NATIONAL BOARD FOR TECHNICAL EDUCATION

Innovation Development and Effectiveness in the Acquisition of Skills (IDEAS) Project

NATIONAL TECHNICAL CERTIFICATE (NTC)

AND

ADVANCED NATIONAL TECHNICAL CERTIFICATE (ANTC)

PROGRAMMES

CURRILCULUM AND MODULE SPECIFICATIONS

IN

CARPENTRY AND JOINERY

JANUARY, 2023

NATIONAL AND ADVANCED NATIONAL TECHNICAL CERTIFICATE

PROGRAMMES

GENERAL INFORMATION

AIM:

To give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self –reliant.

ENTRY QUALIFICATIONS

CRAFT PROGRAMME

Candidates must not be less than 14 years of age and should have successfully completed three years of Junior Secondary education, pre-vocational 1 – 3 or its equivalent. Special consideration may be given to sponsored candidates with lower academic qualifications who hold trade test certificates and are capable of benefiting from the programme.

ADVANCED CRAFT PROGRAMME

Candidates should possess the National Technical Certificate or its equivalent and should have had a minimum of two years post qualification cognate industrial experience.

THE CURRICULUM

The Curriculum of each programme is broadly divided into three components:

a General Education, which accounts for 30% of the total hours required for the programme
b Trade Theory, Trade Practice and Related Studies which account for 55% and
c Supervised Industrial Training/Work Experience, which accounts for about 15% of the total hours required for the programme. This component of the course which may be taken in industry or in college production unit is compulsory for the full-time students

Included in the curriculum is the teacher's activity and learning resources required for the guidance of the teacher.

Unit Course/Module

A Course/Module is defined as a body of knowledge and skills capable of being utilized on its own or as a foundation or pre-requisite knowledge for more advanced work in the same or other fields of study. Each trade when successfully completed can be used for employment purposes.

BEHAVIOURAL OBJECTIVES

These are educational objectives which identify precisely the type of behaviour a student should exhibit at the end of a course/module or programme. Two types of behavioral objectives have been used in the curriculum. They are:

a General Objectives
b Specific learning outcomes

General Objectives are concise but general statements of the behaviour of the students on completion of a unit of work such as understanding the principles and application.

a Orthographic projection in engineering/technical drawing
b Loci in Mathematics

c Basic concepts of politics and government in Political Science
d Demand and Supply in Economics

Specific Learning outcomes are concise statements of the specific behaviour expressed in units of discrete practical tasks and related knowledge the students should demonstrate as a result of the educational process to ascertain that the general objectives or course/programme have been achieved. They are more discrete and quantitative expressions of the scope of the tasks contained in a teaching unit.

GENERAL EDUCATION IN TECHNICAL COLLEGES

The General Education component of the curriculum aims at providing the trainee with complete secondary education in critical subjects like English Language, Economics, Physics, Chemistry, Biology, Entrepreneurial Studies and Mathematics to enhance the understanding of machines, tools and materials of their trades and their application and as a foundation for post-secondary technical education for the above average trainee. Hence, it is hoped that trainees who successfully complete their trade and general education may be able to compete with their secondary school counterparts for direct entry into the Universities, polytechnics or colleges of education (Technical) for BTech, BSc, ND or NCE courses respectively. The Social Studies component is designed to broaden the trainee's social skills and understanding the environment.

For purpose of certification, only the first three courses in Mathematics will be required. The remaining modules are optional and are designed for the above average students.

National Certificate

The NTC and ANTC programmes are run by Technical Colleges accredited by NBTE

NABTEB conducts the final National Examination and awards certificates.

Trainees who successfully complete all the courses/modules specified in the curriculum table and passed the national examinations in the trade will be awarded one of the following certificates

S/NO	LEVEL	CERTIFICATE
	Technical Programme	
1	Craft Level	National Technical Certificate
2	Advanced Craft Level	Advanced National Technical Certificate

Guidance Notes for Teachers Teaching the Curriculum

The number of hours stated in the curriculum table may be increased or decreased to suit individual institutions' timetable provided the entire course content is properly covered and the goals and objectives of each module are achieved at the end of the term

The maximum duration of any module in the new scheme is 300 hours. This means that for a term of 15 weeks, the course should be offered for 20 hours a week. This can be scheduled in sessions of 4 hours in a day leaving the remaining hours for general education. However, (properly organized and if there are adequate resources), most of these courses can be offered in two sessions a day, one in the morning and the other one in the afternoon. In so doing, some of these programmes may be completed in lesser number of years than at present.

The sessions of 4 hours include the trade theory and practice. It is left to the teacher to decide when the class should be held in the workshop or in a lecture room.

INTEGRATE APPROACH IN THE TEACHING OF TRADE.

Theory, Trade Science and Trade Calculation

The traditional approach of teaching trade science and trade calculation as separate and distinct subjects in technical college programmes is not relevant to the new programme as it will amount to a duplication of the teaching of mathematics and physical science subjects in the course. The basic concepts and principles in mathematics and physical science are the same as in the trade calculation and trade science. In the new scheme therefore, mathematics and physical science will be taught by qualified persons in these fields and the instructors will apply the principles and concepts in solving trade science and calculation problems in the trade theory classes. To this end, efforts have to be made to ensure that mathematics and science modules required to be able to solve technical problems were taken as pre-requisite to the trade module.

Evaluation of Programme/Module

For the programme to achieve its objectives, any course started at the beginning of a term must terminate at the end of the term.

Instructors should therefore device methods of accurately assessing the trainees to enable them give the student's final grades at the end of the term. A national examination will be taken by all students who have successfully completed their modules. The final award will be based on the aggregate of the scores attained in course work and the national examination.

Table of Contents

CURRICULUM TABLE COURSE HOURS/WEEK

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY

Module Code	MODULE	YEAR I						YEAR 2						YEAR 3						TOTAL HOURS
		Term 1		Term 2		Term 3		Term 1		Term 2		Term3		Term 1		Term 2		Term 3		
		T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	
CMA 12-15	Mathematics	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	1	-	216
CEN 10-12	English and Communication	2	-	2	-	2	-	3	-	3	-	3	-	2	-	3	-	3	-	288
CPH 11-12	Physics	2	2	2	-	2	-	2	1	2	1	2	1	2	1	1	1	2	1	288
CCH 10	Chemistry	2	2	2	-	2	-	2	1	2	1	2	1	2	1	2	1	2	1	288
CEC 10	Economics	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	252
CBM 10	Entrepreneurship	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	2	-	72
CTD 11	Technical Drawing	-	2	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	72
CTD 12	Descriptive Drawing	-	-	-	-	-	-	2	-	2	-	2	-	-	-	-	-	-	-	72
ICT 10	Introduction to Computer	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	36
ICT 11	Computer Application I	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	36
ICT 12	Computer Application II	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	36
ICT 13	AutoCAD	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	36
ICT 14	AutoCAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2			36

CCJ 11	**Introduction to Building Construction**	**2**	**1**	**2**	**1**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**108**
CCJ 12	**Basic Construction Management I.**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**36**
CTD 14	**Building Drawing I**	**2**	**-**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**72**
CCJ 13	**Machine Woodworking I**	**-**	**-**	**-**	**-**	**-**	**-**	**4**	**16**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**240**
CCJ 14	**Machine Woodworking II**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4**	**16**	**-**	**-**	**-**	**-**	**-**	**-**	**240**
CCJ 15	**Joinery – I**	**2**	**4**	**2**	**4**	**1**	**4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**204**
CCJ 16	**Joinery – II**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4**	**8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**144**
CCJ 17	**Carpentry – I**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**8**	**-**	**-**	**-**	**-**	**120**
CCJ 18	**Carpentry - II**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**8**	**2**	**8**	**240**
	Total	**16**	**14**	**16**	**14**	**15**	**15**	**15**	**22**	**13**	**22**	**13**	**24**	**13**	**14**	**10**	**14**	**10**	**16**	**3,132**

ADVANCED NATIONAL TECHNICAL CERTIFICATE PROGRAMME IN CARPENTRY AND JOINERY

Module Code	**MODULE**	**YEAR I**						**TOTAL HOURS**
		Term 1		**Term 2**		**Term 3**		
		T	**P**	**T**	**P**	**T**	**P**	
CMA 21-22	Mathematics	2	-	2	-	2	-	36
CEN 21-22	English Language & Communication	2	-	2	-	2	-	36
CEC 21-23	Economics	2	-	2	-	2	-	36
ICT 21	AutoCAD I	-	2	-	-	-	-	24
ICT 22	AutoCAD II	-	-	-	2	-	-	24
CCJ 20	Building ScienceI	3	0	-	-	-	-	36
CCJ 21	Building ScienceII	=	-	3	1	-	-	48
CTD 23	Building DrawingII	3	0	-	-	-	-	36
CCJ 22	Construction Management II	3	0	3	0	-	-	72
CCJ 23	Advanced Joinery I	2	8	2	8	-	-	240
CCJ 24	Advanced Carpentry II	-	-	-	-	4	16	240
CBM 21	Entrepreneurship							
	TOTAL	**17**	**10**	**14**	**11**	**10**	**16**	**828**

INSERT MODULE **BASIC CONSTRUCTION MANAGEMENT I**

INSERT MODULE INTRODUCTION TO BUILDING CONSTRUCTION

INSERT MODULE INTRODUCTION TO BUILDING DRAWING I

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.		
Module: Machine Woodworking I	**Module Code: CCJ 13**	**Total Contact Hours: 240HRS. Year 2, Term 1**

GOAL: This module is intended to introduce the trainee to the basic machine woodworking.

GENERAL OBJECTIVES:

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

1. Understand the Working Principles, Scope of Functions and Methods of Operation of Pull-Over Cross Cutting Machine
2. Understand the Main Features and Working Principles of the Circular Rip Saw
3. Understand the Features and Working Principles and Be Able to Operate and Maintain Dimension Saw
4. Understand the Working Principles of a Surface Planning Machine and Know How to Maintain It
5. Understand the Features and Operational Principles of Combined Thicknessing and Planning Machine
6. Understand the Purpose of Setting Out Rods, Route Sheet and Preparation of Cutting List and Their Application in a Wood Machine Shop.
7. Understand the Working Principles of a Narrow Band Saw and its Applications in Carrying Out Various Band Sawing Operations.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.						
Module: Machine Woodworking1		**Module Code: CCJ 13**		**Contact Hours: 4hrs Theory and 16hrs practical**		
Module: Specification: Theoretical and Practical Content.						
General Objective 1.0: Understand the Working Principles, Scope of Functions and Methods of Operation of Pull-Over Cross Cutting Machine. Year 2, Term 1						
Theoretical Content				**Practical Content**		**Evaluation**
Week	**Specific Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	
Week 1-3	1.1 Explain the main features and working principle of the pull-over Cross cutting machine. 1.2 Explain the principles of operation of the machine. 1.3 Explain how hazards related to the use of the machine can be identified and state their potential causes. 1.4 State necessary safety and operational precautions to be taken when using the pull-over cross	List parts of cross cutting machine and explain each function Identify possible hazard and necessary precaution to be taken	Wall chart Lesson notes Posters Clips of cross cutting machine and various sizes of blades.	1.1 Identify the various fixed woodworking machines such as spindle moulder, thicknesser, band saws, drilling, cross-cutting machines, circular saw etc. 1.2 Identify the various cutters and accessories for the machine and explain their uses: e.g., saw blades, cutters for trenching, etc. 1.3 Mount and dismount Machine cutting correctly. e.g., Saw blade. 1.4 Sharpen saw	Guide students in the operation, use and maintenance of a given machine to perform a specific job observing all operational and safety requirements. Guide the students on proper use of P.P.E kits before operating the machines	Explain the working principles of the pull-cross cutting machine Describe the application and scope of operation of the pull-cross cutting machine. Describe the hazards related to the application of the pull-cross cutting machine Explain the

	cutting machine.			blades correctly 1.5 Set up and use the Machine to carry out its range of functions. E.g. – cutting operations (straight and angular) – trenching operations. 1.6 Undertake routine application of safety measure when using the machine. 1.7 Carry out routine service and maintenance operations on the machine. E.g. – routine cleaning after use regular greasing and oiling		safety precautions before and during the use of the pull-cross cutting machine.
General Objective 2.0: Understand the Main Features and Working Principles of the Circular Rip Saw. Year 2, Term 1						
Week 4-5	2.1 Describe the main features and explain the working principles of the circular rip saw. 2.2 Explain the scope of operation of the	Explain the main features of a circular rip saw machine, list the major parts and describe their functions and scope of	White board Charts Lesson note Video Clips	2.1 Fix and adjust the riving knife correctly. 2.2 Identify the component parts of the circular rip saw and justify their use.	Demonstrate how to fix and adjust riving knife Demonstrate how circular rip saws are being used in operations and	Describe the main features and working principles of circular rip saw Explain the

	circular rip saw. 2.3 State necessary safety and operational precautions to be taken when using the circular rip saw. e.g. correct use of guards, Use of goggles, etc.	operation e.g., beveling. Trenching, grooving, rebating, tenoning and mitring. Etc. Explain possible hazards in the use of the machine.	I.T Teaching aids	2.3 Set up and use the circular rip saw for the following operations: label sawing using canting fence. a. Grooving b. Rebating c. Tenoning d. Mitring 2.3 Construct and use jigs and fixtures for intricate jobs e.g., tapering, mitering etc. 2.4 determine the speed required for the operation of the pull up and the peripheral speed of saw for the specific job 2.5 Set and sharpen saw blades proficiently Undertake routine service and maintenance of circular rip saw: e.g. – routine cleaning after uses regular greasing and oiling.	necessary adjust that will be made. Construct jobs using jigs and fixtures with students' participation. Demonstrate to students how to sharpen the blades of the saw and the routine services and maintenance activities required	scope of application of the circular rip saw. Describe the necessary safety and operational precautions to be taken when using the circular rip saw
General Objective 3.0: Understand the Features and Working Principles and Be Able to Operate and Maintain Dimension						

Saw. Year 2, Term 1						
Week 6-7	3.1 Describe the main features and explain the working principles of dimension saw bench. 3.2 Explain the scope and principles of operations of a dimension saw bench. 3.3 Identify hazards related to the use of dimension saw bench and state their potential causes. 3.4 State necessary safety and operational precautions to be taken when operating a dimension saw and undertake their routine application e.g., adjustment of fence, guard, and stops correctly before blade mounting operation.	Describe the main features and explain the principles of operation of dimension saw. Identify hazards and state necessary operational precautions to be taken when operating the machine	Posters Lesson note Video Clips Dimension saw, bench and machine components P.P.E Kits I.T Teaching aids	3.1 Set and sharpen saw blade correctly. 3.2 Mount and dismount saw blade correctly 3.3 Set up and use dimension saw bench to carry out the following operations to specification: a. cross cutting to length b. mitring c. tongue and groove d. chamfering e. leveling f. tenoning g. compound angular cutting, h. rebating i. ripping, etc. 3.4 Undertake routine service and maintenance dimension saw e.g. cleaning and lubricating. 3.5 Determine the	Undertake a visitation to a workshop to: Demonstrate mounting and dismounting saw blades Demonstrate operations of dimension saw bench to various specification of operation.	Describe the main features and working principles of Dimension saw Explain the scope of application of the Dimension saw. Discuss the necessary safety and operational precautions to be taken when using the Dimension saw

				spindle speed and peripheral speed of saw.		
General Objective 4. 0: Understand the Working Principles of a Surface Planing Machine and know how to maintain it. Year 2, Term 1						
Week 8	4.1 Observe all the safety precautions before and during operating a surface planer. 4.2 Explain the various operations and correct adjustment of table in relation to the cutters, adjust fence, bridge guard, etc. 4.3 Explain the purpose of a push-stick/or push-block and be able to use it when necessary. 4.4 Explain the cutting action of the blades of a planning machine in relation to the speed of the cutter block.	Identify all parts of the machine and state functions and operational mode. Explain scope, functions, and principles of operation. Determine the RPM of the cutter block. Give note to students. Explain the action of planing in relation to the speed of the cutter block	I.T teaching aids Surface Planer Posters Pictures Charts Video clips	4.1 Perform the following operations with the surface planer: a. surfacing and edging b. tapering c. chamfering d. through and stopped rebating. 4.2 Mount and dismount cutters correctly 4.3 Grind, hone and set cutters. 4.4 Undertake routine service and maintenance of the surface planer. 4.5 Determine the speed of the cutter (RPM).	Demonstrate the various operations of the surface planner to students. Demonstrate the mounting and dismounting cutters, grind, hone and set cutters Demonstrate the servicing and maintenance of the surface planer. Guide the students on how to determine the speed of the cutter (rpm)	Describe the main features and working principles of surface planing machine Explain the scope of application of the Surface Planing Machine Discuss the necessary safety and operational precautions to be taken when using the surface planing machine
General Objective 5.0: Understand the Features and Operational Principles of Combined Thicknessing and Planning.						

Machine. Year 2, Term 1						
Week 9	5.1 Describe the main features and explain the working principles of the combined thicknessing andplaning machine. 5.2 State the functions of the major components of the machines. 5.3 Explain hazards related to the use of the thicknesser and combination planer and their potential causes. 5.4 Outline the safety and operational precautions to be observed when operating the combined thicknesser and planer and their routine application.e.g.use of sharp and balanced cutter maintenance of	State and explain the main features of the combined thicknessing and planning machine. Explain the working principle of the machine. State the functions of the components of the machine. State the likely accidents, and their causes in the process of using the machines. List the safety precautions to be observed when working on the combined thicknessing and planning machines.	I.T teaching aids Surface Planer Posters Pictures Charts	5.1 Sharpen and set cutters using: - patent device wooden straight edge 5.2 Mount and dismount the cutters correctly. 5.3 Undertake routine service and maintenance of the thicknessing and combination planning machines.		Describe the main features and working principles of combined thicknessing and planing machine Explain the scope of application of the combined thicknessing and planing machine Discuss the necessary safety and operational precautions to be taken when using the combined thicknessing and planing machine

	correct operation postureisolation of power source soon after operation etc. 5.5Explain the scope and principles of operating the combined thicknesser and planer. 5.6Explain operational faults, that may occur while operating the planer, their causes and remedies. 5.7 Explain the importance of high or low cutter speed or cutter block when using the planning machine.	Explain the relevant of the speed of the cutter and the block in process of operation.				
General Objective 6.0: Understand the Purpose of Setting Out Rods, Route Sheet andPreparation of Cutting List andTheir Application in a Wood Machine Shop. Year 2, Term 1						
Week 10-11	6.1 Explain the purpose of rods and route sheets their advantages and disadvantages 6.2 Differentiate	Define the term-: Rod, Route Sheet and Cutting list and differentiate between them.	Lesson note White Boards Clips I.T Teaching	6.1 Setout rods for common woodwork items such as doors, stool, kitchen unit, bookshelves, etc. 6.2 Prepare a setting-	Guide the students in setting out Rods for common woodwork items Demonstrate the process of setting	Describe Rods and Route sheets Differential between rod and route

	between height and width rods. 6.3 Explain the purpose of a cutting list and its importance for determining the cost of a job. 6.4Discuss a cutting list for each item of woodwork item 6.3above. 6.5Explain exploded orthographic pictorial views of an item to be made showing all the parts and number each part. 6.6 Differentiate between a rod and route sheet.	Explain the purpose and application of each. Prepare a typical route sheet/cutting list Give assignment to students to prepare a cutting list of common woodwork project.	aids Posters/Drawings	out rod for use in workshop for production purposes. 6.3 Produce set-out rods for common woodwork/joinery/furniture items such as door, stool, kitchen units, bookshelves, etc. 6.4 Draw to a suitable scale the detailed working drawing of each part and a cutting list. 6.5 Sketch exploded orthographic pictorial views of an item to be made showing all the parts and number each part. 6.6 Prepare route sheets for the production of joinery and furniture items.	out rods Draw to scale a suitable detailed working for part of cutting list. Demonstrate the preparation of route sheets	sheets Explain cutting List Explain the importance of determining the cost of a project. Draw orthographic pictorial views of a carpentry and joinery item to be produced
General Objective 7.0: Understand the Working Principles ofa Narrow Band Saw and its Applications in Carrying Out Various Band Sawing Operations. Year 2, Term 1						
Week 12	7.1 List the parts of the Narrow Band sawmachine,	Use question and answer technique to	Posters/pictures	7.1 Mount and dismount the saw blade on the wheels	Guide trainees to sharpen saw blades and determine	Explain the functions of Narrow Band

	7.2 State their functions. 7.2 Explain the working principles of a narrow band sawing machine. 7.3 Explain the necessary safety precautions involved in operating narrow band saws. e.g. a. Isolate power before fixing the saw blades b. Ensure that the wheels are clean c. Ensure that both the top and bottom wheels are properly covered before operation.	explain the functions of the various parts of a narrow band saw machine.	Lesson note Parts of the Narrow band saw, etc. ICT applications	correctly 7.2 Set up and use the machine for various band sawing operations. 7.3 Observe all the necessary safety precautions involved in operating narrow band as the relate to Power supply Saw blades Wheels 7.4 Produce and use simple jig for various band sawing operations. 7.5 Set and Sharpen saw blade (manually or with sharpening machine). 7.6 Braze or butt-weld band saw blade. 7.7 Undertake routine service and maintenance of the narrow band sawing	when sharpening is necessary. Guide trainees to carry out operations on the narrow band saw observing all operational and safety procedure.	Saw machine Explain the necessary safety precautions involved in the operation of the Narrow Band Saw machine e.g. a) how to isolate power before use b) how to isolate power before fixing the blades

				machine.		
Week 13	**Examination: Practical - 70% Theory – 30%**					

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.		
Module: Fundaments of Machine Woodworking II	**Course Code: CCJ 14**	**Total Contact Hours: 240hrs**

GOAL: This module is intended to introduce the trainee to the application of woodworking machines for general production of carpentry and joinery items.

GENERAL OBJECTIVES:

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

1. Understand the working principle and operations of a mortising machine.
2. Understand the Principles and Operations of Tenoning Machine
3. Understanding the Principles and Operations of Boring Machine
4. Understand the Principles and Operations of Sanders
5. Understand the Common Portable Electric Tools Used in Wood Work
6. Understand the Principles and Operations of Planing Machines
7. Understand the Principles and Operations of Circular Sawing Machine
8. Understand the Principles and Concepts of Carcass Construction
9. Understand the Principles and Concept of Frame Construction

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.						
Module: Fundamentals of Machine Wood Working Ii			**Module Code: CCJ -14**		**Contact Hours 4hrs theory and 16hrs practical**	
Module Specification: Theoretical and PracticalContent:						
General Objective 1.0: Understand the working principle and operations of a mortising machine. Year 2, Term 3						
	Theoretical Content			**Practical Content**		**Evaluation**
Week	**Specific Learning Objectives**	**Teacher Activity**	**Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	
Week 1	1.1 Explain the working principles of a mortising machine. 1.2 Describe the layout and general design of the machine. 1.3 Differentiate between the two main types of cutters used on the machine Hollow chisel Chain cutter, and state the types of job each cutter is best suited. 1.4 Describe types of clamping devices and attachments for the mortising	Explain the working principles of a mortising machine, describe the layout and general design of the machine, differentiate between the two main types of cutters used on the machine, Hollow chisel and chain cutter and their uses. Explain the Set-up of the machine for normal and repetitive mortising operations.	Mortising machine and charts showing the various parts of the machine, Maintenance equipment, oil, brush etc. I.T Teaching aids Clips P.P.E Kits Video Clips Consumables	1.1 Install and remove cutters correctly 1.2 Set up the machine for normal and repetitive morticing operations. 1.3 Carry out morticing operations to given specifications. 1.4 Apply routinely the safety and operational precautions related to the use of the machine.	Set up the machine for normal and repetitive operations and carry out a given operations to given specifications. Guide the students perform various stages of operation on the machines observing all safety and operational procedures. Guide students to produce work products using the machines	Describe the main features and working principlesofmo rtising machine Explain the scope of application of the mortising machine Describe the general layout of the mortising machine Discuss the necessary safety and operational precautions to be taken when using the

	machine. 1.5 Explain all the necessary safety precautions and procedures of using a mortising machine					mortising machine
General Objective 2.0: Understand the Principles and Operations of Tenoning Machine. Year 2, Term 3						
Week 2-3	2.1 Explain the working principles of the single-end tenoning machine in its various forms. 2.2 Explain in details the spur cutters and state their functions. 2.3 Explain in details the shape of scribing cutter for a molding operation. 2.4 Explain the principles and applications of backing piece, and stops for production work. 2.5 Explain the	Explain the working principles of the single end tenoning machine in its various forms, list the different cutter blocks that can be mounted on machine and the type of job each cutter is best suited for. e.g. Split tapered cutter block, circular cutter block, - Scribing cutter.	Mortising machine Charts White Board I.T Teaching aids Consumables	2.1 Produce templates for setting tenoning cutters. Set the machine to produce tenon for a mortice and tenon joint. 2.2 Set up tenoning machine and produce miter tenons 2.3 Apply the safety and operational precautions related to the use of the tenoning machine. 2.4 Set tenons, square and step shoulders, single	Set up the machine for normal and repetitive operations and carry out a given operations to given specifications. Guide the students perform various stages of operation on the machines observing all safety and operational procedures. Guide students to produce work products using the machines	Describe the main features and working principles of tenoning machine Explain the scope of application of the tenoning machine Discuss the necessary safety and operational precautions to be taken when using the tenoning machine

	purpose of balancing each pair of cutters on the balancing machine.			and double scribing. 2.5 Adapt the machine for trenching, square tenoning and comb joints, turn tenon. 2.6 Set up tenoning machine and produce miter tenons 2.7 Design and produce suitable jig for the safe and accurate production of angle tenons.		
General Objective 3.0: Understanding the Principles and Operations of Boring Machine. Year 2, Term 3						
Week 4	3.1 Explain the basic principle of boring machine. 3.2 Identify using pictures major components of boring machine and state their	Explain the basic principles of boring machine, its major components and their functions, e.g., motor, chuck, spindle, etc. Illustrate the scope	Boring machine, Charts White board P.P.E Kits	3.1 Apply routinely the safety and operational precautions related to the use of the machine. 3.2 Mark out work pieces for boring	Set up the machine for normal and repetitive operations and carry out a given operations to given specifications. Guide the students	Describe the basic principle of the boring machine Explain the major components of a boring

	functions: motor spindle table cramping device chuck leverage, hand or foot pedal 3.3 Explain and demonstrate the scope of operation of the boring machine. 3.4 Apply safety precautions related to boring machines, e.g., Isolate machine from power source, etc.	of operation of the boring machine.,	I.T Teaching aids Consumables	operations 3.3 Make simple jigs and fixtures for repetitive boring operations. 3.4 Set machine for various boring machines-single holes, double etc. 3.5 Carry out boring operatives to given specification 3.6 Sharpen bits to correct profile and keenness 3.7 Undertake routine service and maintenance of the boring machine. 3.8 Select the correct size of drill and fix on chuck 3.9 Set up drilling machine and drill holes on timber to a given specification.	perform various stages of operation on the machines observing all safety and operational procedures. Guide students to produce work products using the machines	machine State the functions of a boring machine. Discuss the necessary safety and operational precautions to be taken when using the boring machine

General Objective 4.0: Understand the Principles and Operations of Sanders. Year 2, Term 3						
Week 5	4.1 Explain the principles of operation of the following hand machines: a. Overhead traveling belt b. Disc and bobbing sanders c. Drum sander 4.2 Illustrate with sketches the working principles of the sanding machines. a. Overhead traveling belt b. Disc and bobbing sanders c. Drum sander 4.3Apply safety and operational precautions related to the use of the sanding machines. 4.4 Explain the importance of the exhaust system.	Explain the principles of operation of the following sanding machines: (a). overhead traveling belt. Disc and bobbing sanders Drum sander. Carry out sanding operation with wood sawing machine.	Sanders Machine Charts/Pictures White board Sketches/drawings. Lesson note I.T Teaching aids P.P.E Kits	4.1 Mount the belt, strain and track correctly on the overhead sander 4.2 Adjust the work-table to convenient working height. 4.3 Apply the belt to the face of the job using one of the following: -Hand pad	Set up the machine for normal and repetitive operations and carry out a given operations to given specifications. Guide the students perform various stages of operation on the machines observing all safety and operational procedures. Guide students to produce work products using the machines	Explain with sketches the working principles of sanders machine Describe the safety operational precautions required in the use of the sanders machine

General Objective 5.0: Understand the Common Portable Power Tools Used in Wood Work. Year 2, Term 3						
Week 6	5.1 Describe the common portable power hand tools used in woodwork; a. Portable saw b. Portable planer c. Portable drill d. Portable sander e. Portable Jig saw 5.2 Explain how each of the tools listed in item 5.1 above works. 5.3 Explain the health and safety regulations in the used of portable power hand tools	Explain the working principles of portable power tools Explain the difference between Portable Power tools and heavy machines Present samples of the various machines for students to see. Ask students to identify the parts and explain their functions.	Portable power tools Charts White board Lesson note I.T Teaching aids	5.1 Identify the various Portable Power Tools (PPT) and equipment such as orbital sanders, portable power planer, portable power drill, portable power jig saw etc.	Demonstrate the Portable Power hand tools to the students Demonstrate the use of Portable Power Hand tools observing all safety regulations.	List the common portable power hand tools Describe the health and safety regulation in the use of portable power hand tool
General Objective 6.0: Understand the Principles and Operations of Planing Machines. Year 2, Term 3						
Week 7-8	6.1 Explain the working principles of planning machines using annotated single line diagram. 6.2 List the types of basic planning machines and their uses:	Explain the principles of planning machines using diagrams Identify the main parts of the planning machine Explain the related safety precautions to	Planning machine Charts, white board and markers, tools and accessories. I.T Teaching aids	6.1 Carry out the following operations on the surface planning machine; surfacing; edging; through and stopped rebating; chamfering and beveling` 6.2 Identify all the	Guide the students to operate the planning machine to carry out operations at different specifications observing all necessary safety precautions	Describe the operation Planing machine List types of planing machine Describe the safety

	Surface/overhand planer for surfacing and edging; Thicknesser for thicknessing and widening. 6.3 Apply relevant safety precautions.	be observed	Video Clips	component parts of the overhead traveling belt, strain the belt, and explain the functions of the weighted lever. Use the fence or the table and the pressure pad		operational precautions required in the use of the planing machine
General Objective 7.0: Understand the Principles and Operations of Circular Sawing Machine. Year 2, Term 3						
Week 9-10	7.1 Explain the working principles of circular sawing machines. 7.2 List types of circular sawing machines and their specific uses: a. Cross cut saw b. Rip saw c. Dimension saw	Explain the working principles of the machine. Outline different types of circular sawing machines and the mode of operations to different specifications Identify the main parts of the machine, State safety Precautions related to the machine. Keep the machine in	Circular saw machine Charts Whiteboard I.T Teaching aids Video clips P.P.E Kits	7.1 Carry out the following operations with the circular sawing machines. - ripping stock to width - cutting stock to length	Guide the students to operate different circular sawing machines to produce work products while observing all necessary safety precautions.	Describe the operations of circular sawing machine List types of circular sawing machine

		good state after use.				
General Objective 8.0: Understand the Principles and Concepts of Carcass Construction. Year 2, Term 3						
Week 10-11	8.1 Explain the basic principles of carcass construction work. 8.2 Sketch and state the uses of common carcass, construction joints used in wood-work. a. Widening joints: i. butt ii. dowel iii. tongues and groove iv. slot-screw joints b. Angle Joints: i. mitre ii. lap joint iii. through dovetail iv. lap dovetail v. secret mitre dovetail c. Intermediate Joints i. housing joint ii. through housing iii. stop housing iv. pin-joint	Explain the basic principles of carcass in constructions work using sketches of various joints. Exhibit different Models of various joint used in woodwork construction Outline reasons for Carcass constructions. List and explain various parts of carcass. Explain the functional requirements of Joints	Models Charts White board and Markers I.T Teaching aids P.P.E Kits	8.1 Using hand tools, construct the angles and widening joints: a. Make woodwork items involving the use of carcass joints – small bathroom cabinets, trinket box, etc. b. Test carcass for squareness and out of wind c. Lip edges of man-made boards using: d. veneer e. solid piece (plain or moulded) etc.; f. Make simple car-case moulding, e.g., simple-edged moulding, chamfer, nosing and rounding e.g. Sketch common carcass construction joints. h. Assemble frame i. Test the frame for	Demonstrate to students on how to construct angles in 8.1 while observing all the necessary safety precautions.	Enumerate the basic principles of carcass construction State common carcass construction joints

				squareness and out of wind j. Make projects using the joints listed in 8.1 picture, frame cabinet door etc.		
General Objective 9.0: Understand the Principles and Concept of Frame Construction. Year 2, Term 3						
Week 12	9.1 Explain the principles of frame construction 9.2 List factors that must be considered in frame construction: a. rigidity b. jointing method c. squareness of frame in all directions 9.3 Explain the principles of triangulation in relation to the rigidity of a square frame carcass.	Explain the principles of frame construction using sketches of framing joints. Outline their possible uses. Show models of the joints.	Models Charts White board and Markers I.T Teaching aids P.P.E Kits Tools and Equipment Drawings	9.1 Select tools and demonstrate frame installation required 9.2 Produce the joints using hand and machines, 9.3 Select hand, portable power tools and equipment that are deployed in installation of framed doors and fixtures. 9.4 Apply hand tools correctly in accordance with instructions given for the installation of frames and fittings.	Demonstrate the processes of frame construction of various types of joints with students' participation.	Describe factors to be considered in frame construction
Week	**Examinations: Practical = 70%; Theory = 30%**					

13	

PROGRAMME: National Technical certificate in Carpentry and Joinery		
Module: Joinery I	**MODULE CODE: CCJ 15**	**Total Contact Hours: 204**

Goal: To provide the trainee with appropriate theoretical knowledge and practical skills required of a craftsman to carry out basic operations/jobs in Carpentry and Joinery.

General Objectives:

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

1. Understand the General Safety Rules in The Workshop, Properties and Common Materials.
2. Understand the Operation of Various Hand Tools and Use of Materials in Carpentry and Joinery workshop
3. Understand the characteristics of Common Materials Used in Joinery and Carpentry
4. Understand the Process and Procedures in Timber Preparation.
5. Understand How to Estimate and Cost Joinery Projects
6. Understand the Methods and Techniques of Frame Construction.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY						
MODULE: JOINERY 1			**MODULE CODE: CCJ 15**		**Contact Hours: 2hrs theory and 4hrs practical**	
Course Specification: Theoretical and Practical Content						
General Objective 1.0:Understand the General Safety Rules in The Workshop, Properties and Common Materials. Year 1, Term 1						
Week	**Theoretical Content**			**Practical Content**		**Evaluation**
	Specific Learning Objectives	**Teacher's Activities**	**Learning Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	
Week 1-2	1.1 Explain sources of hazards in a wood workshop e.g. Handling and using of hand tools, power tools and machines; Stepping on or striking obstructions left on the floor or bench; Lifting; moving and storing materials or jobs; Using inflammable liquids Inhaling vapors or	Explain the various sources of hazards and hazardous materials in the workshop Ask the students to mention common types and causes of accidents in the workshop Explain the application of P.P.E Kits Use question and answer techniques to explain	Lesson Plan Whiteboard Wall Chart Basic tools Fire Extinguisher, etc. Accident pictures/posters Eye Goggles Video Clips Hard sole Shoes First aid Box	1.1 Apply safety rules relating to: a. Clothing and health hazards b. Workshop hygiene c. Movement and other behaviour of workers in the workshop d. Materials' handling e. Tools' handling Machine operations f. Fire g. operation of fire extinguisher h. Location of first box.	Demonstrate the application of P.P.E Kits and various operations with students' participation Identify the location of first aid box and its contents.	Describe hazards in the wood workshop Enumerate safety wears essential in the wood workshop Identify the location of the box list the items in the first aid box. Enumerate

	fumes that are toxic in nature. 1.2 Identify how accidents can occur through the various items listed in 1.1 above. 1.3 Explain how the various types of accidents can be prevented. 1.4 List and explain Personal Protective Equipment Kits(P.P.E Kits) essential in a wood workshop and their application in work situations: (Shoes, non-flowing gowns, eye goggles, fire extinguishers and sand and water buckets, etc.) 1.5 List basic	appropriate procedures to avoid accidents or danger in the workshop. Examples must be shown using the relevant safety equipment and tools	I.T Teaching aids			procedure to take when there is an accident in the wood workshop

	items in the first aid box. 1.6 Undertake appropriate procedures in the event of accident or danger in the workshop. e.g. of procedures include: Application of first-aid to the victim Removal or rectification of the cause of accident Reporting the incident to the appropriate authority Keeping a record of accidents for use by the appropriate authority in the school or industry					
General Objective 2.0: Understand the Operation of Hand Tools and Use of Materials in Carpentry and Joinery workshop. Year 1, Term 1						
Week 3-5	2.1 Explain the two types of hand	Explain in details the functional	Lesson plan Whiteboard and	2.1 Prepare various timber to size using appropriatehandtool	Take students to the workshop and identify the	Explain the two types of

	tools used in carpentry and joinery (a) manual hand tools (b) portable power hand tools and state their operational principles. 2.2 List manual hand tools and their operational principles. (a) planes – jack, try, smooth and special purpose planes (b) saws-tenon, panel, rip and crosscut (c) chisels: - paring/beveled, mortise of various sizes, (d) pneumatic impelling tools. hammer, screwdrivers, etc. (f) boring – brace, hand drills, twist bits, etc.	operations of different woodworking hand tools. Explain the advantages and disadvantages of manual and powered hand tools Explain in details the safety precautions to be observed in handling of specific hand tools. Show the portable powered tools to students and explain their specific applications. Explain each wood working tools and their limitations.	Markers Charts Catalogs Various Hand tools Video Clips I.T Teaching aids	s. 2.2 Apply appropriate safety precautions when using various hand tools e.g. (a) keeping all sharp-edged tools away b) earthing of all electric tools (c) use of fuse to check over flow of current into the equipment. 2.3 Make a specified wood item involving the use of the portable hand tools. 2.4 Demonstrate how to dismantle some tools and how to reassemble them. 2.5 Carryout joint Maintenance of tools with students' participation.	specific tools, explaining their functions. Demonstrate wood cutting, planing, boring, processes using appropriate tools Present a list of simple joinery items for students to choose from and produce.	hand tools used in carpentry and joinery trade List some manual hand tools and state their application in the preparation of timber List some portable hand tools and state their specific application.

	(g) cramping tools – sash cramp, G-cramp, etc. 2.3 List various portable powered tools and their specific uses. (a) crosscut saw (b) the portable drill (c) the planner (d) the portable jig saw (e) the router			(a) sharpening plane cutters, chisels, drills and saw teeth (b) sharpening of pointed tools cleaning and lubricating all tools before they are stored away.		
General Objective3.0: Understand thecharacteristics of Common Materials Used in Joinery and Carpentry. Year 1, Term 1						
Week 6-10	3.1 Explain the source of timber and timber products used for joinery in Nigeria (a) locally from tree grown in the forests in the Southern States; (b) import from Ghana, etc. 3.2 Explain the main differences in structure between softwood and hardwood	Explain the sources of timber in Nigerian. Explain the differences between softwood and hardwood. Explain the various methods of timber conversion. Explain the purpose of timber conversion	Specimen of timber sizes Lesson note Whiteboard Charts Video Clips I.T Teaching aids			List sources timber used in Nigeria Explain structural difference between soft and hard wood. Describe methods of conversion Define seasoning

	and the broad division of hardwoods into soft, medium hard and hardwood. 3.3 Explain species of wood classified as softwood and hardwood, their properties, resistance to insect, ease of finishing and common applications. *NOTE: Nigeria/West African Hardwoods should be adequately treated before importation* 3.4 Explain the process of tree felling and logging 3.5 Define conversion in	Explain the characteristics of timber produced in the three main methods of conversion.				Explain methods of seasoning. Explain wood preservation.

	relation to timber and explain its purposes: (a) to obtain correct size of timber for use (b) for ease of seasoning (c) for ease of transportation (d) for marketability 3.6Explain the various methods of conversion: (a) rift sawing (b) slab sawing (c) tangential sawing 3.7Explain the main characteristics of timber converted in any of the methods rift, slab and tangential sawing and the effect on their strength, aesthetics and stability when					

	used as structural members.					
Week 11-12	3.8 List the standard sizes of timber that are sold in the Nigerian timber market: 25 x 120mm 50 x 100mm 25 x 300mm 50 x 150mm 50 x 75mm 50 x 300mm 100 x 300mm 75 x 300mm 3.9 Explain timber seasoning and list the basic types of seasoning: Natural/air seasoning Kiln/artificial seasoning; State the advantages and disadvantages of each method; Name the type of seasoning most commonly used	List and explain the standard/market sizes of timber in Nigeria using sketches/diagrams, Explain the basic method of wood seasoning in Nigeria. Explain the moisture content in timber and mention the acceptable range of percentage for both external and internal joinery works.	Specimen of timber sizes Lesson note Whiteboard Charts Video Clips I.T Teaching aids Samples of hardwood and soft wood			List some standard commercial sizes of timber that are sold in the Nigerian timber market.

	in Nigeria. 3.10Use sketches and drawings to Explain the process of timber seasoning by the two methods listed above 3.11 Explain moisture content (M.C) in timber and its effects on joinery. Determine the moisture content of timber suitable for joinery using: the formulae: $\frac{W1 - W2 \times 100}{W2 \times 1}$ where W1 = Wet weight W2 = Dry weight (b) an electric moisture meter. State the moisture content of timber used for the following items of joinery internal joinery					

	external joinery					
Week	**Year 1, Term 2**					
1- 2	3.12 Explain in details common wood destroying agents: (a) Fungi – dry and wet (b) insect-borers, the nature of damage and how these can be identified 3.13 Explain the causes of fungus growth on timber, the conditions favorable to its growth and how these could be prevented. 3.14 Explain in detail the process of fungi treatment in affected timber.	Explain in details the causes and conditions favorable to the growth of fungi in timber Explain how timber affected by fungi can be treated.	Lesson note White board Charts Pictures of Fungi growth in timber I.T Teaching aids Wood preservatives	3.12 Identify common wood destroying agents e.g. Fungi, Insects. 3.13 Identify the nature of damage caused by these agents by inspection.	Practically show the students example of the damage caused by these wood destroying agents. Demonstrate the steps to be adopted in preventing defects of these agents with the participation of students	List common wood destroying agents Describe the condition necessary for the growth of Fungi in timber Explain how to prevent the growth of Fungi in timber.
Week 3-4	3.15 Define 'Timber Defect' and explain the two classes of timber defects –	Explain in details various the differences between natural and artificial	Lesson note White board and Markers			Define defects in timber Explain two classes of

	natural and artificial 3.16 Explain how the following defects associated with seasoning occur and state how they could be corrected. e.g. collapse case hardening; and surface checks 3.17 Define: - (a) Wood preservation; (b) preservative 3.18 Explain the three groups of wood preservatives: a. oil type preservatives. b. solvent preservatives. c. water soluble preservatives. 3.19 Describe the process of	defects in timber. Lists and explain seasoning defects With aid of sketches describe characteristics of wood behaviour affected by defects	Charts Pictures I.T Teaching aids Samples of timber defects Wood preservatives			timber defects. What is wood preservation List the groups of wood preservatives. Explain the process of applying preservative to wood.

	applying preservatives to wood 3.20 Explain the process of protecting timber against fire.					
Week 5-6	3.21 Explain common wood products used in joinery construction e.g., plywood, laminboard, blockboard, chipboard and hardboard, and state their specific applications, marketable sizes, structure and properties. 3.22 Explain how the boards listed above are manufactured 3.23 Explain the advantages and disadvantages for using	Explain in details some timber products/manufactured boards used in joinery works with aid of sketches and drawing. Explain how manufactured boards are produced. Enumerate the advantages and disadvantages of manufactured boards over solid timber	Lesson plan I.T Teaching aids Whiteboard and markers Charts Samples of manufactured boards Veneer samples	Identify various types of Manufactured boards such as plywood, particles board, hardboards, medium density fiber boards etc. Identify various sizes of Manufactured boards. Select Manufactured boards for specific task in carpentry and joinery. Adopt an appropriate method of storing Manufactured boards.	Demonstrate the purpose of lipping edge of boards. Visit a wood product factory with the students to observe the production processes.	List names of manufactured boards. State the application of these manufactured boards. Explain how these boards are manufactured. Explain the advantages and disadvantage of using manufactured boards.

	manufactured boards over solid timber. e.g., reduction in labour, stability and strength, decorative, low weight, etc. 3.24 Explain the methods of (a) jointing timber products at right angle and on edge to increase width (b) lipping edges of manmade boards using (i) metal (ii) hardwood strip and iii) veneers.			Identify the two main types of veneers (a) wood veneer (b) plastic laminates.		
Week 7	3.25 Explain in details veneers and its purposes e.g., providing beautiful, expensive surface. 3.26 Explain in details the process of wood veneer production.	Explain the purpose of veneering Enumerate the two major types of veneers Use sketches or charts to explain the of veneer production and its	Lesson plan I.T Teaching aids Whiteboard and markers Charts Veneer samples	Describe Veneer and its purposes Describe wood veneer production and its application.	Demonstrate various samples of veneer, its production, application and purposes to students	

	e.g. slicing method and rotary method 3.27 Explain application of veneers in joinery	application in joinery work				
Week 8-9	3.28 Explain veneer surfaces such as (a) cheap wood surfaces to produce a decorative surface (b) edge of plywood, laminboard, chipboard, etc. 3.29 Explain the uses of plastic laminates in joinery e.g. covering for surfaces that will be subject to excessive wear as well as maintain cleanness; decoration etc. 3.30 Explain examples of jobs	Enumerate the importance of plastic laminate in joinery works Explain in details the articles where plastic laminates can be used Discuss various types of plastic laminates suitable for joinery construction, e.g., Formica Enumerate the type of adhesives used for sticking plastic laminates to solid wood surface e.g., contact adhesive etc.	Lesson note Chalkboard Charts Formica/other laminates Superglue/ Araldite Evo stick Lesson plan Chalkboard	Identify various types of plastic laminates suitable for joinery construction, etc.' their composition and properties e.g., resistance to wear, burns, stains, etc. Identify the various types of adhesives used in joinery work and their broad classifications as: a) interior – animal glue, urea formaldehyde, polyvinyl acetate, contact adhesives b) exterior – urea formaldehyde, phenol formaldehyde,	Demonstrate the use of veneer surfaces to cover cheap wood surfaces to produce a decorative surface Demonstrate Use plastic laminates to cover surfaces. Demonstrate the use of adhesive to stick plastic laminate to plain wooden surfaces	Describe Veneer State the purposes of using veneers Explain how veneers are used. Explain the use of plastic laminates in joinery. Give example in which they are applied.

	in which plastic laminates may be used: counter tops, kitchen cabinets, home and office furniture, etc. 3.31 Explain the composition of adhesives used for sticking plastic laminates to plain wooden surface. 3.32 Explain the merits and demerits of plastic laminates over standard wood finish such as paints, polish, etc. 3.33 Explain the reasons why man-made wood products are used as base on which plastic laminates/veneers are laid instead of	Show the students samples of such adhesives. Discuss the advantages and disadvantages of plastic laminates over standard wood finish. Enumerate the reasons why man-made wood products are used as base for veneer and plastic laminates Explain the basic requirements of adhesives e.g., the bonding material must be as strong and durable as the timber itself, resistant to moisture, withstand heat and microbiological attack		resorcinol formaldehyde, epoxy resins		

	solid timber; such as stability, wider uninterrupted and regular surface, etc. e.g. plywood, chipboard, 3.34 Explain the basic principles of adhesion.	Enumerate the classification of adhesives used in wood e.g. protein adhesives synthetic adhesives contact adhesives				
Week 10	3.35 Explain in detail the properties of each type of adhesive and state specific joinery and carpentry jobs in which they can be used. 3.36 Illustrate with sketches and pictures how a properly framed joint aids in increasing the strength of a glued joint. 3.37 Define and explain the gluing terms:	Explain the properties of protein, synthetic and contact adhesives, and areas of application of each in joinery works. Sketch and explain how a properly framed joint and aid in increasing the strength of glued joint Explain the gluing terms: storage time, setting time, etc.	Fastening: holding, and pulling items White Boards and markers Lesson note Charts and Posters. Fastening items Finishing products Schedule of some finishing products brand names I.T Teaching aids	Select bonding materials in relation to Manufacture boards. Apply bonding materials such as animal glue in accordance with manufacturer's instructions. Apply bonding materials in accordance with given instructions. Clean excess bonding materials in accordance with instructions. Return unused	Demonstrate the use of adhesive in specific joinery and carpentry jobs. Construct various joints and subject them to their functional requirement and observe. e.g. adhesive joints and non-adhesive joint	Explain adhesives and their uses Describe the effect of heat in setting of adhesive Explain curing of blue line in carpentry and joinery Explain with example fastening, holding and pulling Explain wood finishes.

	thermo-setting and thermo-plastic. 3.38 Explain the effect of heat on the setting of adhesives 3.39 Explain two methods of curing glue lines (a) traditional method of allowing the glue to set within 24 hours (b) using electronic radio-frequency equipment and explain where each one is preferred. 3.40 Differentiate between fastenings, holding and pulling: Fastening: - screws, nails, corrugated	Explain how heat affects the setting of glues Explain the two methods of curing glue lines Define the terms: fastening, holding and pulling and give examples of each. Explain in details use of fastening items. Explain the types of metal used in wood fittings Define the term finishing and give example of some. State the purpose of finishing. Explain the composition of common finishing products		bonding materials for storage. Apply fastening materials for the construction of bookshelf. Return un-used fastening materials for storage.		

	fasteners, bolts and nuts. Holding and Pulling: - hinges, handles, locks catch, stays, etc. 3.41 Explain how fasteners are used to hold two parts together 3.42 State the properties of materials used for common fittings: - brass, mild steel, aluminum, plastic, etc. 3.43 Explain the purpose of finishing wood surfaces: - hygiene, preservation, and aesthetic 3.44 Name and state the composition of common materials used for					

	finishing wood surfaces: sand paper, varnish and paint.					
General Objective 4.0: Understand the Process and Procedures in Timber Preparation.						
Week 11-12	4.1 Explain the basic requirements of a good joint, e.g. (a) rigid, stable and structurally strong to withstand any force acting on it (b) easy to make, (c) parts fitted together should provide a continuous glue line to increase the strength of the joint. 4.2 Classify joints according to use: (a) widening joints, e.g., rebate, tongue and groove, slot screw, etc. (b) lengthening joints, e.g. half	Discuss the basic requirements of a good woodwork joints Using sketches and drawing explain the methods of constructing various joints and state their application in carpentry and joinery works	Lesson note Whiteboard and markers Charts Drawings Video clips I.T Teaching aids	4.1 Produce sketch/drawing of given angle/corner joints. 4.2 Produce sketch/drawing of framing joints, prepare the stocks, select tools, required for the production of the joints. 4.3 Produce sketch/drawings of corner framing joint, e.g., dovetail joint. Prepare stocks, select tools and produce joint. 4.4 Construct the various joints using hand and portable power hand tools.	Demonstrate the procedures involved in the construction of joints. Demonstrate the classification of joint according to their uses. Demonstrate the procedures involved in dressing timber to the required sizes showing the face edge and face side marks Demonstrate the procedures involved in the construction of angle, corner or carcass joints. State the	Explain the functional requirements of a joint Classify different joints according to use.

	lapped and scarfed joints, etc. (c) angle, corner or carcass joints, e.g. housing, dove tail, pin or combed joints. (d) Framing joints; e.g. mortise and tenon, bridle, half lap, joints etc.				appropriate areas of application in carpentry and joinery work with the participation of students	
General Objective 5.0: Understand How to Estimate and Cost Joinery Projects. Year 1, Term 3						
Week 1-3	5.1 Interpret joinery and carpentry drawings including rods and route sheets and specifications. 5.2 Differentiate between costing and estimating 5.3 Explain the process of estimating and costing. 5.4 Make a cutting list of a	Explain the procedures and techniques to interpret drawings and specifications meant for carpentry and joinery project Explain the differences between costing and estimating List and explain the processes involved in estimating and costing	Lesson plan Chalkboard Charts Sawn-size sample Finished size sample	5.1 Interpret carpentry and joinery drawings and specification notes 5.2 Differential between costing and estimating 5.3 Understand the process of estimating and costing 5.4 Make a cutting list of a joinery item using the different format.	Guide the students on how to interpret drawings and draft specifications notes. Demonstrate the process of estimating and costing with the student's participation. Guide the students to prepare cutting list of joinery items using	Interpret joinery and carpentry drawings Explain the difference between costing and estimation. Prepare a cutting list of a joinery item. Differentiate between sawn size and finished size

	joinery item using the different formats. 5.5 Explain the difference between sawn-size and finished-size. 5.6 Calculate the quantity of all materials required for a job. 5.7 Define the basic components of an estimate (a) materials (b) Labour cost (c) Overhead (d) Profit. 5.8 Explain unit cost and how this is applied to various types of joinery e.g. (i) architrave, skirting per meter run (ii) table tops,	Explain the process of papering cutting list in carpentry and joinery projects. Explain the differences between sawn-sizes and finished sizes of timber. Choose a joinery project and calculate the quantity of all the material required for it. Give the student similar project to perform. List and explain the basic components in estimation. Solve some mathematical examples involving unit cost calculations		5.5 Identify sawn-size and finished size 5.6 Calculations of quantity of materials, labour cost, overhead and profit required for a joinery job. 5.7 Identify various units of cost and their application to various activities of joinery work. 5.8 Prepare costing and estimation of simple joinery work. 5.9 Demonstrate the effect of cost control in joinery project	different format. Select a project in joinery and prepare a cutting list as sample Give group or individual projects to students.	Calculate the cost of a) material required b) Labour c) overhead for a furniture item. Prepare specification for basic joinery items a) Size of items b) Timber type c) size of section d) type of joints e) finishing.

	paneling, etc. per m2 (iii) polishing of doors, etc. per m2. 5.9 Cost a simple joinery item and explain the importance of cost control in a joinery project to the business and the client. 5.10 Write specifications for basic joinery items. Specifications should include (a) sizes of items (b) timber type and sizes of sections (c) type of joints for connecting the various parts (d) finishing – painting, polishing and varnishing.	Illustrate the judicious costing of a joinery project to satisfy both customer and contractor Explain the basic methods involved in writing a satisfactory specification for a joinery item.				
General Objective 6.0: Understand the Methods and Techniques of Frame Construction. Year 1, Term 3						

Week 4-7	6.1 Define frame as consisting of two sides and one top and bottom. 6.2 Explain the basic principles of frame design taking into account (a) functionality (b) structural stability (c) aesthetics, etc. 6.3 Sketch joints used for making a standard frame, namely (a) butt and nailed (b) housed and nailed (c) mortise and tenon (d) dowel joint. 6.4 Explain with sketches how a square frame is kept stable before glue is set and frame is fixed in position	Define the term – "Frame" Discuss the principle involved in frame designing. Illustrate with sketches, joints used in making standard frames. With aid of sketches illustrate how window frames are kept stable before fixing in position. Enumerate the purpose of mouldings and rebates on frames	Lesson note Whiteboard and markers Video clips Charts I.T Teaching aids	6.1 Make and assemble a simple frame using one or more types of joints. 6.2 Design and produce moldings, rebates and grooves by hand method. 6.3 Make a rod or route sheet for the construction of a standard door frame. 6.4 Produce a standard door frame (rebated and moulded) ready for a panelled door. Any one of the following mouldings may be used: (a) Dado (b) Chamfer (c) Cavetto (d) A combination of these mouldings NOTE: Traditional construction technique and mass	Guide student to construct and assemble a simple frame. Demonstrate the procedures involved in forming rebate, moulding and groove on wood Design a door frame. Explain the procedure involved in door frame construction and prepare the cutting list Demonstrate the production of raised and fielded panel, bead-flush and bead-butt panels and carved panels. Using conventional	Define a frame Explain the basic principle of frame design Sketch joint commonly used in frame construction Explain the purpose of moulding and rebates in frames. Sketch a detailed working drawing of a panelled door label the parts and state their functions.

	e.g. (a) by cross bracing (b) letting a panel into a grove, rebate or nailed to the face(s) of frame. 6.5 Explain the purpose of mouldings and rebates on frame/door members.			production of component parts to be employed. 6.5 Produce (a) raised and fielded panel (b) bead-flush and bead-butt panels, and (c) carved panels suitable for a panel door. 6.6 Draw detailed working drawing of a panelled door, with the raised and fielded panel, finished with a collection mould. 6.7 Make a rod/route sheet for a five-panelled door and produce a cutting list for the door. 6.8 Produce a five-panelled door using hand and machine tools as appropriate either as group or	drawings, explain the production procedures of panel door. Demonstrate the procedures involved in the production of a panelled door. Demonstrate the method of making the joints between the rails and the stiles Using demonstration techniques, explain the procedure in constructing joints between the stiles and the rails Demonstrate the procedures involved in producing battened doors.	

				individual project. NOTE: The door and frame must be produced full size. 6.9 Produce half glazed paneled door as group or individual project. 6.10 Produce full-size flush door ready for fixing of the site. 6.11 Fix a door using at least two types of ironmongeries of butterfly hinge, mortise lock, staple, etc. 6.12 Prepare flush door ready for finishing with paint or varnish and for hanging to a frame. 6.13 Construct the joints between the stile and rails by hand and/or		

				machine processes. 6.14 Produce (a) a ledged and braced door suitable for a public toilet door (b) a frame, ledged, braced and battened door. All two doors must be finished ready for hanging on site. 6.15 Draw the diagrams of the various doors, label the parts and state their functions.		
Week 8	6.6 List standard sizes of external and internal doors; 1950mm (6'-6") x 750mm (2'-6") 2025mm (6'-9") x 825mm (2'-9") 2025mm (6'-9") x 900mm (3'-0") 2100mm (7'-0") x 900mm (3'-0") 6.7 Special purpose doors,	Explain various sizes of doors for external and internal purposes	Lesson note Whiteboard and markers Video clips Charts I.T Teaching aids			List sizes of internal and external doors

	e.g., entrance doors to public buildings may have bigger size than those stated above.					
Week 9	6.8 Name the parts and sizes of a door frame: Head - 100mm x 50mm Jambs - 100mm x 50mm 6.9 Define a 'door' and explain different types of doors e.g. (1) those with wooden panels – plywood or fielded and raised (2) Glazed panels 6.10 List the components of a five-paneled (5-panelled) door and state their conventional sizes: Stiles – Ex	Enumerate the parts and functions of a door frame Define the term "Door" and explain its functions in a building. Using question and answer techniques, explain various types of paneled doors With the aid of sketches explain the components of five-paneled door. Illustrate with sketches, various details of methods	Models of paneled door Lesson note Whiteboard and markers Video clips Charts I.T Teaching aids			Define the term door. Explain types of panel doors List the components of a five-paneled door.

	50 x 100mm, Bottom Rail – Ex 50 x 220mm, Middle Rail – Ex – 50 x 220mm, Frieze, top and intermediate Rail – Ex 50 x 100mm plywood/solid wood panel or glass panel, moulding – stuck to edge of members or planted. 6.11 Sketch in details the of methods of fixing mouldings in a paneled door rails and stiles.	of fixing mouldings in paneled door rails and stiles				
Week 10	6.12 Explain with Sketches the methods of (a) halving joint between the glazing bars (b) jointing the diminished stile and gun stile. (c) joint between top rail and stile	Demonstrate the procedures involved in the production of half glazed door. Enumerate the components of flush door With the aid of	Model of flush door Lesson note Whiteboard and markers Video clips Charts			State the components of a flush door. Sketches the methods of halving joint between the glazing bars

	for glass panels. 6.13 Enumerate the components of a flush door, stating the conventional sizes of the parts: Stile – Ex 32 x 75-100mm Rails – Ex x 75mm 6.14 Explain the types and methods of jointing the rails to stiles e.g., corrugated fasteners or dowel joints, etc. 6.15 Explain types of flush doors 6.16 Explain the methods of spreading adhesives on both faces of the frames e.g. (a) by manual method,	sketches, explain the methods of joining the rails to the stiles With the aid of sketches, explain types of flush door. Explain methods of spreading adhesive on both faces of the frame Explain the two methods of curing glue line in flush door Define the term ironmongery and show examples	I.T Teaching aids			

	and (b) by a glue spreading machine					
Week 11	6.17 Explain the purpose of edging strip in a flush door construction. 6.18 Sketch details of edging strip and stile of a flush door.	Explain with sketches the methods of stripping the edge of flush door Demonstrate the steps involved in production of flush door ready for finishing and hanging				Describe the purpose of edging strip in a flush door construction.
Week 12	6.19 Explain the common types of batten doors and state where they can be used. e.g. (a) Ledged and battened (b) Ledged, battened and braced (c) framed, ledged and batten door (d) Frame, ledged, battened and braced, 6.20 Explain the	List and explain common types of battened door With the aid of line diagrams explain various doors, their parts and functions Make sketches to illustrate the importance of brace in battened door construction Explain the two methods of				Describe common types of batten doors. Explain their application Discuss bracing of batten doors Sketch the joints used for constructing frame components for a batten door.

	mechanics of the brace as a structural member and the importance of the brace in a batten door. 6.21 Explain two methods of bracing a batten door and state which one is most proffered 6.22 With Sketch and drawings explain the joints used in constructing the frame components of batten doors. (1) Stile and top rail – mortise and tenon or dowels (2) Stile and middle/bottom rail – bare faced and hunched mortise and tenon.	bracing a battened door and state the reasons for preferring one Using sketches illustrate the joints used in constructing battened doors				
Week	Examinations: Practical 70% Theory 30%					

13	

PROGRAMME: National Technical certificate in Carpentry and Joinery		
Module: Joinery II	**MODULE CODE: CCJ 16**	**Total Contact Hours: 104hrs. Year 2, Term 2**

Goal: To provide the trainee with the theory and skills in Joinery production ready for installation on site.

General Objectives:

On completion of this module, the student should be able to:

1. Understand the Principles and Techniques of Wall and Doors Panels Productions.
2. Understand the Basic Principles of Stair Design, Their Construction and Finishing Ready for Installation.
3. Understand the Principles and Techniques of Producing Furniture.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY						
MODULE: JOINERY II			**MODULE CODE: CCJ 16**		**Contact Hours: 4hrs theory and 8hrs practical**	
Course Specification: Practical Content						
General Objectives 1.0: Understand the Principles and Techniques of Wall and Doors Panels Productions. Year 2, Term 2						
Week	**Theoretical Content**			**Practical Content**		**Evaluation**
	Specific Learning Outcome	**Teachers Activities**	**Learning Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	
Week 1-2	1.1 Explain the purpose of wall paneling: mainly aesthetics and warmth in cold weather. 1.2 Describe using pictures, two basic types of wall panel (a) flush; (b) panel 1.3 Define the following terms used in wall paneling; dado paneling full-height paneling three-quarter/frieze rail paneling skirting dado rail cover mould grounds plaster	enumerate the purpose of wall paneling in construction Explain the methods of constructing types of wall paneling using sketches and drawings. Explain the functions and use sketches where necessary to explain the wall paneling terms Explain the reason for choosing particular types of timber for wall paneling construction.	White board Drawings/ Sketches Catalogs Lesson note Charts I.T Teaching aids	1.1 Produce a dado wall panel with fielded and raised panels finished with volution mouldings ready for installation. 1.2 Produce requisite sections of the frame using both hand and machine (a) Hammer – headed key joint (b) Handrail bolt (c) dowel joint 1.3 Produce templates for the shaped head and write out a bill of quantities to make the head. 1.4 Produce	Demonstrate the procedures involved in the construction of dado paneling. Demonstrate the process involved in producing templates for curved headed constructions.	Explain Wall Paneling construction States its purposes. Describe two basic types of wall paneling Enumerate timber suitable for paneling.

	1.4 Explain how to select suitable timbers for wall paneling; (a) Sapele (b) cedar (c) Abura, (d) Lagos Mahogany, etc. 1.5 State their characteristics and application. 1.6 Design, draw and write specification for a dado wall panel 1.7 Estimate the cost of the panel per square meter.	Explain the methods of designing and preparing specifications for dado panelling. Use simple calculation to estimate paneling per square metre.		frames with shaped head by jointing the various components of the frame e.g. bar, transome, etc. finished ready for fixing.		
Week 3-4	1.8Explain the shape of head of doors and windows e.g. segmental, semicircular and semi-elliptical in single curvature. 1.8 Explain the types of joints used	List and explain various types of shapes used in the construction of shaped - headed windows and doors Use sketches to explain the joints used in the	White board and markers Chart Sketches Drawings Lesson note	1.5 Set out a semi-circular or semi-elliptical head of a door in single curvature.	Use demonstration techniques to produce the sections of curved headed doors Demonstrate methods of setting out curved headed doors in workshop	Explain the shape of head of doors and windows

	in the construction of shaped headed doors and windows.	construction of curved headed doors and windows.	I.T Teaching aids		rod	
General Objective 2.0: Understand the Basic Principles of Stair Design, Their Construction and Finishing Ready for Installation. Year 2, Term 2						
Week 5-9	2.1 State the purpose of a stair in a building 2.2 Explain the factors that determine the location of a staircase in a building 2.3 Select Nigerian and other West African timbers suitable for stair construction, e.g. Iroko, Mahogany, Opepe, etc. 2.4 Describe with line diagrams the common types of stairs used in public and domestic buildings: - a. straight flight b. dog leg c. open newel	Explain the purpose of stair case in a building Enumerate the factors to be considered for the location of the stair in a building Explaincharacteristics of Nigerian timber use inconstruction of staircase Use diagrams to explain the types of stairs used in private and public buildings Use sketches and explain in details terms in staircase Use question and	Whiteboard and markers Lesson note Drawing/sketches Wood Samples I.T Teaching aids Building regulation Model of step rise/tread	2.1 Produce templates for marking out housing or treads and risers in a closed string and open risers' stairs. 2.2 Mark out string and other components for: a) closed string stairs b) open riser stairs c) cut string stairs, using: (i) templates where appropriate or (ii) the steel squares. 2.3 Recess stair strings to take treads and risers using: a. manual process b. woodworking machines:	Demonstrate the procedures involved in installation of wooden stair in a building Explain by demonstration the procedures involved in preparation and fixing of wooden tread, riser and string as facing to a concrete stair Let the students participate in the preparation of handrail and balusters, and fixing them in position during demonstration. With the help of sketches,	Describe the factors determining the location of stair. Define and state the functions of the following term a. riser b. going c. step d. headroom e. flight f. pitch Sketch the design standards for the var components of a stair in accordance with the building regulations

	d. geometrical/spiral stairs State factors which determine the choice of each type of stair. 2.5 Explain the following terms used in stair construction; a. riser b. going c. step d. headroom e. flight f. pitch 2.6 State the functions of each of the following parts of a stair; (a) tread (b) riser (c) balusters (d) balustrade (e) handrail (f) newel (g) landing (h) step – tapered, bullnosed, ordinary, etc.	answer, sketch and diagrams to explain the parts of a stair		(i) the spindle moulder (ii) the high-speed router. 2.4 Prepare treads, risers, wedges and other components of the stair ready for assembly. 2.5 Assemble stairs 4.6 Install a wooden stair in a building using suitable ironmongery 2.7 Prepare and fix wooden tread, riser and string as facing to a concrete stair. 2.8 Prepare handrail and balusters and fix in position 2.9 Join handrail to increase length by: a. handrail bolt	demonstrate the three, methods of jointing handrail Use the buildingregulations and sketches to explain the design standard of various components in staircase construction. Visit a construction with students to explain further the part/construction of stairs. Demonstrate the procedures to produce a model stair case. From 2.1 - 2.11	

	4.7 Explain with sketches the design standards for the various components of a stair in accordance with the building regulations, e.g. a. rise and going of step b. riser and tread relationship c. headroom d. width of stair for domestic and public building e. width of landing f. sizes of the components e.g. (i) string (ii)handrail (iii) tread (iv) risers, etc.			b. hammer-headed key c. dowels 2.10 Design and draw details of a straight flight with a closed string or open riser 2.11 Draw details of handrail and balusters and their relationship to the string, newel, step and landing		
General Objective 3.0: Understand the Principles and Techniques of Producing Furniture. Year 2, Term 2						
Week 10-12	3.1 Explain the basic characteristics of furniture designs for public and domestic buildings e.g.,aesthetics,portable,functional, stableand	Explain the important features to be considered when designing furniture for various uses Enumerate and	Whiteboard and markers Drawings/Pictures Lesson note	3.1 Design and drawfurniture items for various uses a) Writing table with drawer and neatly finished top and/or	Engage the students to produce various furniture items for different uses	Describe the basic Characteristic of furniture design as it relates to public buildings.

	comfortable, etc. 3.2 State the basic design requirements for furniture in public buildings: a. withstand wear b. comfortable c.aesthetics. 3.3 Explain how to Design and draw furniture items. 3.4 Explain the principles of interchangeability of components parts and their application to the production of joinery furniture. 3.5 Estimate and cost a job involving furniture items listed above.	explain the basic design requirements for furniture in public buildings With conventional drawings explain the methods of designing furniture items for public and domestic purposes. State the reasons for the differences in the designs of joinery furniture items used in domestic and public buildings with examples. Make a cutting list for furniture items and prepare the estimate and costing for mass production.	I.T teaching aids	dining/kitchen table b) Chest of drawers for storage c) Church furniture, e.g. lectern, priest chair, pew, etc. d. Reading tables and chairs to a given specification.		Enumerate the basic design requirements in a public building. Design and draw a specific furniture item. Estimate and cost a furniture job.
Week 13	**Examinations: Practical 70% Theory 30%**					

PROGRAMMES: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY		
Module:Carpentry 1	**MODULE CODE: CCJ 17**	**Total Contact Hours: 120HRS. Year 3, Term 1**

Goal: This module is designed to provide the trainee with the knowledge and skills in the design, construction and erection of various temporary carpentry structures

General Objectives: On completion of this module, the trainee should be able to:

1. Understand The Factors Governing the Construction, Erection and Dismantling of Site and Other Hoardings in Common Use.
2. Undersatnd The Basic Requirements of Suitable Centers for Various Brick and Concrete Arches, Their Construction, Erection and Stripping for Spans Up To 3m.
3. Understand Timbering to Shallow Trenches and Shoring Construction.
4. Understand The General Requirements of Formwork Construction and Striking.
5. Understand The Construction and Erection of Temporary Supports for Workmen and Materials

PROGRAMMES: NATIONAL TECHNICAL CERTIFICATE IN CARPENTARY AND JOINERY						
MODULE: CARPENTRY I		**MODULE CODE: CCJ 13**		**CONTACT HOURS: 2hrs Theory and 8hrs Practical**		
MODULE SPECIFICATION: THEORETICAL CONTENTS						
General Objective 1.0: Understand the factors governing the Construction, Erection and Dismantling of Site and other Hoardings in common use. Year 3, Term 1						
Week	**Theoretical Content**			**Practical Content**		**Evaluation**
	Specific Learning Outcome	**Teachers Activities**	**Learning Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	
Week 1-2	1.1 Describe the purposes of hoarding in building and other construction sites: a) enclose site b) advertisements. 1.2 Name the parts of a hoarding and their functions 1.3 Describe the materials used for hoarding construction e.g. timber, steel and steel sheets, plywood, boards, etc. 1.4 Explain the basic factors to be considered in the	State the purpose of hoarding in building/construction site. Explain the various types of hoarding Sketch and label parts of a hoarding and state their functions. Mention the various materials used in hoarding construction.	Lesson note Whiteboard Charts Drawings Samples of Materials Posters/Pictures I.T Teaching aids	1.1 Select appropriate hoarding for a given project putting into consideration design, rigidity and location etc. 1.2 Identify types of hoarding, e.g. Construction/site hoarding. General purposehoarding. 1.3 Calculate materials for the erection of hoarding. 1.4 Transfer to Practical content from 1.3	Explain the factors to be considered when selecting a hoarding for a job and calculate the materials required for its erection. Demonstrate the procedures in construction and dismantling of hoarding observing safety precautions and town planning laws	Explain the purpose of hoarding in a building. Enumerate the functions of hoarding Enumerate the materials used in hoarding Enumerate the basic factors considered in the design of site and hoarding.

	design of site and general hoarding with specific reference to: structural stability protection of the public-pedestrians and motorists during site construction or other hazards beauty/aesthetics/appearance, and economic			1.5 Explain the procedure for construction.		
General Objective 2.0: Understand the basic requirements of suitable centers For Various Brick and Concrete Arches, their construction, erection and stripping for spans up to 3m. Year 3, Term 1						
Week 2-3	2.1 Explain the purpose of an arch in building and civil engineering construction, e.g. a) aesthetic. b) to support load in place of a beam. 2.2 Explain the basic factors influencing the design of wooden centers for various arches, e.g.	Describe the purpose of an arch in building and civil engineering construction. Use sketches where necessary. Explain with examples basic design factors for an arch. With sketches, identify the parts of centers and explain their	Lesson note Whiteboard Charts Drawings Samples of Materials Posters/Pictures I.T Teaching aids Sketches	2.1 Define and explain the purpose of an arch in building and civil engineering construction, e.g., a) aesthetic b) to support load in place of a beam. 2.2 Set out geometrical profiles of the following centers: a) turning piece/flat arch b) segmental arch c) semi-circular	Demonstrate the purpose of an arc in building and civil engineering construction. Use sketches where necessary Use Sketches to demonstrate various types of centers to arches. Demonstrate the procedures in erecting and striking centers	Describe the purpose of an arch in building construction. Enumerate the basic functions of an arch centre and their functions. Describe open and closed lagging.

	a). Achieving the desired geometrical shape of the arch; b). Rigid to be able to carry the weight of building units forming the arch until set; c). Economic to construct d). Easy to erect and strip, etc. 2.3 List the parts of an arch center and their functions. 2.4 List suitable timbers and other materials used for the construction of wood centers. 2.5 Explain the purposes of open and closed lagging 2.6 Explain how the ribs of centers are built up to obtain the desired shape for the span.	functions. State the reasons for selecting a particular timber for centering. Sketch and explain open and closed laggings. Sketch and explain the formation of the ribs of centers.		arch d) elliptical arch e) gothic arch. 2.3 Design all of the following centers for spans not exceeding 3m: flat, segmental, semicircular, elliptical and gothic arches 2.4 Construct all of 2.3 2.5 Erect, ease and strike centers when arch is set 2.6 Apply relevant safety precautions in construction and erection of centers.	when the arch is set, observing necessary safety precaution.	Enumerate the parts of an arch center and their functions.

General Objective 3.0: Understand Timbering to Shallow trenches and Shoring Construction. Year 3, Term 1						
Week 4-5	3.1 Define timbering Shores and shoring 3.2 Describe the type of soils and depth of trenches for which timbering's are required 3.3 Explain the function of the parts of the timbering to trench. 3.4 Enumerate appropriate local timbers and other materials, e.g. steel, pipes, poles, etc. used for timbering to trenches in normal and waterlogged soils 3.5 Define shores and shoring in building and civil engineering construction.	Explain what timbering, Shores and shoring are. List types of soils in which timbering are required and state their depth. Enumerate the function of various part of timbering to trenches. Explain the suitability of some timbers for timbering over others. Explain the techniques of constructing shores and shoring in building and civil engineering works. Use question and answer techniques to explain the purpose of shores	Lesson note Whiteboard Charts Drawings Samples of Materials Posters/Pictures I.T Teaching aids Sketches	3.1 Design simple timbering/shoring for various trenches up to a depth of 2m and walls 3.2 Apply safety precautions as necessary during construction and erection of timbering. 3.3 Apply the basic principles of design to produce suitable designs of shoring structures for: a. the support of upper wall when converting a window opening to an entrance to a departmental store; b. preventing temporarily a building wall from falling on to a public thoroughfare/street. 3.4 Erect and strike	Use conventional drawing to demonstrate a simple design of timbering to various trenches. Applying basic principles, erect and strike shore and shoring while observing necessary safety precautions	Explain timbering Shores and Shoring. Explain shores and shoring in building construction Enumerate types of shoring commonly used in Nigeria.

	3.6 Describe types of shoring commonly used in building, civil engineering and maintenance work e.g. dead, raking and flying shores. 3.7 Enumerate the function of the parts and the specific applications of the shores in alteration and maintenance work. 3.8 Select materials used for shoring construction e.g., steel, local timber, etc. and their sizes.	and shoring in building and civil engineering works. List types of shoring's and explain their application. State basic principles, of erecting shores and the necessary safety precautions.		shores applying the safety precautions 3.5 Apply the basic principles of design to produce suitable designs of shoring structures for the support of upper wall when converting a window opening to an entrance to a departmental store; preventing temporarily a building wall from falling on to a public thorough fare/street.		
General Objective 4.0: Understand the General Requirements of Formwork Constructionand Striking. Year 3, Term 1						
Week 6-7	4.1 Define formwork and state its purpose in building, civil engineering and maintenance work.	Explain in details the purpose of formwork in building and civil engineering works.	Pictures/Posters Drawings Video Clips	4.1 Sketch/draw details of formwork construction for the following in-situ concrete items: (a) beam (b) floor	Use sketches to demonstrate different types of formwork constructions.	Explain form work and state its purposes in building construction.

	4.2 Explain the following terms used in formwork construction: - In-situ, pre-cast, stripping, striking, setting/set, curing and mould. State the general requirements of formwork, e.g. a. produces the shape of concrete structure required; b. rigidity and structural stability; c. ease of erection and stripping; d. if built up, boards should be sufficiently light to prevent loss of finished materials from the concrete. 4.3 State common types of forms – timber and steel and listthe advantages and disadvantages of each type of form.	Explain as stated in specific learning objectives. Enumerate types of forms and state their advantages and disadvantages. Explain the characteristics of Nigerian timbers used in formwork construction and explain the sizes stated. Show the different types of planks and plywood to students and explain their composition. Explain effect of liquid concrete on forms and how this can be correct in the construction of forms. Explain demerits and merit of	Models Lesson note Sample of planks and ply wood I.T teaching aids Props Lining/Lubricants	and roof slab (c) lintel (d) wall (e) concrete straight flight stair and landing (f) oversite concrete (German floor) (g) column – square, circular and shape (k) tapered footing/foundation base and (j) balconies. 4.2 Construct, erect and strip formwork for at least two of the following concrete items: - i)beam ii)floor and roof slab iii)lintel iv)straight flight stair and landing v) oversite concrete (German floor) vi) column square, circular vii) tapered footing/foundation base viii) balconies	Demonstrate the processes involved in erecting and striking various forms for concrete. Demonstrate the procedures of constructing and stripping various moulds for precast concrete items. Demonstrate the processes of preparing working drawings for various precast concrete moulds Demonstrate the procedures of constructing and stripping various mould for precast concrete items.	Explain - In-situ - Pre-cast - Stripping - Striking - Setting - Curing State the common types of forms. (Timber and steel) State the characteristics of Nigerian timbers used in formwork State the sizes of timber used in different types of formwork construction.

	4.4 Explain the characteristics of Nigerian timbers used in formwork- Abura, Afara, Obeche, etc. 4.5 State the sizes of timbers used for formwork: Beam sides - 25-50mm thick Beam bottom - 25-250mm thick Floor slabs - 25-50mm thick Joists - 50x 160mm Props - 50x 100mm – bush poles of different sizes. Head tree - 50x 100mm Ledger/ribbon - 25x150mm 4.6 Explain the difference between ordinary plywood and formply. 4.7 State the effect of liquid concrete	timber forms. Explain the methods used in treating the interior of forms.		4.3 Make detailed sketches/scale drawing of moulds for the following pre-cast Concrete items: a). lintel b). window cill c). cornice mould d). cover slab for manhole soak-away and septic tank e). fence posts f) circular ring750mm diameter 4.4 Details should include: a. provision for stripping b. builds up for the true shape of the pre-cast unit c. an example of a gang mould for producing several units of the same type at a time. 4.5 Construct and strip mould for one of the pre-cast		

	on forms and how this is catered for in the construction of formwork for beams, wall, concrete stair case, column, balconies, etc. NOTE: The effect of liquid concrete on form is that it exerts pressure proportionate to depth of concrete. 4.8 Describe methods of treating the interior of forms to prevent it from sticking to concrete e.g. a. By lining the interior with paper; or b. Coating the interior of form with soap or form oil (release agent).			concrete items shown in itemabove.		
Week 8	4.9 Determine how long forms should remain after pouring liquid concrete before form is	Teach the students how in-situ forms are prepared Made sketch of	Drawings Posters Models of			Explain the basic factors governing the stripping time

	stripped; e.g. beam sides, wall and columns - 3 days slabs - 3 days beam soffits - 7 days removal of props to slab - 7 days 4.10 State the basic factors governing the stripping time – e.g. type of cement used type of structure mix of concrete re-use of forms on large building site. 4.11 Explain the difference in the preparation of forms for in-situ and pre-cast concrete. 4.12 List the various components and sizes of moulds for pre-cast items - base	moulds and describe the components	forms Lesson note I.T Teaching aids			Differentiate between the preparation of forms for in-situ and pre-cast. Describe the difference in the preparation of forms for in-situ and pre-cast concrete

	- sides - wedge - bolts, etc.					
General Objective 5.0: Understand the Construction and Erection of Temporary Supports for Workmen and Materials. Year 3, Term 1						
Week 9-11	5.1 Explain the purposes of scaffold: a) support to workmen and materials above ground level b) support to structure during construction or alterations 5.2 State the basic functional requirements of a good scaffold: a. structurally rigid to be able to carry the load placed on b. Safe for workmen to walk about while working. 5.3 Describe with aid of pictures the main parts of a scaffold and their functions and state	Define the term "Scaffold" and state its purposes. Explain the basic requirements of good scaffold. Use sketches to illustrate the parts of scaffold and their functions. Use drawings to differentiate between dependent and independent scaffolds. Explain the factors to be considered in the structural design of scaffolds.	Drawings Posters Models of scaffolding Lesson note I.T Teaching aids	5.1 Construct and/or erect wooden and metal scaffolds for heights up to 6m. 5.2 Maintain scaffold in good working condition. 5.3 Construct step and ladder using different material. 5.4 Apply all current safety regulations in the use of ladders and steps, e.g. a. pitching of ladder at correct angle, i.e. 75 to prevent slipping outwards; b. tying the ladder at the top and at the foot to a stake driven into the ground.	Demonstrate practically erections of different scaffolding including Ladder and platform Demonstrate safety regulations in respect of scaffolding construction and dismantling	State the purposes of Scaffolding in building construction. State the requirement of a scaffold. Identify the parts of a scaffold with the aid of a diagram/picture. Differentiate between Metal and wooden scaffold.

	their sizes: a. Ledger b. braces c. standard d. guide rail e. toe rail f. platform g. coupler, etc. 5.4 Differentiate between dependent and independent scaffolds and state where each is used. 5.5 Select different scaffolding components such as props, platforms, brace, toe board, guardrail etc. 5.6 Explain the basic requirement of when and how to use dependent and independent scaffolds. 5.7 State the factors to be considered in the structural design of scaffolds			c. Placing foot of ladder on a sand bag or a sole plate with a stop d. Maximum overhang of platform plank to be 150mm. 5.5 Determine the sizes of members used in timber gantry. 5.6 Construct and erect timber gantry on construction site. 5.7 State and apply all current safety regulation in the erection, maintenance and use of timber gantry. 5.8 Erect dependent and independent scaffolds to meet functional requirements. 5.9 Check scaffold		

	a. load to be carried, moving, dead and lateral; b. rigidity and stability through triangulation and correct sizes of materials used. 5.8 State procedures and method of erecting dependent and independent scaffolds. 5.9 Explain the advantage and disadvantage of using either wood or metal scaffold.			for strength, rigidity and stability. 5.10 Dismantle dependent and independent scaffold after use in accordance with procedure.		
Week 12	5.10 Determine the sizes of scaffold boards – width and thickness of wood-work platform, fender, maximum and minimum projection of board over the ledger in accordance with current safety regulations.	Explain the functions of ladder and steps, and state the sizes of timber used. With aid of sketches differentiate between timber gantry and scaffolds.	Models of scaffold Lesson note Posters/Pictures Drawing			Explain the purpose of a ladder Explain timber gantry with the aid of a detailed sketch. Differentiate between timber gantry

	5.11 State the purpose of ladder and step. 5.12 Determine the sizes of materials used for step and ladder. 5.13 State the difference between timber gantry and scaffold. 5.13 Sketch details of a timber gantry. 5.14 State and apply all current safety regulation in the construction, erection and dismantling of scaffolds.	Illustrate with sketches the details of a timber gantry, and state their sizes.				and scaffold.
Week13	Examinations: Practical: 70% Theory: 30%					

PROGRAMMES: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY		
Course/Module: CCJ 14 Carpentry II	**MODULE CODE CCJ 18**	**Total Contact Hours: 240HRS. Year 3, Term 2&3**

Goal: This module is designed to provide the trainee with the knowledge and skills to build and erect various permanent carpentry structures

General Objectives: On completion of this module, the trainee should be able to:

1. Understand the Methods and Techniques of Floor/Platform Construction and Finishing
2. Understand the Construction and Erection of Roofs and Ceilings in Different types of Building
3. Understand the different Methods of Measuring Roof Members to Determine the Length, Levels and Angles.
4. Understand How to Construct and Erect Partitions and Screens.
5. Understand How to Erect and Install Purpose-Made Joinery in Various Locations.
6. Understand Methods and Techniques of Construction, Erection and Finishing of Timber Building.
7. Understand the Techniques and Methods of Cladding Concrete and Steel Members in A Building.
8. Understand the Insulating Materials for Sound and Thermal Classes of Sound and Method of Heat Transfer.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY						
MODULE: CARPENTRY II			**MODULE CODE CCJ 17**			**Contact Hours: 2hrs Theory and 8hrs Practical**
MODULE SPECIFICATION: THEORETICAL CONTENT						
General Objectives 1.0: Understand the Methods and Techniques of Floor/Platform Construction and Finishing. Year 3, Term 2						
Week	**Theoretical Content**			**Practical Content**		**Evaluation**
	Specific Learning Outcome	**Teachers Activities**	**Learning Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	
Week 1-2	1.1Explain the purpose of floors/platforms 1.2Classify floors into ground and upper floors stating the main characteristics of each type. 1.3Classify upper floors into single, double and framed. State their applications. 1.4With aid of line diagrams, explain different types of floors, and their functions name e.g. sill, joist, girder (RSJ) trimming	Explain the purposes of timber floors and platforms. Explain the two classes of floors and their characteristics. Use sketches and explain the differentiate between the three classes of upper floor and state their application. Explain the distribution of loads in floor joists.	Lesson note Whiteboard and markers Picture Diagrams Sketches Drawings I.T teaching aids	1.1 Select materials and tools 1.2 Prepare floor joists and other components 1.3 Lay floor joists for floors/platforms to specification. 1.4 Fix struts to floor/platform joists. 1.5 Trim floor openings to receive stairs, trap doors, etc. to include methods of painting between trimmer, trimmed and trimming joists – butt and nailed joint, joist hangers, etc. 1.6 Fix flooring to	Select appropriate African timbers suitable for floor construction. Demonstration how joists struts, etc. are laid. Demonstration methods of trimming floor openings. Fix flooring to joists Apply suitable finish to flooring with students' participation	Describe the purpose of floors. Explain different types of floors. Explain the following - sill - joist - girder - floor boards

	stringer, sub floor, floor boards, etc. 1.5Explain floor joists as simple supporting beams with point and evenly distributed load. 1.6List Nigerian and West African timbers used for floor construction, their densities, ultimate stress and other characteristics and state how they are treated against fire and wood destroying agents – insects,fungi, etc.			joist or sub-floor and finish ready for polishing. 1.7 Apply suitable finish using one of the following: a. varnish/polish b. Pvc tiles.		
Week 3-4	1.7Explain the purposes, methods and applications of a) damp-proofing and ventilating suspended ground floor construction.b) Treatment of timber to avoid wood	Use sketches to explain the methods of supporting joists in floor and platforms, and the various tools used in floor construction.	Lesson note White board and markers Pictures Diagrams/sketches	1.8 Sketch detail of wood strip flooring and wood block flooring on a concrete floor showing details of fixing, etc. 1.9 Finish wood block and strip floor.	Demonstrate with students' participation, the steps involved in laying the floor joist for floors and platforms.	Explain the reasonsfor damp-proofing. Enumerate the tools used in floor construction

	destroying agents – insects, dry and wet rot, etc. 1.8 Explain methods of supporting joist in floors and platforms. 1.9Explain the tools, used in floor construction. 1.10 Explain the purpose of strutting in upper floors. 1.11Explain the common types of strutting: solid and herringbone. 1.12Explain types of floor coverings/finishing s (a) floor boards – tongue and groove (b) strip flooring on sub-floor of t and g and plywood sheet (c) wood block	Use Sketch toExplain the steps involved in laying the floor joist for floors and platforms. State and explain the function of strutting in upper floors. Use sketches to illustrate solid and herring-bone struttings and demonstrate how they are fixed in floor. Sketches to explain constructions different types of joints in laying floor board. Use conventional drawing to explain the differences between a sub-floor and normal wooden floor	Drawings I.T Teaching aids	1.10 Cost the flooring of a typical project, to include cost of materials, area of flooring, labour and overhead.		Describe the following terms - floor boards - wood block floor

	flooring. 1.13 Explain the difference between a sub-floor and a normal wooden floor. 1.14 State the purpose of a sub-floor. 1.15 Describe two methods of laying T&G sub-floor: (a) normal across the joists at right angle (b) diagonally across the joists; and state which one of the two methods is preferred and why. 1.16 Explain the composition of PVC tiles and where and why they are preferred to varnish/polish in certain areas of the building,	Use sketches to explain the two methods of laying sub-floors. Explain the advantages of PVC tiles over varnish/polish				

	e.g. bathrooms, kitchens, etc.					
General Objective 2.0: Understand the Construction and Erection of Roofs and Ceilings in Different types of Building. Year 3, Term 2						
Week 7-9	2.1 Explain the purpose of roof in a building. 2.2 Explain the basic functional requirements of a roof design and construction e.g. a. structurally stable to withstand wind and roof covering material loads. b. Aesthetics to enhance the architectural features of the building it is to cover (c) functionality. 2.3Explain the following terms and parts associated with roof/ceiling construction (a) span	State the functions of roof on a building. State the design requirements of roofs. Make a sketch of a roof and explain the various roof terms and parts. Explain the functions of the roof parts. State the sizes of roof members. Enumerate the reasons for choosing a specific local timber for roof construction. State factors that determine the	Lesson note White board and markers Pictures Diagrams/sketches Drawings I.T Teaching aids	2.1 Prepare working drawing 2.2 Select tools and materials 2.3 Prepare materials/components of roof truss members. 2.4 Construct and erect a roof truss to support the following roof coverings a) corrugated iron sheets b) Roof Tiles c) Long Span Aluminium Roof Sheets: explaining the main characteristics of roof truss to support the various materials to ensure safety. 2.5 Sketch details arrangements of members for the	Demonstrate with students' participation the methods of constructing roof with tie beam, rafter, purlin, structs, king post, facia board fixed to wall plate.	Describe the functional requirements of roof design. Construct a model ceiling, showing the different arrangements of joist and noggings. Explain the sizes of members of a roof truss. Explain the species of local timbers used for roofing. Explain how timber is treated to prevent it from attack by wood

	(b) pitch (c) rafter (d) strut (e) tein-beam (f) rise (g) ridge (h) wall plate (i) eaves (j) fascia 2.4Explain the functions of the following components of a timber roof: (a) rafter (b) purline (c) fascia board (d) wall plate (e) struts (f) tie beam/ceiling joist (g) wall plates. 2.5Explain the basic factors that determine (a) the slope of the roof (b) the design of the structural framework of the roof	slope of a roof.		ceiling at the eaves of a pitched roof e.g. flat ceiling and parallel eaves to pitch of roof. 2.6 Construct a ceiling and install covering and battens (where necessary as finishing. 2.7 Trim opening in a ceiling and finish up as appropriate.		destroying agents.

	(c) the method of construction and erection- prefabricated or erect in-situ, etc. 2.6Explain the sizes of members of a roof truss. 2.7Explain the species of local timbers used for roofing and how the timber is treated to prevent it from attack by wood destroying agents.					
	2.8 Explain the common types of ceiling used for domestic building. 2.9 State and Explain factors that determine the structural arrangements of the ceiling members. 2.10 Select suitable Nigerian timbers for constructing the	Enumerate the common types of ceilings. Use line diagrams to explain the arrangements of ceiling members. Explain the factors that determine the structural arrangements of ceiling members	Lesson Note White board Markers Charts Pictures I.T Teaching aids Video Clips	2.8 Draw line diagrams showing the arrangements of ceiling joists and noggings for different types of construction	Supervise the construction of roof and ceiling by students. Demonstrate to students using videoclips the installation of different ceilings Visit a construction site to engage the students in real	

	structural frame-work for a ceiling and methods of preservation against wood destroying agents. 2.11Explain the various materials used for covering ceilings e.g., soft-board, cardboard, asbestos sheet, plywood, wooden and metal states, etc.	State and explain the reasons for selecting specific timber for ceiling construction and explain the preservation methods. List the ceiling covering materials and explain their advantages.			practical work.	
General Objective 3.0: Understand the different Methods of Measuring Roof Members to Determine the Length, Levels and Angles. Year 3, Term 2						
Week 10-12	3.1 List different measuring tool required in measuring Length and angles of roof members 3.2 Explain how to calculate different angles in relation to the width of the buildings using measuring tools.	Explain in details the types of measuring tool and their specification. Explain how to measure roof members in accordance to the building drawing.	Measuring Tape Steel Square Lesson Notes I.T Teaching aids Drawing/Pictures White Board and Markers	3.1 Demonstrate the use of different measuring tool with students' participation. 3.2 Use different measuring tools to measure length and angles of roof members	Demonstrate the use of different measuring tool in measuring different types of roof members with the student's participation	Enumerate different measuring tool required in measuring Length and angles of roof members

Week 13	Examinations: Practical 70 % Theory 30%					
General Objective 4.0:Understand How to Construct and Erect Partitions and Screens. Year 3, Term 3						
Week 1-3	4.1 Explain the difference between a screen and a partition. 4.2 State the basic requirements of a good partition e.g. (a) structural stability (b) aesthetics (c) ease of fixing and removal when necessary. 4.3 State the function of the following components of a partition (a) struts (b) sill (c) head (d) noggings (e) sheeting/facing panel (f) brace/strut. 4.4 Select suitable	Explain in details the difference between a screen and a partition Explain the basic requirements of a good partition. Explain the various components of a partition. use drawing and diagram where necessary. Explain the reasons for selecting specific timber for partition construction. Explain the purpose of insulating partitions. Mention and explain some	Lesson note White board Charts Pictures Diagrams Video Clips I.T Teaching aids	4.1 Make and interpret working sketches/drawings of a partition and write simple specifications of materials and construction techniques as appropriate. 4.2 Sketch details of methods of framing various parts of a partition together and select tools and materials for the job. 4.3 Construct and fix student partition. 4.4 Finish the partition ready for polishing or painting. 4.5 Sketch various types of screens (a) panelled – raised and flush (b) louvered (c) free standing (d) glazed.	Give the students group project to carry out 4.1 –4.8 while observing safety precautions. Guide the students to undertake any of the prospects.	Differentiate between Screens and Partitions. Enumerate the basic requirement of a partition. Explain - struts - sill - nogging Explain face panel and its functions.

	timber and other materials (a) abura (b)afara (c) mahogany (d) plywood (e) hardboards 4.5 Explain the function of a face panel on a partition. State the purposes of insulation in a partition e.g. (a) prevent/reduce sound transmission from one room to the other (b) reduce beat transmission from one room to the other	insulating materials		4.6 Construct any of the screens listed above using both hand and machine tools. 4.7 Finish screen and install as appropriate. 4.8 Select the materials used for insulating partitions e.g., softboard, quilt, etc. their characteristics and apply as appropriate. 4.9 Apply appropriate safety precautions while undertaking the installations.		
General Objective 5.0: Understand How to Erect and Install Purpose-Made Joinery in Various Locations. Year 3, Term 3						
Week 4-6	5.1 Read drawings/blue print and specifications of prefabricated/purpose-made joinery and carpentry items and locate where the items will be installed.	Explain the procedure involved in interpreting drawings and specifications. Use drawings to explain the various methods of fixing	Lesson note White board Charts Pictures Diagrams	5.1 Install and finish one of the following joinery items on site a) door and window frame b) sliding door c) wall panels – flush or framed d) screens e) counters and kiosks	Guide the students to interpret drawings and specifications of fabricated purpose made joinery and carpentry items. Demonstrate the	2 Explain the principles of modular construction Explain the methods of fixing woodwork items to

	5.2 Explain the principles of modular construction and their application in pre-fabricated joinery and carpentry items. 5.3 Explain the methods of fixing woodwork items to different part of a building and appropriate provision for fixing and installation of services and fixtures. 5.4 Select and describe appropriate tools and equipment used for installation and fixings of joinery and carpentry fixtures e.g. hammer, screwdriver, portable power	joinery & Carpentry fixtures to building e.g. block or brick wall and concrete floor. Explain the use of appropriate tools for fixing and installation of timber buildings on site.	Video Clips I.T Teaching aids	f) kitchen unit and kitchen shelves g) staircase and handrail h) built-in wardrobes i) hang doors and sashes, and install louvers j) joists for a wooden floor/platform k) picture rails l) insulation material. 5.2. Apply appropriate safety precautions while undertaking the installations.	principles of modular constructions and their application to pre-fabricated joinery and carpentry items Demonstrate various methods of fixing wood work items to different building structure Demonstrate the use of appropriate tools and equipment for the installation and fixing of joinery and carpentry items.	different part of a building

	tools, etc.					
General Objective 6.0: Understand Methods and Techniques of Construction, Erection and Finishing of Timber Building. Year 3, Term 3						
7-8	6.1 Explain the difference between the following (a) temporary (b) semi-permanent (c) permanent buildings giving examples of each type. 6.2 Explain the basic principles of design in timber buildings listed in item 6.1 e.g. (a) temporary buildings – site buts, security kiosk at entrance exhibition stands (b) semi-permanent – classrooms, living homes, offices etc. (c) permanent buildings living homes, offices, etc. 6.3 Explain the	Use Sketches to explain the various kinds of buildings and explain the differences between the two main types of timber building. State and explain the reasons for the selection of timber and materials. Explain the procedure of preparing site for building base. Use sketches to explain purpose and various components of a timber building.	Lesson note White board Charts Pictures Diagrams Video Clips I.T Teaching aids Plank Timber Tools and Equipment for Site preparation Drawing materials	6.1 Prepare site for the erection of timber building by: (a) constructing elevated platforms of steel or timber, or (b) building a concrete foundation/oversite concrete with rag bolts set in various positions to provide fixing for sill. 6.2 Draw/sketch constructional details of (a) a temporary timber building suitable for a site office, a guard's hut, etc. (b) a semi-permanent or permanent timber building for domestic purposes using either platform or balloon construction. 6.3 Select tools and prepare materials.	Instruct the students on the procedure of preparing site for building base. Explain the constructional details with the aid of drawings and sketches. Demonstrate with the student's participation, the procedure involved in constructing and erecting timber building, observing safety precautions.	Differentiate between - temporary building - semi-permanent building -permanent building Explain the importance of (a) elevated concrete foundation and oversite concrete (b) damp-proof membrane between concrete/block wall and timber framing (c) preserving structural timber members.

	difference between platform and balloon construction used in timber frame construction. 6.4 Select suitable sizes and types of timber and other materials used for timber buildings, insulating materials, timber products and finishing, etc. State their characteristics and specific area of applications. 6.5 Explain the importance of (a) elevated concrete foundation and oversite concrete in timber building construction (b) damp-proof membrane between concrete/block wall and timber framing (c) preserving			6.4 Construct timber buildings by: (a) erecting the timber frames on concrete/steel base (b) selection and fixing of interior and exterior finishing to the building. 6.5 Erect temporary and semi-permanent buildings using pre-fabricated timber building components, and finish for use as appropriate to client's description. 6.6 Apply safety and building regulation while performing the jobs		

	structural timber members. 6.6 List and state the functions of the following component of a timber building (a) stud (b) sill (c) head (d) door head (e) window head (f) braces (corner let-in frame construction) (g) sheathing (h) ribbon (let-in) for balloon framing only (i) braces – diagonal for balloon construction.					
General Objective 7.0: Understand the Techniques and Methods of Cladding Concrete and Steel Members in A Building. Year 3, Term 3						
9-10	7.1 Explain cladding and state the purposes of cladding in building e.g., improve aesthetics, cheap surface-brickwork,	Explain the use of claddings Explain with sketches showing various types of claddings.	Lesson Plan Chalk board Charts Workshop rod.	7.1 Select Nigerian timbers and other materials used for cladding: (a) ground (b) finishing; and give reasons for the choice.	State reasons for selection of particular timber for cladding. Guide the student in the installation	Define cladding State purposes of cladding Enumerate

	stee, etc. 7.2 Describe with sketches types of cladding used in building construction (a) wall panelling (b)column/stanchion and steel beam casing (c) suspended ceilings. 7.3 Read and interpret working drawings and specifications of sections to be cladded. 7.4Calculate the materials to be used for a cladding project and the cost using present rates.	Teach the students how to interpret working drawing and specifications related to claddings. Calculate the materials needed for a particular cladding work.		7.2 Select various hand and powered tools may be used for the cladding project. 7.3 Install grounds to steel or concrete to receive various fixings. 7.4 Fix cladding and finish for painting, varnishing or polishing.	of specified cladding to industry specification.	types of cladding. Calculate the materials to be used for a cladding project and the cost using present rates.
General Objective 8.0: Understand the Insulating Materials for Sound and Thermal Classes of Sound and Method of Heat Transfer. Year 3, Term 3						
10-12	8.1 Define sound insulation in relation to building	Define ‘sound’; ‘sound insulation’ and explain the effect of sound in	Lesson Plan Chalk board Charts.	8.1 Select appropriate sound /thermal insulation materials	Select appropriate insulation project and ask students to carry out in	Describe sound/thermal insulation in building

	8.2 Describe types and sources of sound production in building. a. Air borne – speech, music, air-craft, noise etc. b. Impact – footsteps, hammering, door slamming etc. 8.3State basic insulation materials e.g., slag wood, wall boards, quilts, felt, fiber glass etc. and describe the application in building. 8.4 Mention the purpose of thermal insulation in building e.g., prevent heat, loss during cold weather, and heat gain during hot weather. 8.5 State various processes of heat	buildings. Use question and answer technique to explain sources of sound Explain the application of sound insulating materials. Explain the purpose of thermal insulation with definition. Explain the processes of heat transfer and part of building where heat loss occurs. Ask students to mention possible areas through which heat can escape in a building.		8.2 Select tools for sound/thermal insulation job. 8.3 Fix insulation materials to specified building component e.g., wall 8.4 Finish insulation to specification	group	construction Enumerate the basic material used for insulation in building construction

	transfer in a building e.g., conduction, convection and radiation. 8.6 List common areas of heat loss in a building.					
Week 13	Examinations: Practical 70% Theory 30%					

ADVANCED NATIONAL TECHNICAL CERTIFICATE

CURRICULUM AND MODULE SPECIFICATIONS

IN

CARPENTRY AND JOINERY

INSERT MODULE BUILDING SCIENCE I

INSERT MODULE BUILDING SCIENCE II

INSERT MODULE BUILDING DRAWING II

PROGRAMME: ADVANCEDNATIONAL TECHNICAL CERTIFICATE IN CARPENTRY & JOINERY	
Module: Advanced Joinery	**MODULE: CCJ 23.**
Total Contact Hours:	**240 HRS**

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 Blue Prints and Specifications of Joinery in A Drawing and Produce Working Drawing Route Sheets/Rods for Mass Production Work.
2. Understand the process of Estimating and Costing of Joinery Projects.
3. Understand the Techniques and Process of Mass Production and Be Able to Mass Produce Joinery Items of All Types.
4. Design and Construct Specialized (High Class) Items of Joinery Furniture.
5. Understand the Techniques and Procedures of Producing Formwork for Stair Case.
6. Undertake the Construction Joinery Involving Geometry 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, produces 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 23**		**Total Contact Hours: 240HRS. Year 1, Term 1 & 2**	
Module Specification: Theoretical and Practical Content						
General Objective: 1.0 Read Blue Prints and Specifications of Joinery ina Drawing and Produce Working Drawing Route Sheets/Rods for Mass Production Work. Year 1, Term 1						
Week	**Theoretical Content**			**Practical Content**		**Evaluation**
	Specific Learning Objection	**Teachers Activities**	**Learning Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	
1-4	1.1Explain symbols used for various items of joinery, furniture and other building components in architectural drawings. 1.2Develop and interpret specifications of any joinery item/work. 1.3Compare and contrast the use of route sheets and workshop rod in the production process.	Enumerate symbols used for various items of joinery, furniture and other building components in architectural drawings. Choose a joinery item and develop specification notes for its constructions. With the aid of sketches, compare and contrast the use of route sheet	Lesson note White board Charts Model of a joinery item. Drawing Materials Plywood Writing Materials I.T Teaching aids	1.1Make various furniture and joinery items 1.2 Make route sheets/workshop rod as appropriate and cutting list required for joinery project. 1.3 Make jigs and templates and production tooling for mass production work. 1.4 Make items of joinery according a given specification	Prepare preliminary sketches of joinery items. Ask the students to develop them into working drawings and prepare cutting lists. Demonstrate production processes of templates and jigs and clearly outline difficulties that will be encountered and enumerate the advantages and disadvantages	Explain symbols used for various items of joinery, furniture and other building components in architectural drawings. Differentiate route sheets and workshop rod in the production process. Explain the advantages and disadvantages of route sheets.

	1.4 Explain the advantages and disadvantages of route sheets and rods in the production of joinery. 1.5Make exploded sketch/drawing of any joinery items from design sketch or architects working drawings and write out part list/cutting list.	and workshop rods in production process of joinery items and state their advantages and disadvantages. Prepare preliminary sketches of joinery itemsand develop them into working drawings and prepare cutting lists.				Explode a sketch/drawing of any joinery item and write out part list/cutting list
General Objective 2.0: Understand the process of Estimatingand Costing of Joinery Projects. Year 1, Term 1						
5-7	2.1Explain the terms'estimating'and 'costing' and state their significance in a joinery manufacturing business. 2.2State the basic elements of an estimate/cost: e.g. a. materials	Define the terms "Estimating" and "Costing" and state their difference and significance in joinery works. Ask the students to choose a joinery item and	Lesson note Whiteboard Charts Current price list of building materials. Working Drawings			Explain the terms 'estimating' and 'costing' and state their significance in a joinery manufacturing business. State the basic elements of an estimate/cost:

	b. labour c. overhead d. profit 2.3 Explain why labour is the most difficult item to estimate for. 2.4 Determine completion time and cost of materials for a project to be mass produced. 2.5 Cost a typical joinery item and compare the unit cost of a custom and a mass-produced joinery item. 2.6 Extract from a bill of quantities all joinery and related items. 2.7 Measure from working drawing and produce a bill of quantities for a	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	I.T Teaching aids (Costing and Estimating Software)			e.g. a. materials b. labour c. overhead d. profit Explain why labour is the most difficult item to estimate for. Extract from a bill of quantities all joinery and related items. Using a working drawing develop a bill of quantities for a specified joinery item.

	specified joinery item. 2.8 Price the joinery item in a bill of quantities using current rates.	specifications and prepare its bill of quantities. Introduce the students to costing and estimating software.				
General Objective 3.0:Understand the Techniques and Process of Mass Production andbe able to Mass Produce Joinery Items of All Types. Year 1, Term 1						
8-10	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	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	Lesson note White board Charts Hand tools Equipment Materials. I.T Teaching aids Video Clips	3.1 Design and draw a specified joinery item suitable for mass production. 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. 3.3 Carry out production tooling for the mass production of components of a chosen joinery/wood	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	Describe mass production State the basic principles of mass production – work layout, production flow, equipment layout, etc. Differentiate between designs and working drawings for customary and mass production. State the importance in mass production

	and its importance in mass production work. 3.5Explain 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.	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.		work item e.g. a. jigs and fixtures for repetition works; b. making of templates. 3.4 Mass produce a specific marketable item of joinery involving frame and carcass construction and various finishing's, e.g., panel door, flush door.	local factory	of interchangeability of parts and how this can be easily achieved.
General Objective 4.0: Design and Construct Specialized (High Class) Items of Joinery Furniture.Year 1, Term 1						
11-14	4.1 Explain the special characteristics of high-class joinery items. a. exhaustive and classical designs such as mouldings, etc. b. high class finish etc.	Use question and answer approach to explain the special characteristics of high-class joinery. Use question and	Lesson note White board and markers Charts Models Drawings	4.1 Design and draw details of a specified high class joinery item including detailed specification of materials, method of construction, finishing and installation. 4.2 Construct at least one specialized item	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.	State the special characteristics of high-class joinery items. Describe the main features of special joinery items in public buildings

	4.2 Describe the main features of special joinery items in public buildings such as: (a) Church furniture – pews, pulpit, priest chair and desk and chair stall (b) Office furniture – reception counters, writing desks, etc. (c) Shop-fittings – display counter for various items such as jewelry, watches, etc. (d) Educational Furniture 4.3 Cost the job for any of the items above relating actual cost to the current rate. 4.4 Explain the importance of finishing the tops and fronts of	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.	I.T Teaching aids (Estimating and Costing Software) One High-Class Joinery item	of furniture as a group project and as an individual project to industry standard. Such items as: - church Pew, Shop counter, lectern, pulpit, conference table, etc. May be considered.	Ask the students to construct the selected item of furniture to specified standard of finish.	State the importance of finishing the tops and fronts of counters

	counters with such materials as marble, granite, laminated plastic covering or glass.					
General Objective 5.0: Understand the Techniques and Procedures of Producing Formwork for Stair Case.Year 1, Term 2						
15-20	5.1 Sketch/draw detail of formwork for straight flight stair 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 White board and markers Charts Drawing Instrument. I.T Teaching aids (Drawing Software)	5.1 Design formwork for stairs 5.2 Calculate pitch and rise 5.3 Determine tread and riser 5.4 Produce working drawings 5.5 Prepare cutting list 5.6 Produce template for string 5.7 Cut and produce components for formwork. 5.8 Assemble components ready for pouring of concrete.	Demonstrate with the student's participation the design, preparation and assembly of unit components of formwork for different flight of staircase Guide students to produce formwork for straightflightstaircase.	Draw detail of formwork for straight flight stair Calculate the height of rise and width of treads. State the advantages of manufactured board in formwork.
General Objective 6.0: Undertake the Construction Joinery Involving Geometry Single Curvature.						
21-24	6.1 Define single	Use drawing to	Lesson note	6.1 Design, draw and	Direct the students	Define single

	curvature and list examples of the items of joinery so classified, e.g. a. bull's eye window b. Doors and windows with shaped head c. Shaped mirror frame. d. Furniture items	explain single curvative of a specified joinery item.	White board and markers Video Clips I.T Teaching aids Charts. Models	write specifications for producing one of the following items: bull's eye window. Door or window with shaped head, and shaped mirror head. 6.2 Develop templates for working out and jigs for cleaning up: a. the rings of the frame for the shaped head; b. the position of trenches for a bull's eye 6.3 Produce the rings using both hand and machine tools. 6.4 Join the rings to produce a continuous ring using the hammer head key/handrail bolt which ever one is more convenient. 6.5 Produce the chosen item of joinery of single curvature.	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 single curved furniture items.	curvature and list examples

				6.6 Clean up ready for fixing.		
	Examinations: Theory 30% Practical - 70%					

PROGRAMME: ADVANCEDNATIONAL TECHNICAL CERTIFICATE IN CARPENTRY & JOINERY	
Module: Advanced Carpentry	**MODULE CODE; CCJ 24.**
Total Contact Hours:	**240 HRS. Year 1 Term 3**

GOAL: To provide the trainee with further knowledge and the skills required of a master craftsman capable of undertaking very complicated project related to the trade

General Objectives

1. Understand the Basic Design Requirements for the Construction and the Erection of Timber Platforms.
2. Understand the Principles of Design, Erection and Stripping of Various Types of In-Situ and Precast Concrete Forms.
3. Understand the Requirements of Construction and Erection of Roofs and Ceilings on Buildings Spanning Over 10m.
4. Understand Different Types of Doors and Their Installation.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN CARPENTARY AND JOINERY					
Module: Advanced Carpentry			**MODULE CODE: CCJ 21**	**CONTACT HOURS: 4hrs Theory and 16hrs Practical**	
Course Specification: Theoretical and Practical Content					
General Objective 1.0: Understand the Basic Design Requirements for the Construction and the Erection of Timber Platforms. Year 1, Term 3					
Week	**Theoretical Content**		**Practical Content**		**Evaluation**
	Specific Learning Objective	**Teachers Activities**	**Learning Resources**	**Specific Learning Outcomes**	**Teacher's Activities**	
Week 1-3	1.1Explain the basic considerations in the design of timber structure spanning various openings e.g. a. Suitability for intended purpose b. Structural stability to take the specified span c. Ease of erection and finishing	List examples of basic considerations in the designs of timber structure over a span of 10m. Define types of structural loads. (Live and dead loads). Use calculation and graphical methods to explain forces acting on a structural beam.	Lesson note White board and Markers Charts Graph Sheets I.T Teaching aids	1.1Produce detailed working drawing of built-up structural timber beam. 1.2Prepare cutting list for the specified built-up structural timber beam. 1.3Construct any built-up structural timber beam and apply it appropriately to a specified construction work: a. built-up girder b. I-beam c. Box beam	Guide the students to construct a built-up structural timber beam, explaining their advantages and disadvantages over solid timber beams. Guide the students to prepare cutting list for the specified built-up structural timber beam Guide the students in designing, constructing and fixing timber	State the basic considerations in the design of timber structure spanning various openings Explain the following structural loads: dead load, point, distributed and rolling load and their effect on the stability of the structure. Give assignment

	1.2Define the following structural loads: dead load, point, distributed and rolling load and their effect on the stability of the structure. 1.3Determine by calculation or graphical method the following forcesacting on a structural beam: a. the reaction at support b. shear force c. bending moment			d. Laminated beam 1.4Design, construct and fix any of the following timber structures in position on site. 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).	footbridge across a small stream; wooden stage and spectator's stand.	to students: Use calculation and graphical methods to determine moment of resistance of a typical timber beam
	1.4Explain the main advantages and disadvantages of built-up structural beams and solid timber beams.					State the main advantages and disadvantages of built-up structural beams and solid timber beams.

	1.5Determine the moment of resistance of a typical timber/built-up timber beam showing the neutral axis, the maximum compressive and tensile stresses.					
General Objective 2.0: Understand the Principles of Design, Erection and Stripping of Various Types of In-Situ and Precast Concrete Forms. Year 1, Term 3						
Week 4-5	2.1Explain the basic design requirements for forms in-situ and pre-cast concrete work: 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	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	Lesson note Whiteboard and markers Charts Drawings Pictures Material I.T Teaching aids P.P.E Kits	2.1Design, draw and interpret working drawings of formwork for any of the following in-situ concrete structures: a. barrol vault b. domed roof c. circular concrete tanks d. geometrical/spiral stairs. Specific peculiarities of the various items listed above should be made quite clear. 2.2Construct, erect, and strip formwork for any of the in-situ	Lead 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.	State the basic design requirements for forms in-situ and pre-cast concrete work State the properties of fluid concrete and its effect on the design of formwork State how mouldings and circular shapes in concrete are allowed for in the design and

	concrete. e. Re-use of materials used for forms/moulds. 2.2Explain the properties of fluid concrete and its effect on the design of formwork. 2.3Explain how mouldings and circular shapes in concrete are allowed for in the design and construction of forms. 2.4Select suitable timber and other materials used for formwork structure.	construction of forms. Explain the suitability of certain timber other materials for formwork constructions.		concrete structures listed above applying appropriate safety precautions. 2.3Design, draw, construct, erect and strip mould for pre-cast concrete of any shape.		construction of forms.
	2.5Explain the effect of the cost of formwork on: the choice ofmaterials	Discuss with the student the effect of the cost of formwork.				State the effect of the cost of formwork on: the choice of materials

	construction methods; when necessary. 2.6Discuss properties of formwork systems including those of materials other than timber, their advantages and disadvantages, erection and stripping.	Explain in detailspropertie s of formwork systems including materials other than timber, stating their advantages and disadvantages and procedures for erecting and stripping.				construction methods; when necessary. Explain properties of formwork systems including those of materials other than timber, their advantages and disadvantages, erection and stripping.
General Objective 3.0:Understand the Requirements of Construction and Erection of Roofs and Ceilingson Buildings Spanning Over 10m. Year 1, Term 3						
Week 6-10	3.1Explain the basic requirements of construction of a standard roof truss and ceiling for an opening over 10m span.e.g. a. adequate pitch to throw out rain water; b. aesthetics c. structurally sound to carry	Use sketches and discussion approach to explain the basic requirements for construction of a standard roof truss and ceiling for a span of 10m and above. Guide the students to	Lesson Note Whiteboard Charts. Drawing Instruments I.T Teaching aids Preservatives for timber treatment	3.1Draw details of construction of: a. standard domestic or industrial type roof trusses and ceiling where necessary for spans over 10m 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 –	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	State the basic requirements of construction of a standard roof truss and ceiling Construct the shape of roof surface to be covered showing the roof members State the purposes of roof ventilators in buildings

	roofing materials and ceiling and withstand wind pressure. 3.2Develop the shape of roof surface to be covered showing the roof members 3.3Write specifications of timber – type, characteristics and sizes, and other materials used in roof and ceiling construction. 3.4Determine either by calculation or graphically, the forces acting on each member of a roof truss, stating if the stress in the member is	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.		10m including: (i)banol roof (ii)domical roof – semispherical and octagonal (iii)shell roof – hyperbolic paraboloid stating their applications. 3.2Construct at least one of the various roofs mentioned above 3.3Install roof lights and ventilators in a roof. 3.4Trim openings for roof light and ventilators. 3.5Draw or sketch detailed arrangements of ceiling joists and noggings for specific type of ceiling and produce them 3.6Preserve ceiling joists and noggings against wood	roof light. Use geometrical constructions to explain to students. 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.	

	tensile or compressive force. 3.5 Explain the purposes of roof ventilators in buildings.			destroying agents. 3.7Construct ceiling framework and fix ceiling boards. 3.8Finish ceiling by fixing ceiling battens (where necessary) and corner moulds.		
	3.6Identify types and characteristics of common ceiling materials with Regards to sizes and method of fixing: a. timber plates; b. celotex boards; c. acoustic ceiling tiles d. flat asbestos sheets e) PVC f) POP g) Suspended Ceiling. Etc. 3.7Develop the true shape of the	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.				

	intersection of dormer or other roof lights with the main roof.					
General Objective 4.0: Understand Different Types of Doors and Their Installation. Year 1, Term 3						
Week 11-12	4.1Describe the main features of a sliding/folding doors and understand the purposes and features of sliding/folding doors. 4.2Describe the types of sliding and folding doors and select appropriate sliding gear.	Use drawings and discussion method to explain the features of sliding and folding doors and state their purposes. Use sketches to explain the characteristics of siding and folding door and the factor affecting the choice of gears	Lesson note White board and markers Charts I.T Teaching aids Sliding/Folding Doors	4.1Install sliding and folding doors or screen as appropriate. 4.2Finish up the door or partition.	Use sketches and explain the characteristics of folding and sliding door. Guide students to install sliding and folding doors.	State the main features of a sliding folding doors and understand the purposes and features of sliding and folding doors. Explain the types of sliding and folding doors and select appropriate sliding gear.
Week 13	Examinations: Theory - 30% Practical - 70%					

Carpentry & Joinery Tools and Equipment

S/NO	TOOLS	MIMIMUM QUANTITY REQUIRED	QUANTITY AVAILABLE
1.	Paint brushes (various sizes)	10 (Each)	
2.	Marking gauge/mortise gauge	20	
3.	Marking knives	20	
4.	Try square	20	
5.	Mitre square	20	
6.	Sliding bevel	20	
7.	Measuring tape (metric) (Different sizes)	10 (Each)	
8.	Jack plane	20	
9.	Smoothing plane	20	
10.	Rebate plane	10	
11.	Multi-plough plane	10	
12.	Spoke shaves (straight/round)	20	
13.	Rip saw	10	
14.	Crosscut/hand saw	10	
15.	Tenon saw	10	
16.	Panel saw	10	
17.	Coping saw	10	
18.	Key hole saw	10	

19.	Dovetail/back saws	20	
20.	Firmer chisel	20 sets	
21.	Mortise chisel	10 sets	
22.	Turning chisel	5 sets	
24.	Twist bits	5 sets	
25.	Counter sink	5	
26.	Rose	5	
27.	Rachet braces	10	
28.	Breast drills	10	
29.	Drill bits	5 sets	
30.	Screw driver (set of 6)	10 sets	
31.	Mallet	20	
32.	Craw hammer	10	
33.	Pein hammer	10	
34.	Warington hammer	10	
35.	Bradwal	10	
36.	Pincers	10	
37.	`F' cramp	10	
38.	Sash cramp	10	
39.	Gee (`G') cramp	10	

40.	Bench-hold fast	10	
41	Pocket hole jigs	20	
42	Right angle clamp	10	
43	1-2-3 Setup Blocks	10	
44	Router tool	10	
45	Lock Mortiser	10	
46	Modern clamps	10	
MISCELLANEOUS			
1	Triangular files (set)	5 (Sets)	
2.	Flat files	5 (Sets)	
3.	Scraper (flat)	20 (sets)	
4.	Dividers	10 (Set)	
5.	Round files (set)	5 (Sets)	
6.	½ Round files	5 (Sets)	
7.	Scraper (cabinet)	10 (sets)	
8.	Calipers (set) inside and outside	10 (sets)	
9.	Dowelling jig	5 (sets)	
10.	Rasps	10 (sets)	
11.	Drawer slide jig	10 (sets)	
12.	Edge ruler	10 (sets)	

13.	Multi-mark tool	10	
14.	Digital protractor	10	
15	Brad Nailer	10	
16	Wood moisture meter	10	
UTILITIES			
1.	Extinguishers (including fire buckets)	8	
2.	Workbenches (computer)	15	
3.	First aid box	2	
4.	Shop vacuum	2	
MACHINE WOODWORKING SHOP			
1.	Circular saw bench (Einhell 4340490 Bench type)	1	
2.	Thicknesser(Heavy Duty Baileigh Industrial Thicknesser)	1	
3.	Surface planner (Caselli group SA)	1	
4.	Wood-lathe (Jet 121vs Variable Speed)	2	
5.	Band saw (High Speed band saw- VT-350m)	1	
6.	Compressor & spraying units (Modern)	1	
7.	Wood jointer (Modern)	1	
8.	Drill press (Modern)	2	
POWER TOOLS (OPTIONAL)			
1.	Circular saw (Handheld)	5 sets	

2.	Planer	1	
3.	Orbital sander	1	
4.	Disc sander	1	
5.	Jib saw	1	
6.	Blower	1	
7.	Sprayer (Airless paint sprayer)	1	
8.	Drill	1	
9	Rotary tool	1	
10	Nail Guns	2	
11	Mitre Saw	2	
Modern Teaching Aids			
1	Projector / K-Yan	2	
2	Desktop/Laptop Computer	2	
3	White Board and Markers	1 per class	
4	Printers (A1, A2, A3)	1 (Each)	
5	Software (Revit, Costing/Estimating software, AutoCAD)		
PERSONAL PROTECTIVE EQUIPMENT (P.P.E Kits)			
1	Gloves	20	
2	Respirators	20	

3	Eye Protection (Goggles)	20	
4	Safety Footwear (Steel Tip Boots)	20	
5	Hearing Protection (Ear Plugs/Ear Defenders)	20	

NATIONAL/ADVANCED TECHNICAL CERTIFICATE IN REFRIGERATION AND AIRCONDITIONING WORK

GUIDELINES FOR TEXT BOOK WRITERS

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 points for normal text and 14 points 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 use 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. Examples should draw from Nigeria wherever possible, so that the information is set in a country text.
10. Each chapter should end with student self-assessment questions (SAG) so that students can check their own master of the subject.
11. Accurate instructions should be given for any practical work having first conducted the practical to check that the instructions do indeed work.
12. The books must have a proper index or table of contents, a list of references and an introduction based on the overall course philosophy an aim of the syllabus.
13. Symbols and units must be listed and a unified approach used throughout the book.
14. In case of queries regarding the contents o the books and the depth of information, the author must contact the relevant curriculum committee via the National Board for Technical Education.

15. 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.

UNESCO-NIGERIA PROJECT IN SUPPORT OF REVITALIUSATION OF TECHNICAL AND VOCATIONAL EDUCATION(TVE) IN NIGERIA

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