 21	Contact Hours: 2hrs Theory and 8hrs Practical
---------------------------------	----------------------------	--

Module Specification: PRACTICAL CONTENT

General Objective 5.0: Undertake The Construction Joinery Involving Geometry Single Curvature.

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
10-12	<p>5.1 Design, draw and write specifications for producing one of the following items: bull's eye window. Door or window with shaped head, and shaped mirror head.</p> <p>5.2 Develop templates for working out and jigs for cleaning up:</p> <ol style="list-style-type: none"> a. the rings of the frame for the shaped head; b. the position of trenches for a bull's eye louver blade. <p>5.3 Produce the rings using both hand and machine tools.</p> <p>5.4 Join the rings to produce a continuous ring using the hammer head key/handrail bolt which ever one is more convenient.</p> <p>5.5 Produce the chosen item of joinery of single curvature.</p> <p>5.6 Clean up ready for fixing.</p>	<ul style="list-style-type: none"> • Direct the students to design, produce working drawing and specifications for the production of single curvature of joinery items. • Ask the students to develop templates and jigs for cleaning up of jobs involving curves. • Guide the students to produce the rings of frames using hand and machine tools. • Guide the students to produce bull's eye louvered window or standard glazed sash windows or shaped mirror frame. Etc. 	<ul style="list-style-type: none"> • Working drawing • Cutting list • Workshop rod/jigs • Hand tools • Machine tools • Equipments • Materials
13	Examinations: Theory - 30% Practical - 70%		

Advanced Carpentry

MODULE: ADVANCED CARPENTRY

MODULE CODE: CCJ 22

GOAL: To prove the trainee with further knowledge and the skills required of a master capable of undertaking; very serious issues related to the trade

General Objectives

1. Understand the basic requirements for the construction and erection of timber platform and supports between openings other than domestic floor to give specification
2. Understand the principles of design, construction, erection and stripping of various types of in-situ and pre-cast concrete forms
3. Understand the requirements for the construction and of roofs and ceilings for domestic, industrial and other special buildings on spans over 10 m.
4. Install sliding and folding doors and partitions

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

MODULE: ADVANCED CARPENTRY	MODULE CODE: CCJ 21	CONTACT HOURS: 4hrs Theory and 16hrs Practical
-----------------------------------	----------------------------	---

Course Specification: THEORETICAL CONTENT

General Objective 1.0: Understand The Basic Design Requirements for the Construction And The Erection Of Timber Platforms And Supports Between Openings Other Than Domestic Floor To a Given Specification

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
1-3	<p>1.1 Explain the basic considerations in the design of timber structure spanning various openings e.g.</p> <ul style="list-style-type: none"> a. Suitability for intended purpose b. Structural stability to take the specified span c. Ease of erection and finishing <p>1.2 Define the following structural loads: dead load, point, distributed and rolling load and their effect on the stability of the structure.</p> <p>1.3 Determine by calculation or graphical method the following forces acting on a structural beam:</p> <ul style="list-style-type: none"> a. the reaction at support b. shear force c. bending moment 	<ul style="list-style-type: none"> • List examples of basic considerations in the designs of timber structure over a span of 10 m. • Define types of structural loads. (Live and dead loads). • Use calculation and graphical methods to explain forces acting on a structural beam. • Give assignment to students 	<ul style="list-style-type: none"> • Lesson note • Chalk board • Charts • Graph Sheets
	<p>1.4 Explain the main advantages and disadvantages of built-up structural beams and solid timber beams.</p> <p>1.5 Determine the moment of resistance of a typical timber/built-up timber beam showing the neutral axis, the maximum compressive and tensile stresses.</p>	<p style="text-align: center;">- do -</p> <ul style="list-style-type: none"> • Use calculation and graphical methods to determine moment of resistance of a typical timber beams 	<ul style="list-style-type: none"> • Lesson note • Chalkboard • Charts

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

MODULE: ADVANCED CARPENTRY	MODULE CODE: CCJ 21	CONTACT HOURS: 4hrs Theory and 16hrs Practical
-----------------------------------	----------------------------	---

Course Specification: THEORETICAL CONTENT

General Objective 2.0: Understand The Principles Of Design, Erection And Stripping Of Various Types Of In-Situ And Precast Concrete Forms.

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
4-5	<p>2.1 Explain the basic design requirements for forms in-situ and pre-cast concrete work:</p> <ul style="list-style-type: none"> a. production of actual shape of structure; b. structural stability to resists lateral and vertical forces due to fluid pressure. c. Ease of removal d. Neat appearance for the finished concrete. e. Re-use of materials used for forms/moulds. <p>2.2 State the properties of fluid concrete and its effect on the design of formwork.</p> <p>2.3 Explain how mouldings and circular shapes in concrete are allowed for in the design and construction of forms.</p> <p>2.4 Select suitable timber and other materials used for formwork structure.</p>	<ul style="list-style-type: none"> • Explain the basic design requirements for forms in-situ and pre-cast concrete works. • Explain how fluid concrete affects the design of formwork. • Use drawings to explain how mouldings and circular shapes in concrete are allowed for in the design and construction of forms. • Explain the suitability of certain timber other materials for formwork constructions. 	<ul style="list-style-type: none"> • Lesson note • Chalk board • Charts • Drawings • Pictures
	<p>2.5 Explain the effect of the cost of formwork on: the choice of materials; construction methods; when necessary.</p> <p>2.6 Discuss properties of formwork systems including those of materials other than timber, their advantages and disadvantages, erection and stripping.</p>	<ul style="list-style-type: none"> • Discuss with the student the effect of the cost of formwork. • Use questions and answer techniques to discuss the properties of formwork systems including materials other than timber, stating their advantages and disadvantages and procedures for erecting and stripping. 	<ul style="list-style-type: none"> • Lesson note • Chalk board • Charts • Hand tools • Materials

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

MODULE: ADVANCED CARPENTRY	MODULE CODE: CCJ 21	CONTACT HOURS: 4hrs Theory and 16hrs Practical
-----------------------------------	----------------------------	---

Course Specification: THEORETICAL CONTENT

General Objective 3.0: Understand The Requirements Of Construction And Erection Of Roofs And Ceilings For Domestic, Industrial And Other Special Buildings On Spans Over 10 m.

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
6-7	<p>3.1 Explain the basic requirements of construction of a standard roof truss and ceiling for an opening over 10 m span. e.g.</p> <p>a. adequate pitch to throw out rain water;</p> <p>b. aesthetics</p> <p>c structurally sound to carry roofing materials and ceiling and withstand wind pressure.</p> <p>3.2 Develop the shape of roof surface to be covered showing the roof members</p> <p>3.3 Write specifications of timber - type, characteristics and sizes, and other materials used in roof and ceiling construction.</p> <p>3.4 Determine either by calculation or graphically, the forces acting on each member of a roof truss, stating if the stress in the member is tensile or compressive force.</p> <p>3.5 Explain the purposes of roof ventilators in buildings.</p>	<ul style="list-style-type: none"> • Use sketches and discussion approach to explain the basic requirements for construction of a standard roof truss and ceiling for a span of 10 m and above. • Guide the students to write specifications. • Use calculation and graphical methods to explain how to determine the forces acting on each member of a roof truss, stating if the stress in the member is tensile or compressive force. • Use question and answer techniques to explain the purposes of roof ventilators and roof lights in a building. • Give assignment to students. 	<ul style="list-style-type: none"> • Lesson Plan • Chalk board • Charts. • Drawing Instruments

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

MODULE: ADVANCED CARPENTRY	MODULE CODE: CCJ 21	CONTACT HOURS: 4hrs Theory and 16hrs Practical
-----------------------------------	----------------------------	---

Course Specification: THEORETICAL CONTENT

8-10	<p>3.6 Identify types and characteristics of common ceiling materials with Regards to sizes and method of fixing:</p> <ul style="list-style-type: none"> a. timber plates; b. celotex boards; c. acoustic ceiling tiles; d. (d) flat asbestos sheets, etc. <p>3.7 Develop the true shape of the intersection of dormer or other roof lights with the main roof.</p>	<ul style="list-style-type: none"> • Use question and answer techniques to explain types and characteristics of common ceiling materials with reference to size and methods of fixing • Ask students to develop the true shape of the intersection of dormer or other types of roof light. 	
------	---	--	--

General Objective 4.0: Doors

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
11-12	<p>4.1 Explain the main features of a sliding and folding doors and partitions and state the purposes of sliding and folding doors.</p> <p>4.2 Describe the types of sliding and folding doors and select appropriate sliding gear.</p>	<ul style="list-style-type: none"> • Use drawings and discussion method to explain the features of sliding and folding doors and partition and state their purposes. • Use sketches to explain the characteristics of sliding and folding door and the factor affecting the choice of gears 	<ul style="list-style-type: none"> • Lesson note • Chalk board • Charts
13	Examinations: Practical 70% Theory 30%		

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

MODULE: ADVANCED CARPENTRY	MODULE CODE: CCJ 21	CONTACT HOURS: 4hrs Theory and 16hrs Practical
-----------------------------------	----------------------------	---

MODULE SPECIFICATION: PRACTICAL CONTENTS

General Objective 1.0: Design, Construct, and Erect Timber Platforms And Supports Between Openings Other Than Domestic Floor To Given Specifications

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
1-3	<p>1.1 Produce detailed working drawing of built-up structural timber beam.</p> <p>1.2 Prepare cutting list for the specified built-up structural timber beam.</p> <p>1.3 Construct any built-up structural timber beam and apply it appropriately to a specified construction work:</p> <ul style="list-style-type: none"> a. built-up girder b. I-beam c. Box beam d. Laminated beam <p>1.4 Design, construct and fix any of the following timber structures in position on site.</p> <ul style="list-style-type: none"> a. Timber footbridge across a small stream; b. a wooden stage/or elevated platform in a lecture theatre; c. a spectator's stand. (The items could be a model only). 	<ul style="list-style-type: none"> • Guide the students to construct a built-up structural timber beam, explaining their advantages and disadvantages over solid timber beams. • Guide the students in designing, constructing and fixing timber footbridge across a small stream; wooden stage and spectator's stand. 	<ul style="list-style-type: none"> • Hand tools/Machines • Materials • Drawing Equipment • Cutting List • Working Drawing

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

MODULE: ADVANCED CARPENTRY	MODULE CODE: CCJ 21	CONTACT HOURS: 4hrs Theory and 16hrs Practical
-----------------------------------	----------------------------	---

MODULE SPECIFICATION: PRACTICAL CONTENTS

General Objective 2.0: Be able to Design, Erect And Strip Various Types Of In-Situ And Precast Concrete Forms.

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
4-5	<p>2.1 Design, draw and interpret working drawings of formwork for any of the following in-situ concrete structures:</p> <ul style="list-style-type: none"> a. barrel vault b. domed roof c. circular concrete tanks d. geometrical/spiral stairs. <p>Specific peculiarities of the various items listed above should be made quite clear.</p> <p>2.2 Construct, erect, and strip formwork for any of the in-situ concrete structures listed above applying appropriate safety precautions.</p> <p>2.3 Design, draw, construct, erect and strip mould for pre-cast concrete of any shape.</p>	<ul style="list-style-type: none"> • Ask students to design, draw and interpret working drawing of formwork for in-situ concrete. • Guide students to construct, erect and strip formwork for in-situ concrete structures. • Guide students to design, draw and guide them to construct, erect and strip mould for pre-cast concrete of any shape. 	<ul style="list-style-type: none"> • Hand tools/Machines • Materials • Cutting List • Working Drawing

General Objective 3.0: Understand The Requirements Of Construction And Erection Of Roofs And Ceilings For Domestic, Industrial And Other Special Buildings On Spans Over 10 m.

Week	Specific Learning Outcome	Teachers Activities	Learning Resources
6-10	<p>3.1 Draw details of construction of a:</p> <ul style="list-style-type: none"> a. standard domestic or industrial type roof trusses and ceiling where necessary for spans over 10 m to show how all components of the roof can be prevented from the effect of high wind pressure or, b. Special purpose roof for spans of 3 - 10 m including: <ul style="list-style-type: none"> (a) barrel roof (b) domical roof - semispherical and octagonal (c) shell roof - hyperbolic paraboloid stating their applications. 	<ul style="list-style-type: none"> • Visit a construction site where industrial type roof is being constructed and explain details to students. • Guide the students to construct a model of any of the roof types, dome, shell, etc.. • Produce a model of roof ventilators and roof light. • Use geometrical constructions to explain to students. 	<ul style="list-style-type: none"> • Hand tools • Materials • Ladder

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY			
MODULE: ADVANCED CARPENTRY		MODULE CODE: CCJ 21	CONTACT HOURS: 4hrs Theory and 16hrs Practical
MODULE SPECIFICATION: PRACTICAL CONTENTS			
General Objective 3.0: Understand The Requirements Of Construction And Erection Of Roofs And Ceilings For Domestic, Industrial And Other Special Buildings On Spans Over 10 m.			
6-10	3.2 Construct at least one of the various roofs mentioned above 3.3 Install roof lights and ventilators in a roof. 3.4 Trim openings for roof light and ventilators. 3.5 Draw or sketch detailed arrangements of ceiling joists and noggings for specific type of ceiling and produce them 3.6 Preserve ceiling joists and noggings against wood destroying agents. 3.7 Construct ceiling framework and fix ceiling boards. 3.8 Finish ceiling by fixing ceiling battens (where necessary) and corner moulds.	<ul style="list-style-type: none"> • Show example of trimming of opening for roof light and ventilators. • Use sketches to explain detailed arrangements of ceiling joists and noggings in ceiling construction. • Guide the students to construct ceiling framework, fix ceiling boards and finish by fixing ceiling battens on site. • Take a visit to a building construction site with students. 	
General Objective 4.0: Doors			
Week	Specific Learning Outcome	Teachers Activities	Learning Resources
11-12	4.1 Install sliding and folding doors or screen as appropriate. 4.2 Finish up the door or partition.	<ul style="list-style-type: none"> • Use sketches and explain the characteristics of folding and sliding door. • Guide students to install sliding and folding doors. 	<ul style="list-style-type: none"> • Hand tools • Articles of sliding door to be installed etc. • Articles to be installed etc.
13	Examinations: Theory - 30% Practical - 70%		