

Furniture Design and Construction - National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC)

Curriculum and Module Specifications - August 2001

National Board for Technical Education, Kaduna

NATIONAL TECHNICAL CERTIFICATE AND ADVANCED NATIONAL TECHNICAL CERTIFICATE
PROGRAMMES



Furniture craft practice

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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

Craft Programme

Candidates must not be less than 14 years of age and should have successfully completed three years of Junior Secondary education 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:

General Education courses, which account for 30% of the total hours required for the programme. Trade Theory, Trade Practice and Related Studies, which account for 65% and Supervised Industrial Training/Work Experience, which accounts for about 5% 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/Modules

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 behavioural objectives have been used as the curriculum. They are:

General Objectives

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 in:

Orthographic projection in engineering/technical drawing;

Loci in Mathematics

Basic concepts of politics and government in Political Science

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 of 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 polytechnics or colleges of education (technical) for ND or NCE courses respectively. The Social Studies component is designed to broaden the trainee's social skills and his understanding of his environment. For the 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 Certification

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.

INTEGRATED APPROACH IN THE TEACHER 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, qualified persons in these fields will teach mathematics and physical science 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 been 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. All students who have successfully completed their modules will take a national examination. The final award will be based on the aggregate of the scores attained in the course work and the national examination.

Curriculum Table (NTC)

CURRICULUM TABLE AND COURSE HOURS/WEEK

COURSE: NATIONAL TECHNICAL CERTIFICATE PROGRAMME: FURNITURE DESIGN & CONSTRUCTION

S/No	Subject Code	Module	YEAR 1						YEAR 2						YEAR 3						Total Hours		
			Term 1		Term 2		Term 3		Term 1		Term 2		Term 3		Term 1		Term 2		Term 3				
			T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P			
																						216	
1	CMA 12-15	Mathematics	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	2	-	288
2	CEN 11-17	English	2	-	2	-	2	-	3	-	3	-	3	-	3	-	3	-	3	-	3	-	288
3	CPH 10-12	Physics	2	-	2	-	2	-	2	1	2	1	2	1	2	1	2	1	2	1	2	1	288
4	CCH 11-12	Chemistry	2	-	2	-	2	-	2	1	2	1	2	1	2	1	2	1	2	1	2	1	288
5	CEC 11-13	Economics	2	-	2	-	2	-	2	-	2	-	2	-	2	-	-	-	-	-	-	-	216
6	CBM 11	Entrepreneurship	-	-	-	-	-	-	2	-	2	-	2	-	-	-	-	-	-	-	-	-	72
7	CTD 11-13	T/Drawing	-	3	-	3	-	3	-	3	-	3	-	3	-	2	-	2	-	2	-	2	288
8	ICT 11-15	Computer Studies	-	-	-	-	-	-	1	2	1	2	1	2	1	2	1	2	1	2	-	-	180
9	CME 11	General Metal Work I	2	5	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	168
10	CME 12	General Metal Work II	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60
11	CMW 11	Machine Woodworking I	2	8	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	240
12	CMW 12	Machine Woodwork II	-	-	-	-	-	-	3	17	-	-	-	-	-	-	-	-	-	-	-	-	240
13	CPD 12	Wood & Metal Finishing	-	-	-	-	-	-	-	-	-	-	-	-	3	17	-	-	-	-	-	-	240
14	CFC 11	Furniture Construction. I	-	-	-	-	3	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	180

S/No	Subject Code	Module	YEAR 1						YEAR 2						YEAR 3						Total Hours	
			Term 1		Term 2		Term 3		Term 1		Term 2		Term 3		Term 1		Term 2		Term 3			
			T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P		
																					216	
15	CFC 12	Furniture Construction II									2	8	2	8								240
16	CFC 13	Furniture Const. III															2	10				144
17	CFC 14	Upholstery Construction.	-		-	-	-	-	-	-	-	-	-	-	-	-	-		3	17		240
			14	16	14	16	15	6	17	24	16	15	16	15	16	23	12	16	12	31		3906

Curriculum Table (ANTC)

CURRICULUM TABLE AND COURSE HOURS/WEEK
 COURSE: ADVANCED NATIONAL TECHNICAL CERTIFICATE
 PROGRAMME: FURNITURE DESIGN AND CONSTRUCTION

S/No	Subject Code	Module	YEAR 1						Total Hours for each
			Term 1		Term 2		Term 3		
			T	P	T	P	T	P	
1.	CMA 21-22	Mathematics	2	-	2	-	2	-	72
2	CEN 21-22	English and Communication	2	-	2	-	2	-	72
4	CTD 22	Fabrication Drawing	-	-	-	3	-	3	72
5	CEC 21-23	Economics	2	-	2	-	2	-	72
6	CBM 21	Entrepreneurship	2	-	2	-	2	-	72
7	ICT 21-22	Advanced AutoCad	1	2	2	2	-	-	72
8	CFC 21	Adv. Furniture Construction	-	-	3	14	-	-	236
9	CMW 22	Advanced Machine W/Work	2	8					126
10	CFC 22	Period Furniture Construction	-	-	-	-	3	14	236
		<u>TOTAL</u>	11	10	13	19	11	17	<u>1030</u>

Fundamentals of Machine Wood Working I

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: Fundamentals of Machine Wood Working I

Module Code: CMW 11

GOAL: This module is designed to develop trainee's skills and knowledge in the use of wood working machines in the preparation of timber components for joinery and furniture construction.

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 and be able to operate and maintain the circular rip saw.
3. Understand the features and working principles and be able to operate and maintain dimension saw bench.
4. Understand the working principles of a Surface Planning Machine and be able to operate and maintain the machine.
5. Understand the features and operation of thickness and combination planning machines and be able to use them to their full scope.
6. Know the purpose of setting out rods, route sheets and cutting list and be able to prepare and use them in a wood machine shop.
7. Understand the working principles of a narrow band saw and be able to use it effectively to carry out various band saw operations.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: MACHINE WOODWORKING-I	Module Code: CMW 11	Contact Hours: 2Hrs Theory & 8Hrs Practical for Two Terms
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Module: Specification: Theoretical Content.

General Objective 1.0: Understand the working principle, Scope of functions and methods of operation of pullover cross cutting machine.

Week	Specific Learning Objective:	Teachers' Activities	Resources
1-3	1.1 Describe the main features and working principle of the pullover cross cutting machine. 1.2 Describe the properties of materials use in the manufacture of the component parts and justify their use. 1.3 Explain the principles of operation of the machine 1.4 Identify hazard related to the use of the machine and state their potential causes. 1.5 State necessary and operational precautions to be taken when using the pullover cross cutting machine. 1.6 Identify the various cutters and accessories for the machine and explain their uses: e.g., saw blades, cutters for trenching, etc.	<ul style="list-style-type: none"> • List all parts of cross cutting machine and explain their functions. • Identify possible hazards and necessary precaution to be taken when using the machine. 	<ul style="list-style-type: none"> • Wall chart • Lesson notes • Posters

General Objective 2.0: Understand the main features and working principles of the circular rip saw.

Week	Specific Learning Objective:	Teachers' Activities	Resources
4-5	2.1 Describe the main features and explain the working principles of the circular rip saw. 2.2 Identify the materials used in the component parts of the circular rip saw and justify their use. 2.3 Explain the scope of operation of the circular tip saw. 2.4 State necessary safety and operational precautions to be taken using the circular rip saw. <ul style="list-style-type: none"> a. Correct use of guards b. Use of goggles, etc. 	<ul style="list-style-type: none"> • Explain the main features of a circular rip saw machine, list the major parts and describe their functions and scope of operation e.g. bevelling, trenching, grooving, rebating, tenoning and mitring, etc. • Explain possible hazards associated with circular saw machine. 	<ul style="list-style-type: none"> • Chalk board • Lesson note • Drawings/Posters

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: MACHINE WOODWORKING-I		Module Code: CMW 11	Contact Hours: 2Hrs Theory & 8Hrs Practical for Two Terms
Module: Specification: Theoretical Content.			
General Objective 3.0: Understand the features and working principles and be able to operate and maintain dimension saw bench.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
6-7	<p>3.1 Describe the main features and explain the working principles of dimension saw bench.</p> <p>3.2 Explain the scope and principles of operations of a dimension saw bench.</p> <p>3.3 Identity hazards related to the use of dimension saw bench and state their potential causes</p> <p>3.4 State necessary safety and operational precautions to be taken when operating a dimension saw and undertake their routine applications e.g. adjustment of fence, guard, and stops correctly before blade mounting operation.</p> <p>3.5 Identify the various materials used in the manufacture of the machine components and justify their choice.</p> <p>3.6 Calculate spindle speed and peripheral speed of saw.</p>	<ul style="list-style-type: none"> • Describe the main features and explain the principles of operation dimension saw. • Identify possible hazards and state necessary operational precautions to be taken when operating the machine. • Explain the various materials used in the manufacture of the machine parts and justify their choice. 	<ul style="list-style-type: none"> • Posters • Lesson note

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: MACHINE WOODWORKING-I		Module Code: CMW 11	Contact Hours: 2Hrs Theory & 8Hrs Practical for Two Terms
Module: Specification: Theoretical Content.			
General Objective 4.0: Understand the working principles of a Surface-planning Machine and know how to maintain.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
8	4.1 Identify all parts of the machine and state the functions. 4.2 State of materials used in manufacturing the part of the machine 4.3 Explain the scope and principle of operation of the surface planer. 4.4 Explain the working principles of a surface-planning machine. 4.5 Observe all the safety precautions involved while operating a surface planner. 4.6 Set machine for various operations and correct adjustment of table in relation to the cutters, adjust fence, bridge guard, etc. 4.7 Explain the purpose of a push-stick/or push-block and be able to use it when necessary. 4.8 Calculate the speed of the cutter (FPM). 4.9 Explain the cutting action of the blades of a planning machine in relation to the speed of the cutter block.	<ul style="list-style-type: none"> • Identify all parts of machine and state functions and operational mode. • Explain scope, functions, and principles of operation. • Calculate the RPM of the cutter block. • Give notes to students. 	<ul style="list-style-type: none"> • Posters • Lesson note

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: MACHINE WOODWORKING-I	Module Code: CMW 11	Contact Hours: 2Hrs Theory & 8Hrs Practical for Two Terms
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Module: Specification: Theoretical Content.

General Objective 5.0: Understand the features and operation of thickness and combination planning machine.

Week	Specific Learning Objective:	Teachers' Activities	Resources
9	<p>5.1 Describe the main features to explain the working principles of the thickness and combination-planning machine.</p> <p>5.2 State the functions of the major components of the machines.</p> <p>5.3 Identify the various materials used in the manufacture of the components parts and justify their use.</p> <p>5.4 Identify hazards related to the use of the thickness and combination planer and their potential causes.</p> <p>5.5 Outline the safety and operational precautions to be observed when operating the thickness and combination planer and their routine application. e.g. use of sharp and balanced cutter maintenance of correct operation posture isolation of power source soon after operation etc.</p> <p>5.6 Explain the scope and principles of operating the thickness and combination planer.</p> <p>5.7 Identify operational faults, that may occur while operating the planer, their causes and remedies.</p> <p>5.8 Calculate speed of cutter block and feed rollers of the thickness machine and the number of cutter mark per 25mm in relation to the finish of a plane timber surface, and explain the importance of high or low cutter speed or cutter block when using the planning machines.</p>	<ul style="list-style-type: none"> • State and explain the main features of the thickness and combination-planning machine. • Explain the working principles of the machine. • State the functions of the components of the machine and the materials used for the parts. • 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 thickness and combination planning machines. • Ask students questions and assess their mastery of the subject matter. 	<ul style="list-style-type: none"> • Lesson note. • Wall chart/posters • Pictures

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: MACHINE WOODWORKING-I		Module Code: CMW 11	Contact Hours: 2Hrs Theory & 8Hrs Practical for Two Terms
Module: Specification: Theoretical Content.			
General Objective 6.0: Know the purpose of setting our rods, route sheet and cutting list and be able to prepare and use them in a wood Machine shop.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
10-11	<p>6.1 Explain the purpose of rods and route sheets their advantages and limitations</p> <p>6.2 Prepare a setting-out rod for use in workshop for production purposes.</p> <p>6.3 Differentiate between height and width rods (Note that all height and width rods are usually made full size).</p> <p>6.4 Produce set out rods for common woodwork/joinery/furniture items such as: door, stool, kitchen units, bookshelves, etc.</p> <p>6.5 Explain the purpose of a cutting list and its importance for determining the cost of a job.</p> <p>6.6 Make a cutting list for each item of woodwork in items 6.4 above.</p> <p>6.7 Sketch exploded orthographic and pictorial views of an item to be made showing all the parts and number each part</p> <p>6.8 Draw to a suitable scale the detailed working drawing of each part and a cutting list.</p> <p>6.9 Differentiate between a rod and route sheet.</p> <p>6.10 Prepare route sheet for the production of a given joinery or furniture item.</p>	<ul style="list-style-type: none"> • Define the term-.Rod; • Route Sheet and Cutting list and differentiate between them. • Explain the purpose and application of each. • Prepare a typical route sheet/cutting list and explain details of the procedure. • Give assignment to student. 	<p>Lesson note</p> <p>Chalk Board</p> <p>Posters/Drawings</p>

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: MACHINE WOODWORKING-I		Module Code: CMW 11	Contact Hours: 2Hrs Theory & 8Hrs Practical for Two Terms
Module: Specification: Theoretical Content.			
General Objective 7.0: Understand the working principles of a narrow band saw and be able to use it effectively to carry out various band Sawing operations.			
Week	Specific Learning Objective:	Teachers' Activities	Resources
12	<p>7.1 Identify all the parts of the narrow band-sawing machine, and state their functions and the materials used for each of them.</p> <p>7.2 Explain the working principles of a narrow band-sawing machine.</p> <p>7.3 Observe all the necessary safety precautions involved in operating narrow band saws,. E.g. isolate power before fixing the saw blades; Ensure that the wheels are clean; Ensure that both the top and bottom wheels are properly covered before operation, etc.</p>	<ul style="list-style-type: none"> • Use question and answer technique to explain the functions of the various parts of a narrow band saw machine. 	<ul style="list-style-type: none"> • Posters/pictures • Lesson note • Parts of the narrow bad saw, etc.
13	Examination: Practical - 70% Theory - 30%		

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FUNDAMENTALS OF MACHINE WOODWORKING-I	Module Code: CMW 12	Contact Hours:
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Module: Specification: Practical Content.

General Objective 1.0: Carry out Sawing Operations on the Pull-over Cross-cutting Machine.

Week	Specific Learning Outcome	Teachers' Activities	Resources
1-3	1.1 Mount and dismount Machine cutting correctly. E.g. Saw blade. 1.2 Sharpen saw blade correctly 1.3 Set up and use the Machine to carry out its range of functions. E.g. - cutting operations (straight and angular) trenching operations. 1.4 Undertake route in application of safety measure when using the machine. 1.5 Carry out routine service and maintenance operations on the machine. E.g. -routine cleaning after use regular greasing and oiling	Guide the students in the operation, use and maintenance of the pull over cross cutting machine to perform a specific job observing all operational and safety requirements.	* The pullover cross cutting machine and accessories.

General Objective 2.0: Carry out Sawing Operations on the Circular Rip Saw

Week	Specific Learning Outcome	Teachers' Activities	Resources
4-5	2.1 Mount and dismount saw blades correctly 2.2 Fix and adjust the riving knife correctly. 2.3 Set up and use the circular rip saw for the following operations: <ul style="list-style-type: none"> a. Label sawing using canting fence. b. Grooving, c. Rebating, e. Tenoning, f. Mitring. 	• Guide students in the operation, use and maintenance of the circular rip saw to perform a specific job observing all operational and safety requirements.	The circular saw bench machine and accessories

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FUNDAMENTALS OF MACHINE WOODWORKING-I		Module Code: CMW 12	Contact Hours:
Module: Specification: Practical Content.			
	2.4 Construct and use jigs and fixtures for intricate jobs e.g. tapering, mitring etc. 2.5 Calculate the speed of the pull up and the peripheral speed of saw. 2.6 Set and sharpen saw blades proficiently 2.7 undertake routine service and maintenance of circular rip saw: e.g. - routine cleaning after use regular greasing and oiling.		
General Objective 3.0: Carry out Sawing Operations on the <u>Dimension Saw Bench</u>			
Week	Specific Learning Outcome	Teachers' Activities	Resources
6-7	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: <ol style="list-style-type: none"> a. Cross cutting to length b. Mitring c. Tongue and groove d. Chamfering e. Levelling f. Tenoning g. Compound angular cutting h. Rebating i. Ripping, etc 3.4 Undertake routine servicing and maintenance of the dimension saw. E.g. cleaning and lubricating	<ul style="list-style-type: none"> • Guide students in the operation, use and maintenance of the Dimension Saw to perform a specific job observing all operational and safety requirements. 	The rip sawing machine Accessories Materials

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FUNDAMENTALS OF MACHINE WOODWORKING-I		Module Code: CMW 12	Contact Hours:
Module: Specification: Practical Content.			
General Objective 4.0: Carry out appropriate Operations on the Surface Planner machine.			
Week	Specific Learning Outcome	Teachers' Activities	Resources
8	4.1 Perform the following operations with the surface planer” <ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> • Guide students in the operation, use and maintenance of the Dimension Saw to perform a specific job observing all operational and safety requirements. 	The surface planning machine Accessories Materials
General Objective 5.0: Carry out appropriate Operations on the Thickness and Combination Planning Machines:			
Week	Specific Learning Outcome	Teachers' Activities	Resources
9-10	5.1 Sharpen and set cutters using:- <ol style="list-style-type: none"> a. Patent device b. Wooden straight edge 5.2 Mount and dismount the cutters correctly 5.3 Undertake routine service and maintenance of the thickness and combination planning machines.	<ul style="list-style-type: none"> • Guide students in the operation, use and maintenance of the Thickness and Combination Planning machine to perform a specific jobs observing all operational and safety requirements. 	The Thickness and combination planning machine Accessories Materials

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FUNDAMENTALS OF MACHINE WOODWORKING-I		Module Code: CMW 12	Contact Hours:
Module: Specification: Practical Content.			
General Objective 6.0: Prepare and use Rods, Route Sheet and Cutting List			
Week	Specific Learning Outcome	Teachers' Activities	Resources
	6.1 Set-out rods for common woodwork items such as doors stool, kitchen unit, bookshelves, etc. 6.2 Prepare route sheets for the production and joinery and furniture items.	Guide the students to prepare rod, route sheet and cutting list to specification.	
General Objective 7.0: Carry out appropriate Operations on the Narrow Band Saw:			
Week	Specific Learning Outcome	Teachers' Activities	Resources
11-12	7.1 Mount and dismount the saw blade on the wheels correctly. 7.2 Set up and use the machine for various band sawing operations. 7.3 Produce and use simple jig for various band sawing operations. 7.4 Calculate the length of the band saw blades. 7.5 Set and Sharpen saw blade (manually or within sharpening machine). 7.6 Braze or butt-weld band saw blade. 7.7 Undertake routine service and maintenance of the narrow bad sawing machine.	• Guide trainees to carry out operations on the narrow band saw observing all operational and safety procedures	Narrow band saw Accessories Materials Jigs
13	Examinations: Practical - 70% Theory - 30%		

Fundamentals of Machine Wood working II

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: Fundamentals of Machine Wood working II

Module Code: CMW 12

GOAL: This module is designed to provide the trainee with knowledge and skill to set up, operate, maintain and repair the following wood working machine: Mortise machine, tenoning machine, boring machine and sanding machine.

General Objectives:

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

1. Understand the working principles of a mortising machine, its construction and be able to use it for mortising operations.
2. Understand the working principles of a single and tenoning machine and are able to use the machine to produce tenons, scribed tenons and mouldings to given specifications.
3. Know the working principle of boring machine and be able to use it to carry out various boring operations.
4. Understand the principles of operation and maintenance of the following sanding machines
 - a. Overhead travelling belt
 - b. Disc and bobbing sanders
 - c. Drum sanders

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FUNDAMENTALS MACHINE OF WOODWORKING II		Module Code: CMW 12	Contact Hours:
Module: Specification: Theoretical Content.			
General Objective 1.0: Understand the working principle of a mortising machine, its construction and be able to use it for mortising Operations.			
Week	Specific Learning Outcome	Teachers' Activities	Resources
1	<p>1.1 Explain the working principles of a mortising machine.</p> <p>1.2 Describe the layout and general design of the machine</p> <p>1.3 Differentiate between the two main types of cutters used on the machine.</p> <p style="padding-left: 40px;">a. Hollow chisel</p> <p style="padding-left: 40px;">b. Chain cutter, and state the type of jobs each cutter is best suited.</p> <p>1.4 Describe the types of clamping devices and attachments for the mortising machine.</p>	<ul style="list-style-type: none"> • Explain the working principles of a mortising machine, describing the layout and general design of the machine. • Differentiate between the two main types of cutter and their uses. • Set up the machine for normal repetitive mortising operations and carry out mortising operations to given specifications. 	<p>Drawing of a mortising machine and charts showing the various parts of the machine.</p> <p>Maintenance equipment, oil, brush etc.</p> <p>Chalk Board</p> <p>Lesson note.</p>
General Objective 2.0: Know the working principles of a Tenoning Machine			
Week	Specific Learning Outcome	Teachers' Activities	Resources
2 3	<p>2.1 Explain the working principles of the single-end tenoning machine in its various forms. Describe the spur cutters and state their functions.</p> <p>2.3 State the relationship of tenoning to mortising and the ordered setting of heads to ensure quick and accurate set ups.</p> <p>2.4 Develop the shape of scribing cutter for a moulding operation.</p> <p>2.5 Explain the principles and applications of backing piece, and steps for production work.</p> <p>2.6 Explain the purpose of balancing each pair of cutters on the balancing machine.</p>	<ul style="list-style-type: none"> • 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 they type of job each cutter is best suited for example: Split tapered cutter block, circular cutter block, - Scribing cutter. • Guide the students to carry out operation on sharpening and setting of profiles. 	<p>Mortising machine</p> <p>Charts</p> <p>Chalk board</p> <p>Lesson note.</p>

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FUNDAMENTALS MACHINE OF WOODWORKING II	Module Code: CMW 12	Contact Hours:
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Module: Specification: Theoretical Content.

General Objective 3.0: Know the working principles of the Boring Machine

Week	Specific Learning Outcome	Teachers' Activities	Resources
4	<p>3.1 Explain the basic principle of boring machine.</p> <p>3.2 Identify major components of boring machine and state their functions:</p> <ul style="list-style-type: none"> a. Motor b. Spindle c. Table d. Cramping device e. Chuck f. Leverage, hand or foot pedal <p>3.3 Explain and demonstrate the scope of operation of the boring machine.</p> <p>3.4 Apply safety precautions related to boring machines, e.g. Isolate machine from power source, etc.</p>	<ul style="list-style-type: none"> • Explain the basic principles of boring machine, its major components and their functions, e.g., motor, chuck, spindle, etc. • Illustrate the scope of operation of the boring machine. 	<p>Boring machine</p> <p>Charts</p> <p>Chalkboard work.</p>

General Objective 4.0: Know the working principles of Portable Electric Power Tools

Week	Specific Learning Outcome	Teachers' Activities	Resources
5	<p>4.1 Describe the common portable hand tools used in woodwork;</p> <ul style="list-style-type: none"> a. Portable saw b. Portable planer c. Portable drill e. Portable sander f. Jig saw g. Drilling machine <p>4.2 Explain how each of the tools listed in item 5.1 above works.</p>	<ul style="list-style-type: none"> • Explain the working principles of portable power tools. • Present samples of the various machines for the students to see. • Ask student to identify the parts and explain their functions 	<p>Portable Electric Power Tools</p> <p>Charts</p> <p>Chalk board</p> <p>Lesson note</p>

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FUNDAMENTALS MACHINE OF WOODWORKING II	Module Code: CMW 12	Contact Hours:
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Module: Specification: Theoretical Content.

General Objective 5.0: Know the working principles of the Sanding Machines.

Week	Specific Learning Outcome	Teachers' Activities	Resources
6	<p>5.1 Explain the principles of operation of the following hand machines:</p> <ul style="list-style-type: none"> a. Overhead travelling belt b. Disc and bobbing sanders c. Drum sander <p>5.2 Illustrate with sketches the working principles of the sanding machines</p> <ul style="list-style-type: none"> a. Overhead travelling belt b. Disc and bobbing sander c. Drum sander <p>5.3 Apply safety and operational precautions related to the use of the sanding machines.</p> <p>5.4 Explain the importance of the exhaust system.</p>	<ul style="list-style-type: none"> • Explain the principles of operation of the following sanding machines: • Overhead travelling belt sander. • Disc and bobbing sanders • Drum sander • Carry out sanding operation. 	- do -

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FUNDAMENTALS MACHINE OF WOODWORKING II	Module Code: CMW 12	Contact Hours:
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Module: Specification: Theoretical Content.

General Objective 6.0: Know the working principles of the Planning Machines

Week	Specific Learning Outcome	Teachers' Activities	Resources
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: i. Surface over-head planer for surfacing and edging ii. Thickness for thickness and widening 6.3 Plane stock to width and thickness on the thickness machines 6.4 Mortising machine 6.5 Select appropriate hollow chisel and install on a mortising machine 6.6 Set up machine correctly and carry out mortising operation to given specifications 6.7 Apply relevant safety precautions.	<ul style="list-style-type: none"> • Explain the difference between portable power tools and heavy machines • Identify the main parts of the planning machine • Explain the related safety precautions to be observed • Guide the students to operate the planning machine. 	Planning machine Chart, Chalk board, tools and accessories.

General Objective 7.0: Know the working principles of the Circular Sawing Machine

Week	Specific Learning Outcome	Teachers' Activities	Resources
9	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		

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FUNDAMENTALS MACHINE OF WOODWORKING II		Module Code: CMW 12	Contact Hours:
Module: Specification: Theoretical Content.			
General Objective 8.0: Know Carcase Construction and explain the design principles.			
Week	Specific Learning Outcome	Teachers' Activities	Resources
10-11	8.1 Explain the basic principle of carcase construction work 8.2 Sketch and state the uses of common carcase, construction joints used in woodwork. <ol style="list-style-type: none"> i. Widening joints ii. Butt iii. Dowel iv. Tongues and groove v. Slot-screw joints vi. Angle Joints vii mitre viii. Lapp joint ix. Dovetail joint x. Through dovetail xi. Lap dovetail xii.. Intermediate Joints xiii. Housing joint xiv. Through housing xv. Stop housing xvi. Pin-joint 	<ul style="list-style-type: none"> • Make sketches of angle joints on charts or chalkboard. • Exhibit Models of the joint. • List types of carcase • State reasons for carcase constructions. • List parts of carcase. 	Models Charts Chalk board work
General Objective 9.0: Know the principles of Frame Construction and the common joints used.			
Week	Specific Learning Outcome	Teachers' Activities	Resources
12	9.1 Explain the principles of frame construction 9.2 List factors that must be considered in frame construction. <ol style="list-style-type: none"> a. Rigidity b. Jointing method c. Squareness of frame in all directions 9.3 Explain the principle of triangulation in relation to the rigidity of a square frame carcase.	<ul style="list-style-type: none"> • Make sketches of framing joints. • State their possible uses. • Show models of the joints • Produce the joints using hand and machines. 	Charts Models Tool and equipments
13	Examination: Practical 70% Theory 30%		

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FUNDAMENTALS MACHINE OF WOODWORKING II		Module Code: CMW 13	Contact Hours:
Module: Specification: Practical Content.			
General Objective 1.0: Safely operate the Mortising Machines to perform a given job efficiently.			
Week	Specific Learning Outcome	Teachers Activities	Resources
1-2	1.1 Install and remove cutters correctly 1.2 Set up the machine for normal and repetitive mortising operation. 1.3 Carry out mortising operations to given specifications. 1.4 Apply routine safety and operational precautions related to the use of the machine. 1.5 Grind and sharpen mortise chisel/chain.	<ul style="list-style-type: none"> • Set up the machine for normal and repetitive operations and carry out specific operations to factory specifications. • Guide the students to perform various stages of operations on the machine observing all safety and operational procedures. 	The mortising machine. Materials Templates Working drawing, etc.
General Objective 2.0: Safely operate the Tenoning Machine to perform given tasks.			
Week	Specific Learning Outcome	Teachers Activities	Resources
3-5	2.1 Set vertical and horizontal head adjustments 2.2 Apply the safety and operational precautions related to the use of the tenoning machine. 2.3 Grind and sharpen mortise chisels chains.	- do -	The tenoning machine. Materials Templates Working drawing etc.
	2.4 Set scribing cutters to produce the mould 2.5 Adapt the machine for trenching, square tenoning and comb joints, turn tenon. 2.6 Set up tenoning machine and produce mitre tenons 2.7 Design and produce suitable jig safe an accurate production of angel tenons 2.8 Balance each pair of cutters n the balancing machine. 2.9 Undertake routing servicing and maintenance of the machine.	<ul style="list-style-type: none"> • Set up the machine for normal and repetitive operations and carry out specific operations to factory specifications. • Guide the students to perform various stages of operations on the machine observing all safety and operational procedures. 	- do -

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FUNDAMENTALS MACHINE OF WOODWORKING II		Module Code: CMW 13	Contact Hours:
Module: Specification: Practical Content.			
General Objective 3.0 Safely operate the Boring Machine to perform a given operation.			
Week	Specific Learning Outcome	Teachers Activities	Resources
6-8	3.1 Select bits suitable for given jobs 3.2 Mount and dismount bits correctly 3.3 Mark out work pieces for boring operations 3.4 Make simple jigs and fixtures for repetitive boring operations. 3.5 Set machine for various boring machines- single holes, double etc. 3.6 Carry out boring operations to factory specification. 3.7 Sharpen bits to correct profile and keenness 3.8 Replace worn bells. 3.9 Undertake routine service and maintenance of the boring machine. 3.10 Select the correct size of drill and fix on chuck 3.11 Set up drilling machine sand drill holes on timber accurately. 3.12 Carry out the following operations on the surface planning machine; surfacing; edging; through and stopped rebating; chamfering and bevelling.	<ul style="list-style-type: none"> • Set up the machine for normal and repetitive operations and carry out given operations to specifications. • Guide the students to perform various stages of operations on the machine observing all safety and operational procedures. 	The Boring machine. Materials Templates Working drawing etc.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FUNDAMENTALS MACHINE OF WOODWORKING II	Module Code: CMW 13	Contact Hours:
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Module: Specification: Practical Content.

General Objective 4.0: Safely operate the Sanding Machine to perform various tasks.

Week	Specific Learning Outcome	Teachers Activities	Resources
9-10	4.1 Identify all the component parts of the overhead travelling belt sanding machine and explain the functions of the weighted lever. 4.2 Use the fence or the table and pressure pad. 4.3 Mount the belt, stain and track correctly on the overhead sander 4.4 Adjust the worktable to convenient working height. 4.5 Apply the belt to the face of the job using one of the following: a. Hand pad b. Travelling pressure pad c. Spiral contact mechanism 4.6 Install a saw blade in a machine 4.7 Carry out the following operations with the circular sawing machines. a. Ripping stock to width b. Cutting stock to length c. Mitring d. Rebating	<ul style="list-style-type: none"> • Set up the machine for normal and repetitive operations and carry out specific operations to factory specifications. • Guide the students to perform various stages of operations on the machine observing all safety and operational procedures. 	The Sanding machine. Materials Templates Working drawing etc.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FUNDAMENTALS MACHINE OF WOODWORKING II		Module Code: CMW 13	Contact Hours:
Module: Specification: Practical Content.			
General Objective 5.0: Be able to construct/produce Carcases			
Week	Specific Learning Outcome	Teachers Activities	Resources
11	5.1 Construct common carcase joints by hand and machine processes 5.2 Make woodwork items involving the use of carcase joints e.g. small bathroom cabinet, trinket box, etc. 5.3 Test carcase for squareness and out of wind. 5.4 Lip edges of man-made board using:: veneer, solid piece (plain or moulded) etc; 5.5 Make simple carcase moulding, e.g. simple-edged moulding, chamfer, nosing and rounding. 5.6 Sketch common carcase construction joints.	Guide students to design standard carcases for a given item of furniture. Guide students to design standard carcase of a given item of furniture	Hand tools Materials Working drawing, etc. - do -
General Objective 6.0: Perform Frame Construction Operations.			
Week	Specific Learning Outcome	Teachers Activities	Resources
12	6.1 Prepare components for framed construction 6.2 Assemble frame 6.3 Test the frame for squareness and out of wind 6.4 Make projects (e.g. picture frame, cabinet door, etc.) using common framed joints such as, housing, lap, dovetail, dowel, etc. 6.5 Produce the following types of Moulding <ul style="list-style-type: none"> a. German mould b. Cavetto moulding c. Redeem or fluting d. Ovolo moulding, etc. e. Select the correct tools use and machine for their production. 	Guide students to design standard carcases for a given item of furniture.	Hand tools Materials Working drawing, etc.
13	Examinations - Theory - 30% Practical - 70%		

Wood and Metal Finishing

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: WOOD AND METAL FINISHING		Module Code: CPD-12	Contact Hours/Week: 17 hours Practical.
Course Specification: Practical Content.			
General Objective 1.0: Design, construct and finish wood and metal furniture items to industry standard.			
Week	Specific Learning Outcome	Teachers Activities	Resources
1-6	<p>1.1 Prepare a layout sketch of a standard spray boot showing standard structural requirements e.g. lighting, types and sizes of work stations, safety installations, storage facilities, etc.</p> <p>1.2 Make outline sketches showing the layout features of a typical low bake and make conveyor ovens.</p> <p>1.3 Identify necessary considerations for effective spraying and describe methods of their attainment e.g. pure air, adequate temperature and humidity, proper lighting.</p> <p>1.4 Dry the prepared surfaces by using air duster or chamois leather</p> <p>1.5 Mask up job prior to spray painting using:(i) masking paste(ii) masking tape(iii) masking paper.</p> <p>1.6 Spray test area taking care to adjust:(i) material setting(ii) pressure</p>	<ul style="list-style-type: none"> • Draw plan of a spray painting workshop and mark out activity areas for typical operations • Identify the characteristics of various spray surfaces e.g. wood surface, ferrous and non-ferrous metal, fibre, etc. • Guide the students to prepare surface by using air duster, chamois leather and masking tape prior to spraying. 	<ul style="list-style-type: none"> • Charts showing typical workshop lay-out • Furniture Items for spraying • Car or metal body for spraying etc. • Tools and equipment and accessories.
7-9	<p>1.7 Prepare newly fabricated and rusted (old) ferrous metal surfaces, aluminium alloy surface, glass fibre reinforced plastics and resinous and oily woods for spray finishing.</p> <p>1.8 Carry out masking operation.</p> <p>1.9 Organise and execute operations involved in spray finishing such as; cellulose synthetic (half-hour enamel), acrylic enamel and other classes of metallic paints:(i) complete spray from bare metal(ii) refinishing over an existing finish(iii) local repair.</p>	<ul style="list-style-type: none"> • Ask the students to enumerate the sequence of operation involved in spray work. • Guide the students to carry out complete finishing operation on a given furniture item using: hand brush; spray gun etc. 	<ul style="list-style-type: none"> • Charts showing typical workshop lay-out • Furniture Items for spraying • Car or metal body for spraying etc. • Tools and equipment and accessories.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: WOOD AND METAL FINISHING		Module Code: CPD-12	Contact Hours/Week: 17 hours Practical.
Course Specification: Practical Content.			
7-9	1.10 Identify the essential operations after spraying and explain their importance e.g. removal of masks, burnishing, polishing, removal of over-spray, cleaning and refitting of parts removed from machine, vacuum cleaning of the interior, lining work.		
10 - 12	<p>1.11 Spot defects in finished spray work and explain their possible causes, preventive and repair measures e.g. blistering, blooming, brushing, bridging, cob-webbing dry spray, excessive over-spray, lifting, orange peel, pin-holing, runs, sags, curtains, shelving, discoloration, etc.</p> <p>1.12 Execute final detailed operations after spraying.</p> <p>1.13 Inspect finishing and refinishing job and certify that it is good enough to factory standard.</p> <p>1.14 Check for defects and take preventive or remedial measures against such defects in furniture spraying work.</p> <p>1.15 Identify and replace defective parts of the spray gun.</p> <p>1.16 Dismantle the gun.</p> <p>1.17 Clean up the spray gun components with appropriate solvent. Grease and oil spray gun components to prevent rusting.</p> <p>1.18 Re-assemble spray gun components for storage.</p> <p>1.19 Maintain other tools used in spray painting.</p> <p>1.20 Tidy up work and work environment/premises.</p>	<ul style="list-style-type: none"> • Carry out complete finishing work on a furniture item using hand brush; spray gun, etc. • Guide the students to perform such projects. 	<ul style="list-style-type: none"> • Tools • Materials • Furniture item • Equipment • Solvent.
13	Examination Theory 30% Practical 70%		

General Metal Work I

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN ENGINEERING CRAFT PRACTICE		
Course: General Metal Work I	Course Code: CME 11	Contact Hours 7hrs/wk
Module Specification: PRACTICAL/KNOWLEDGE REQUIREMENTS		
General Objective:		
<p>On completion of this module the student will be able to:</p>		
<p>1.0 Understand workshop safety rules and their application in machine shop.</p>		
<p>2.0 Know the physical properties, manufacturing process and application of ferrous and non-ferrous metals in common use</p>		
<p>3.0 Select and use common measuring, marking out, cutting and striking tools.</p>		
<p>4.0 Understand the basic working principles of drilling machine and be able to use it for various types of screws treads rivets, and be able to rivet and cut screws by hand.</p>		
<p>5.0 Understand the application of various types of screw threads and rivets, and are able to rivet and cut screws by hand.</p>		
<p>6.0 Understand the ISO system of tolerances and fit their application in engineering production.</p>		
<p>7.0 Produce simple engineering components on the bench.</p>		
<p>8.0 Understand the essential features and working principles of the centre, lathe and carry out basic operations such as turning, stepped turning facing, taper turning., knurling, chamfering and undercutting.</p>		

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.**Module: GENERAL METAL WORK I****Module Code: CME 11****Contact Hours/Week: 17
hours /Wk.****Module Specification: Practical Knowledge Requirements.****General Objective: On completion of this module the student will be able to:**

Week	Specific Learning Outcome	Teachers Activities	Resources
	<ol style="list-style-type: none">1. Understand workshop safety rules and their application in machine shop.2. Know the physical properties, manufacturing process and application of ferrous and non-ferrous metals in common use3. Select and use common measuring, marking out, cutting and striking tools.4. Understand the basic working principles of drilling machine and be able to use it for various types of screws threads rivets, and be able to rivet and cut screws by hand.5. Understand the application of various types of screw threads and rivets, and be able to rivet and cut screws by hand.6. Understand the ISO system of tolerances and fits their application in engineering production.7. Produce simple engineering components on the bench.8. Understand the essential features and working principles of the centre, lathe and carry out basic operations such as turning, stepped turning facing, taper turning., knurling, chamfering and undercutting.		

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I

Module Code: CME 11

**Contact Hours/Week: 17
hours /Wk.**

Module Specification: Practical Knowledge Requirements.

Practical Competence:

1. On completion of this module, the student will be able to:
2. Use all tools correctly ensuring the machinery guards and protective eye shields are used at all times.
3. Comply with the general rules for safe practice in the work environment at all this.
4. Use and select hand tools for carrying out various bench fitting and assembly tasks
5. Tools: hacksaws, taps, reamers, drills, dividers, surface gauge
6. Produce threads using taps and dies
7. Correctly grind drill point angles: Drills: Twist and flat drills
8. Select and set drilling machine speeds to carryout a range of operations using the appropriate coolants. Drilling, reaming, counter sinking, counter boring
9. Perform metal joining by a range of processes. Cut through the joints and investigate the depth of penetration of the metals at the interface. Processes: Soldering, brazing, and fusion welding.
10. Mark out on metals and other materials, datum lines, angles, radii/ circles and hole positions using a range of tools.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.			
Module: GENERAL METAL WORK I		Module Code: CME 11	Contact Hours/Week: 17 hours /Wk.
Module Specification: Practical Knowledge Requirements.			
General Objective 1.0: Safety and Practice			
Week	Specific Learning Outcome	Teachers Activities	Resources
1-3	1.1 Using and handling hand tools, portable power tools and machine 1.2 Lifting, moving and storing materials or job 1.3 Demonstrate first aid application in cases of minor cuts, electric shock, burns. Assess the students	<ul style="list-style-type: none"> • Demonstrate safe ways of handling basic hand tools • Show a film on industrial safety • Demonstrate how to treat energy cases like artificial respiration cold compress, etc 	<ul style="list-style-type: none"> • Hand tools files, hacksaw • Television, Video machines • Posters on artificial respiration
General Objective 2.0: Measuring and Marking			
Week	Specific Learning Outcome	Teachers Activities	Resources
4-6	2.1 Describe the essential features and use of the following <ul style="list-style-type: none"> a. micrometer b. veneer calliper c. Veneer height gauge d. combination set 2.2 Maintain and care for the instruments listed above 2.3 Perform marking out exercise on plane surfaces including profiles 2.4 File a piece of metal to given specifications using any of the following: Cross filing, draw filing, filing square and flat surfaces 2.5 Test surface for flatness using surface plate and try square and state precautions to be taken to avoid pinning 2.6 Maintain files in good working conditions 2.7 Apply various hammers and mallets e.g. ball pein, rubber mallets, etc for engineering purposes 2.8 Select and install hacksaw blade correctly	<ul style="list-style-type: none"> • Demonstrate how to use micrometer, veneer calliper, veneer height gauge, combination set • Demonstrate the maintenance and care of the instruments listed above • Perform marking out for the students to learn and practise till they become competent • Demonstrate how flat surface can be tested using surface plate and try square • Demonstrate how files are cleaned and state the precautions to be taken against pinning. Students to practice till competent • Demonstrate the application of hammers and mallets for engineering purposes 	<ul style="list-style-type: none"> • Micrometer, veneer callipers, veneer height gauge, combination sets • Steel rules, dividers, punches, trammel, scribe angle plate, vee block centre square • Flat fill, hand file, engineers square, tray square • File card, flat file • Ball pein hammers, mallet • Hacksaw blade, Hack frame

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.			
Module: GENERAL METAL WORK I		Module Code: CME 11	Contact Hours/Week: 17 hours /Wk.
Module Specification: Practical Knowledge Requirements.			
4-6	2.9 Cut metal and other engineering materials to given specification using the adjustable hacksaws, junior hacksaws, piercing saw, etc drills and Drilling. Assess the students	<ul style="list-style-type: none"> • Demonstrate how a hacksaw blade can be inserted correctly • Demonstrate how to use adjustable hacksaw, junior hacksaw piercing • Students should be allowed to practice till competent 	
General Objective 3.0 Machine Tools			
Week	Specific Learning Outcome	Teachers Activities	Resources
7-9	<p>3.1 Setting up and operate a drilling machine in given situations Note Setting up drilling machine should include</p> <ol style="list-style-type: none"> change of spindle speed adjustment of drilling table to required height and angle, holding of work on drilling table to required height and angle, holding of work on drilling table using appropriate Install up the drill bit in chuck <p>3.2 Sharpen a twist drill currently to manufactures' specification</p> <p>3.3 Perform with facility the following operations:</p> <ol style="list-style-type: none"> drilling blind holes drilling round stock counter boring and counter-sink drilling large diameter holes 	<ul style="list-style-type: none"> • Demonstrate how to set up and operate a drilling machine in given situation • Students to practice till competent • Demonstrate how a twist drill can be sharpened correctly • Demonstrate with the appropriate facility how to perform all the drilling operations • Students to practice till they become competent • Give notes as well as demonstrate the operation sequence in cutting internal (through and blind) and external threads by hand method • Demonstrate how riveting can be done and let the students practice same till they become competent 	<ul style="list-style-type: none"> • Bench drill pillar drill, drill bits • Bench drill, pillar drill, twist drill, flat drill, counter sink drill, counter bore drill, centre drill • Drills, taps, tap wrench, die and die stock • Rivets and sets of drill bits • Surface table, surface plate, marking solution, DoT/dot punches, scribing block

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I	Module Code: CME 11	Contact Hours/Week: 17 hours /Wk.
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Module Specification: Practical Knowledge Requirements.

7-9	<p>3.4 List the operation square and cut internal through and blind) and external threads by hand method and state precautions to taken when tapping on the bench</p> <p>3.5 Rivet metals together in any given situations</p> <p>3.6 Mark out only given bench work using datum points, datum lines, datum faces, chalk or marking solution centre or dot, punch, scribing block or measurement transfer. Assess the students.</p>	<ul style="list-style-type: none"> • Demonstrate the marking out procedures on bench working using datum lines datum faces, etc • Students to practice till they become competent 	
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General Objective 4.0: Lathe and Lathe work

Week	Specific Learning Outcome	Teachers Activities	Resources
	<p>4.1 Sharpen cutting tool for plain turning, shouldering, parting off and facing operations</p> <p>4.2 Set up rough and turned stock in 3-jaw-chuck</p> <p>4.3 Select appropriate cutting tool and set them up to centre height for turning or facing operations</p> <p>4.4 Carryout chuck work involving facing, step turning, undercutting radius cutting, chamfering, parting off and knurling</p> <p>Note: Components should be produced to specified tolerance and finish.</p> <p>4.5 Produce simple components involving taper turning using the compound slide.</p>	<ul style="list-style-type: none"> • Guide the students to sharpen cutting tool for plain turning shouldering, parting off and facing operations and allow students to practice till competent • Demonstrate how to set-up rough and turned stock in a 3-jaw-chuck and operate lathe. Allow students to practice till competent • Guide the students to select appropriate cutting tools and set them up to centre height for lathe work (turning or facing) 	<ul style="list-style-type: none"> • Point tools, grinding machine, lathe machine • 3-jaw chuck and lathe machine • Point tools lathe machine • Lathe machine and accessories • Centre lathe and accessories like catch plate, face plate, dog lathe, lathe centres fixed steady and travelling steady • Round nose turning tool, fine finishing tool, form tool, parting off tool, boring tool, bar of good length and 4mm diameter, Live/dead centres catch plates • Standard exercises or prepared

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I

Module Code: CME 11

**Contact Hours/Week: 17
hours /Wk.**

Module Specification: Practical Knowledge Requirements.

- Guide students to produce simple engineering components like open ended spanner, engineers square, tool makers clamp, centre square, etc.
- Make a simple precision fitting project like hexagonal mild steel bar making push fit through a mild steel plate
- Students should be allowed to practice till they become competent
- Prepare simple exercises that will guide students to produce components involving taper turning using the compound slide. Assess the students

Assessment profile: Practical 60% Theory 40%

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I	Module Code: CME - 12	Contact Hours/Week: 17 hours Practical.
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Course Specification: Practical Content.

General Objective 1.0: Design, Construct and finishes wood and metal furniture materials to industry standard.

Week	Specific Learning Objective:	Teachers Activities	Resources
1	<p>1.1 State sources of hazards in the workshop and how to prevent them. e.g.</p> <ul style="list-style-type: none"> a. handling and using hand tools, portable power tools and machines; b. stepping on or striking obstructions left on floors or benches; c. lifting, moving and storing materials or jobs; d. using inflammable or corrosive liquids and gases; e. inhaling vapours or fumes; <p>1.2 Explain the application of factory safety regulations in the machine shop.</p> <p>1.3 Name safety equipment and wears essential in the machine shop, and state their application in working situations.</p> <p>Note: Example of safety wears and equipment should include overall, eye goggles, gloves, safety boots, helmet, fire extinguishers, etc</p>	<ul style="list-style-type: none"> • State sources of hazards in the workshop. • Through questions and answer, determine whether the students grasped the topic • Show a film on industrial safety. • Through question and answer technique determine comprehension. • Demonstrate how to treat emergency cases • like artificial respiration, cold compress etc. • List the safety equipment and wears that are essential in the workshop. • Give detail notes and explanation in each topic a-g. • Use questions and answer to determine comprehension. • Assess the students • Give detailed notes and explanation on appropriate. • Procedures to be taken in the event of workshop accident 	<ul style="list-style-type: none"> • Safety posters, common hard tools like files hacksaw • Television, Video machine. • Overall, goggles, gloves, hard shoes, head shield, and fire extinguishers.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I	Module Code: CME - 12	Contact Hours/Week: 17 hours Practical.
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Course Specification: Practical Content.

1	<p>1.4 Outline safety rules and regulations relating to:-</p> <ul style="list-style-type: none"> a. clothing and health hazards; b. workshop hygiene; c. movement and other behaviour of workers in the workshops; d. materials handling; e. tool handling, storage and usage; f. machine operation; g. fire protection. <p>1.5 Understand appropriate procedures in the events of a workshop accident</p>	<ul style="list-style-type: none"> • Give detailed notes and explanations to explain the meaning of the following general physical properties of metals: ductility, malleability, strength, toughness, brittleness, elasticity, and plasticity. Assess the students 	
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General Objective 2.0: Know the physical properties, manufacturing process and application of ferrous and non-ferrous metals in common Use

Week	Specific Learning Objective:	Teachers Activities	Resources
2	<p>2.1 Examples of procedures may include:</p> <ul style="list-style-type: none"> a. application of first aid to the victim; b. removal or rectification of the accident; c. reporting the accident to the appropriate authority; d. keeping a record of accidents for management use. <p>Ferrous and Non-Ferrous Metals</p> <p>2.2 Explain the meaning of the following general physical properties of metals:- ductility, malleability, strength, toughness, brittleness, elasticity, and plasticity.</p>	<ul style="list-style-type: none"> • Give detailed notes and explanations for the topics in 2.0 	

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I	Module Code: CME - 12	Contact Hours/Week: 17 hours Practical.
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Course Specification: Practical Content.

General Objective 3.0: Select and use common measuring, marking out, cutting and striking tools.

Week	Specific Learning Objective:	Teachers Activities	Resources
3 4	<p>3.1 Explain with examples the difference between “line” and “end” measurement.</p> <p>3.2 Explain the use of datum points, datum lines and datum faces in marking out.</p> <p>3.3 Describe, the functions and application of the following instruments used in metal-work, steel rule, dividers, callipers (inside, outside and odd-legs), trammel, scriber angle plate, vee-block, centre square.</p> <p>3.4 Describe the various types of files, stating their grades and applications. Note: Types of files should include: flat, square, round, half round, three square, warding polar, mill and rasp.</p> <p>3.5 Classify the common files use in metal work and state their composition of material used for their manufacture.</p> <p>3.6 Sketch the bench vice, explain its clamping power and demonstrate the technique of holding work in the vice for filing, tapping and designing operations.</p> <p>3.7 Describe the functions of the various parts of a bench vice, its holding power while performing various operations on its, such as filing, tapping sawing etc.</p>	<ul style="list-style-type: none"> • Prepare notes that will clearly differentiate between “line” and “end” measurement. • Prepare notes and examples that will explain the use of datum points, datum lines, and datum faces in marking out. • Give detail notes and explanations regarding the functions and application of: steel rule, dividers, callipers (inside, outside and odd leg) trammel, scriber, angle plate, vee block, centre square • Prepare notes that will describe the various types of files stating their grades and applications. By type it means: flat, square round, half round, three square, warding, mill and rasp. • Prepare detail notes that will classify the common files used in the metal work as well as staffing the composition of materials used for their manufacture. • Assess the students • Show a bench vice and demonstrate the work in the vice for filing, tapping and designing operations 	<ul style="list-style-type: none"> • Steel rule, divides callipers, trammel, scribe angle plate vee block, Centre Square. • Micrometer veneer callipers veneer height gauge combination set • Flat file, hard file, round file square, half round, triangular warding, mill file, rasp file. • Flat file, hand file engineers square. • Surface plate try square (engineers square) • File card • Flat file • Bench vice. • Bench vice. • Ball pein hammers mallets. • Cold chisels, centre punches, dot punch, scrapers power hacksaw blades. • Hacksaw blade • Hacksaw frame • Adjustable hacksaw junior hacksaw piercing saw.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I

Module Code: CME - 12

**Contact Hours/Week:
17 hours Practical.**

Course Specification: Practical Content.

3 4	<p>3.8 Describe and use the following tools:</p> <ul style="list-style-type: none"> a. cold chisels (flat, cross, cut half round, diamond-point) b. centre punch and dot punch c. scrappers (flat, triangular, half round) d. power hack saw <p>3.9 Describe the various parts of a hacksaw and their function.</p> <p>3.10 Describe the common types of hacksaw blades, their range of pitches and their applications.</p> <p>3.11 Show a bench vice and demonstrate the technique of holding work in the vice for filing, tapping and designing operations.</p> <p>3.12 Prepare detail notes that will describe the functions of the various parts of a bench vice, its holding power while performing various operations.</p> <p>3.13 State the safety precautions to be observed when using a hand hacksaw</p>	<ul style="list-style-type: none"> • Prepare detail notes that will describe the functions of the various parts of a bench vice, its holding power while performing various operations • Assess the students • Prepare detail notes and demonstrations that will describe and uses of: cold chisels, centre punch dot punch, scrapers and power hacksaw. • Prepare notes that will describe the various parts of a hacksaw and their functions. • Show sample of hacksaw blades as well as prepare notes that will describe the common types of hacksaw blades, their range of pitches and their applications. • Prepare notes that will show correct way of inserting blades. • Prepare detail notes and explanation, stating the safety precautions to be observed when using a hand hacksaw. • Prepare notes that will describe the uses of various hacksaws. <p>Assess the students</p>	<ul style="list-style-type: none"> • Bench drill • Pillar drill. • List drill, flat drill counter sink drill, counter bore drill combination centre drill.
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PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I	Module Code: CME - 12	Contact Hours/Week: 17 hours Practical.
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Course Specification: Practical Content.

General Objective 4.0: Understand the working principles of a drilling machine, use it to drill and ream holes on metals and other engineering materials.

Week	Specific Learning Objective:	Teachers Activities	Resources
5-6	<p>4.1 Identify the various types of drilling machines.</p> <p>4.2 Describe, with sketches, the main features of a bench or pillar drilling machine.</p> <p>4.4 Describe with sketches and state where each of the following types of drills are best suited. e.g. twist drill (taper shank, parallel shank and jobbers drill, and their relative merits), flat drill, countersink drill, and counter bore drill, combination centre drill.</p> <p>a. Explain the effects of the following faults in a ground twist drill bit:</p> <p>b. point angle too acute;</p> <p>c. point angle too abuse;</p> <p>d. cutting edges at unequal angles;</p> <p>e. insufficient lip clearance;</p> <p>f. excessive lip clearance.</p> <p>4.6 Calculate spindle revolution or cutting speed for specified size of drill using the formulae:-</p> <p>$N = 1000S/\pi d$</p> <p>$S = \pi dN/ 1000$</p> <p>Where S = cutting speed (m/min)</p> <p>N = revolution/minute</p> <p>D = diameter of drill (mm)</p> <p>$\pi = 3.142$</p>	<ul style="list-style-type: none"> • Prepare detailed notes and demonstrations that will describe and uses of the following: cold chisels, center punch, dot punch, scrapers, and power saw. • Prepare notes that will describe the various parts of hacksaw and their functions • Show samples of hacksaw blades as well as notes that will describe the common range of pitches of the hacksaw blade and their applications • Show different types of drilling machines • Make notes and drawings that will identify the various types of drilling m/cs. • Prepare detail notes and drawings that will describe the main features of a bench or pillar drilling machine. • Solve many problems for students to practise. • Prepare notes and drawings that will describe where each of the following drills are best suited Twist drill (taper shank, parallel shank, jobber drill and their relative merits), flat drill, counterbore drill and combination center drill. • Assess the students. 	<ul style="list-style-type: none"> • Ball pein hammers, mallet, cold chisels, dot/center punches, hacksaw and hacksaw blades • Drilling machines and its accessories.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I

Module Code: CME - 12

**Contact Hours/Week:
17 hours Practical.**

Course Specification: Practical Content.

5-6	<p>4.8 State the cause and remedy of drilling faults such as:-</p> <ol style="list-style-type: none"> a. drill breaking; b. drill coloured blue; c. walls of drilled hole left rough; d. chipped cutting lips. <p>4.9 State the safety precautions to be observed when using a drilling machine.</p> <p>4.10 Explain the purpose of reaming and describe different types of hand and machine reamers.</p> <p>4.11 Ream to given specification by hand and machine method</p>		
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General Objective 5.0: Understand the applications of various types of screw threads, rivet and cut screws by hand.

Week	Specific Learning Objective:	Teachers Activities	Resources
7	<p>5.1 Sketch the thread forms below and state their applications:-</p> <ol style="list-style-type: none"> a. the ISO metric thread b. the unified thread c. Whitworth and British fine threads d. British Association (BA) thread e. British Standard pipe f. Square thread g. Acme thread h. Buttress thread. <p>5.2 Sketch and state the functions of:-</p> <ol style="list-style-type: none"> a. taps (taper tap, second tap, plug) b. tap wrench c. die and die stock. 	<ul style="list-style-type: none"> • Give detailed notes with diagrams that will show the various forms of trade and their uses. • Prepare notes that will state the functions of taps, tap wrench, die and die stock. • Give detailed notes that will explain the meaning of tapping size or tapping drill and estimate its values using the formula: $T = D - P$ Where T = tapping diameter D = thread top diameter and P = Pitch • Prepare notes that will state precautions to be taken when tapping on bench. 	<ul style="list-style-type: none"> • Diagrams/charts of thread forms • Parallel reamers taper reamers twist drills. • Rivets sets drills

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I	Module Code: CME - 12	Contact Hours/Week: 17 hours Practical.
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Course Specification: Practical Content.

7	<p>5.3 Explain the meaning of tapping size or tapping drill and estimate its value in given situations using formulae such as:-</p> $T = D - P$ <p>Where T = tapping diameter D = thread top diameter P = pitch</p> <p>5.4 State precautions to be taken when tapping on the bench.</p> <p>5.5 Describe and differentiate types of rivets. e.g. Snap and pan head, mushroom and counter-sunk head, flat head, dod rivet, etc.</p> <p>5.6 Sketch the rivet set and state its use.</p> <p>5.7 Calculate the diameter of rivet and riveting allowance in given situations</p>	<ul style="list-style-type: none"> • Give notes and diagrams that will describe and differentiate types of rivets, rivet sets, and its uses and guide to calculate the diameter of rivet and riveting allowance. • Assess the students. 	
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General Objective 6.0: Understand the ISO tolerances and fits and its application in engineering production.

Week	Specific Learning Objective:	Teachers Activities	Resources
8	<p>6.1 Differentiate between the following:-</p> <ol style="list-style-type: none"> a. nominal size b. limits (upper and lower) c. tolerance (unilateral and bilateral) d. fit (clearance, transition interference). <p>6.2 Explain the importance of tolerance and fit in engineering production and describe briefly the ISO system of limits and fits.</p> <p>6.3 Determine by calculation the amount of tolerance and types of fit in given situations.</p>	<ul style="list-style-type: none"> • Give detailed notes that will differentiate between nominal size, limits, tolerance and fits. • Prepare detailed note and diagrams that will explain the important of tolerance and fits in engineering production as well as describing the ISO systems of limits and fits. • Give notes and explanations that will guide in calculating the amount of tolerance and types of fits in given situations. • Assess the students. 	<ul style="list-style-type: none"> • Charts on tolerances, limits and fits

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION.

Module: GENERAL METAL WORK I	Module Code: CME - 12	Contact Hours/Week: 17 hours Practical.
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Course Specification: Practical Content.

General Objective 7.0: Produce simple Engineering Components on the bench.			
Week	Specific Learning Objective:	Teachers Activities	Resources
9	<p>7.1 Explain layout procedures from working drawing of simple engineering components or tools such as:-</p> <ol style="list-style-type: none"> a. open ended spanner b. engineer's try square c. tool maker's clamp d. plate bracket or gusset (involving rounds, angles, holes) e. centre square. <p>7.2 Explain how to produce any simple engineering component to given specifications including dimensions, tolerance and finish</p> <p>7.3 Explain how to carry out simple precision fitting project. e.g. hexagonal mild steel bar making push fit through a mild steel plate.</p>	<ul style="list-style-type: none"> • Teachers to prepare notes and explanations to guide the students in producing simple engineering components as in 7.0 <p>Assess the students.</p>	<p>Lesson notes</p> <p>Diagrams and charts.</p>
General Objective 8.0 Understand the essential features and working principles of the centre lathe and use it to carry out basic operations such as plain turning, stepped turning, facing taper turning, chamfering, and under-cutting			

General Metal Work II

COURSE: General Metal Work II

Module: CME 12

Goal: This module is designed to introduce the trainee to basic processes in mechanical engineering such as forging, sheet-metal work and welding.

General Objective:

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

1. Understand the basic principles and processes of heat treatment of metal in the workshop
2. Produce simple engineering components by forging
3. Understand the basic principles and techniques of gas and metal arc welding and apply them in fabricating simple metal components.

Practical Competence:

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

1. Carry out heat treatment of metal in the workshop
2. Produce simple engineering components by forging
3. Carry out gas/arc welding and apply them in fabricating simple engineering components

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN MECHANICAL ENGINEERING CRAFT PRACTICE			
Module: General Metal Work II		Module Code: CME 12	Contact Hours: 5hrs/wk
MODULE SPECIFICATION: Theoretical Content			
General Objective 1.0: On completion of the following practical task, the trainee will demonstrate the following abilities			
Week	Specific Learning Objective	Teacher Activities	Learning Resources
1-2	1.1 Carry out the following heat treat processes Hardening, tempering, annealing normalizing, case hardening on given plain carbon steel, engineering component or tool 1.2 Anneal copper, brass and aluminium for various purposes	<ul style="list-style-type: none"> • Demonstrate heat treatment processes and explain the stages • Demonstrate the annealing process on brass, copper and aluminium for various purposes. • Assess the students. 	Furnace, Forge tongs
General Objective 2.0: Forging P processes			
Week	Specific Learning Objective	Teacher Activities	Learning Resources
3-4 5-8	2.1 Select appropriate forging tools and produced to specification given engineering components by forging processes <ul style="list-style-type: none"> a. upsetting - drawing down b. setting down - twisting c. forge welding (scarf and spice welds) d. bending, turning closed ring e. forming an eye 	<ul style="list-style-type: none"> • Demonstrate with appropriate forging tools how to produce some engineering components and let the student practice till they become competent • Assess the students 	<ul style="list-style-type: none"> • Anvil, swage block, leg vice, forging hammers hot set cold set, sets of hammer, punchers, drifts, fillers, top swage, bottom swage, flatter, open tongs, hallow bit

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN MECHANICAL ENGINEERING CRAFT PRACTICE

Module: General Metal Work II

Module Code: CME 12

Contact Hours: 5hrs/wk

MODULE SPECIFICATION: Theoretical Content

General Objective 3.0: Welding Processes

Week	Specific Learning Objective	Teacher Activities	Learning Resources
9-12	<p>3.1 Set up and operate gas or metal arc welding equipment in given situations. Note: Equipment operation should include choice of correct nozzles or electrode. Adjustment for correct gas pressure/flame or voltage</p> <p>3.2 Prepare joints for welding in given situations</p> <p>3.3 Weld given components by arc or gas welding methods, and state safety precautions to be observed</p>	<ul style="list-style-type: none"> • Demonstrate the use of both gas and metal welding equipment; and all the students to practice • Demonstrate to the students how to prepare joints for welding purposes • Guide students to weld various components using both gas and arc welding machines and state safety precautions to students to practice till competent 	<ul style="list-style-type: none"> • Oxygen, cylinders, regulations arc, welding set goggles, shield, electrodes, diagrams and charts various welding joints
<p>Assessment: Practical - 60% Theory 40%</p>			

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN MECHANICAL ENGINEERING CRAFT PRACTICE			
Module: General Metal Work II		Module Code CME 12	Contact Hours 5hr/wk
MODULE SPECIFICATION: KNOWLEDGE REQUIREMENTS			
General Objective 1.0: Understand the basic principles and processes of heat treatment of metal in the workshop			
Week	Specific Learning Outcome	Teacher Activities	Learning Resources
1-4	<p>1.1 Explain briefly the structural behaviour of plain carbon steel as it is heated from room temperature to about 1000°C.</p> <p>a. hardening b. tempering c. annealing d. normalizing. e. case-hardening.</p> <p>1.3 Explain the meaning of hardening metal work.</p> <p>1.4 Outline safety precautions relating to heat treatment processes apply them in given situations.</p>	<ul style="list-style-type: none"> • Prepare detail notes that will explain the structural behaviour of plain carbon steel as it is heated from room temperature to about 1000°C. • Prepare detail notes that will explain the meaning of hardening in metalwork. • Prepare notes that will outline safety precautions relating to heat treatment processes. • Assess the students 	<ul style="list-style-type: none"> • Recommended Text books • Lesson notes, etc
General Objective 2.0: Understand the techniques of producing simple engineering components by forging.			
Week	Specific Learning Outcome	Teacher Activities	Learning Resources
5-6 7-8	<p>2.1 Explain with outline sketch the main features and working principles of the black smith's forge.</p> <p>2.2 Describe and state the functions of common forging tools. e.g anvil, swage block, leg vice, forging hammers, hot and cold sets, set hammer, punches and drifts, hardie, fullers, top and bottom swages flatter, tongs (open mouth, closed mouth, hollow bit, etc.).</p>	<ul style="list-style-type: none"> • Prepare detail notes and diagrams that will explain the main features and working principles of the black smith's forge. • Prepare notes and diagrams that will describe the functions of common forging tools. 	

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN MECHANICAL ENGINEERING CRAFT PRACTICE

Module: General Metal Work II

Module Code CME 12

Contact Hours 5hr/wk

MODULE SPECIFICATION: KNOWLEDGE REQUIREMENTS

	<p>2.3 Describe with sketches the following forging operations:</p> <ul style="list-style-type: none"> a. upsetting b. drawing down c. setting down d. twisting e. forge welding (scarf and splice welds) f. bending g. forming closed ring h. forming an eye. 	<ul style="list-style-type: none"> • Prepare detail notes that will describe the following forging operations: upsetting, drawing down, setting down, twisting, forge welding, bending, forming closed ring, forming an eye. • Assess the students. 	
<p>General Objective 3.0: Understand the basic principles and techniques of gas and metal re-welding and apply them in fabricating simple metal components.</p>			
Week	Specific Learning Outcome	Teacher Activities	Learning Resources
	<p>3.1 State the safety precautions</p> <p>3.2 Describe the equipment and explain the basic principles and application of gas and metal arc welding.</p> <p>3.3 State the safety precautions to be observed and apply them in given welding situations</p> <p>3.4 Differentiate between various tool shapes and state uses e.g. round nose rougher, fine finishing, side finishing, knife tool, form tool, parting off tool, boring tool, etc.</p>	<ul style="list-style-type: none"> • Prepare detail notes and diagrams that will describe the equipment and explain the basic principles and application of gas and metal arc welding • Prepare diagrams of joints that the students will practice. • Prepare detail notes that will state the safety precautions to be observed during welding • Assess the students 	<ul style="list-style-type: none"> • Oxygen cylinder • acetylene cylinder • regulations arc welding • set goggles, shield • electrode • Diagrams and charts of various welding joints and techniques

Furniture Design and Construction I

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

MODULE: FURNITURE DESIGN AND CONSTRUCTION I MODULE CODE: CFC II

GOAL: This module is designed to provide the trainee with the basic knowledge and skill to enable him understand simple furniture and Construction

General Objectives:

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

1. Understand design elements.
2. Appropriate design principles to design elements.
3. Understand the anthropometrics principles of apportioning sizes to products.
4. Know the principles of timber preparation.
5. Know the principles of marking out and be able to mark out given stock accurately.
6. Know the nature of timber and timber growth.
7. Know the principles of surface preparation.
8. Understand the principles and purpose of timber conversion and seasoning.
9. Know the various timber defects and how to prevent them.
10. Know the various technical terms associated with the furniture trade.
11. Know the various adhesives used in woodwork and be able to apply them on a given job.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FURNITURE DESIGN AND CONSTRUCTION I	Module Code CFC - 11	Contact Hours:
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Module Specification: Theoretical Content.

General Objective: 1.0 Understand design elements and design principles.

Week	Specific Learning Outcome:	Teacher Activities	Resources
1	1.1 Explain the meaning of design 1.2 State the basic design elements, i.e. space, line, shape, form, colour, value and texture. 1.3 Explain how these elements affect the quality of a design. 1.4 State how these elements affect the quality of a design in two and three dimensions.	<ul style="list-style-type: none"> • Explain to students, design elements with regards to types of lines, shapes and forms applied in drawing and how they affect dimensions. 	<ul style="list-style-type: none"> • Chalk board. • Drawing instruments. • Lesson notes.

General Objective 2:0 Understand Design Principles

Week	Specific Learning Outcome:	Teacher Activities	Resources
2	2.1 Know the various design principles i.e. balance, movement, repetition, emphasis, contrast and unity. 2.2 Explain their effects in application to the design elements. 2.3 Describe how the design principles apply to the various design elements in nature.	<ul style="list-style-type: none"> • Explanation of types of lines e.g. Zig zag dotted line, thick line, thin line etc. • State the functions of these lines in drawings. 	<ul style="list-style-type: none"> • Chalk board. • Drawing instruments. • Lesson notes.

General Objective 3.0: Know Anthropometrics Principles

Week	Specific Learning Outcome:	Teacher Activities	Resources
3	3.1 Explain the principles of human proportions and dimensions, e.g. relationship of distance between one part of the body and another. 3.2 Use anthropometrics principles to determine various sizes of different types of furniture, e.g. chairs, stools, tables, etc.	<ul style="list-style-type: none"> • Draw the three-dimensional views of a chosen object showing the front, side, and plan views. • Draw the pictorial view of a chosen furniture item. 	<ul style="list-style-type: none"> • Chalk board working using drawing instruments.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FURNITURE DESIGN AND CONSTRUCTION I		Module Code CFC - 11	Contact Hours:
Module Specification: Theoretical Content.			
General Objective 4.0: Know the Principles of Timber Preparation			
Week	Specific Learning Outcome:	Teacher Activities	Resources
4	4.1 Explain the principles of cutting wood to size using handsaws and machine.	<ul style="list-style-type: none"> List the tools used for timber preparation and explain their functions. 	<ul style="list-style-type: none"> Chalk board Woodwork tools Materials (wood)
General Objective 5.0 Marking Out			
Week	Specific Learning Outcome:	Teacher Activities	Resources
5	5.1 Interpret simple working drawing of wood projects. 5.2 Identify conventional representation for timber fastenings on a drawer. 5.3 Define conversion and state its purposes. 5.4 Describe with annotated sketches how a log is converted to timber by the following methods. <ul style="list-style-type: none"> a. Through and through sawing b. Quarter sawing 5.5 State the merits and demerits of each type of conversion method.	<ul style="list-style-type: none"> Teach students to make orthographic drawing of simple objects. Give drawing assignment 	<ul style="list-style-type: none"> Drawing Equipment Marking out tools. Text books Chalk board. Lesson notes.
General Objective 6.0 Know the nature of Timber Growth And Structure			
Week	Specific Learning Outcome:	Teacher Activities	Resources
6	6.1 Describe the growth of a tree from which timber is obtained, how it is fell; and cut into logs for sawmills. 6.2 Classify timber into two groups: - hardwoods and softwood and explain the difference between the two classification. 6.3 State the main characteristics of hardwoods and softwoods.	Structure <ul style="list-style-type: none"> Explain timber growth and Explain the nature of trees from which timber is obtained. Classify timber into hard and soft wood. Show samples of these. 	<ul style="list-style-type: none"> Text Books Chalk board. Samples of woods. Lesson notes.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FURNITURE DESIGN AND CONSTRUCTION I	Module Code CFC - 11	Contact Hours:
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Module Specification: Theoretical Content.

General Objective 7.0 Know the methods of Wood Surface Preparation for Finishing

Week	Specific Learning Outcome:	Teacher Activities	Resources
7	7.1 State the purpose of finishing e.g. decoration, preservation. 7.2 Explain the working principles of air compressors and air line dryers. 7.3 Explain the importance of fan extractors. 7.4 Recognise and remove surface defects. 7.5 Outline the process of staining and filling 7.6 Apply stains, e.g. matching stain using appropriate safety equipment.	<ul style="list-style-type: none"> • State the purpose of surface preparation and finishing e.g. for aesthetics, preservation, hygiene. • Name the types of finishing materials e.g. abrasive paper, stain, transparent and opaque finishes paint, polish, etc. 	<ul style="list-style-type: none"> • Chalk board. • Samples of wood finishing materials. • Lesson note

General Objective 8.0 Know the Principles of Timber Conversion And Seasoning

Week	Specific Learning Outcome:	Teacher Activities	Resources
8	8.1 Explain the two types of conversion: - a) through and through method, (b) back sawing or quarter sawing method. List the merits and demerits of each method. 8.2 Explain the difference between kiln seasoning and natural or air seasoning. 8.3 State the merits and demerits of each type of seasoning. 8.3 Describe the effect of proper staking of boards on the seasoning of the timber.	<ul style="list-style-type: none"> • Explain conversion of timber. • Explain the various methods of conversion. • Explain seasoning and state the importance of seasoning wood. Explain the two main classes of wood seasoning.	<ul style="list-style-type: none"> • Chalk board. • Samples of timber from different conversion methods. • Lesson note • Pictures of defects infested woods.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FURNITURE DESIGN AND CONSTRUCTION I	Module Code CFC - 11	Contact Hours:
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Module Specification: Theoretical Content.

General Objective 9.0 Timber Defects

Week	Specific Learning Outcome:	Teacher Activities	Resources
9	<p>9.1 Classify timber defects into two main groups namely natural and artificial defects.</p> <p>9.2 Explain the causes of the following timber defects; splits, warp, twist, casehardening, collapse, etc.,</p> <p>9.3 Explain the possible causes of the following timber defects; dry rot, wet rot,, woodborers and how they can be prevented.</p> <p>9.4 Explain the possible causes of timber defects</p> <p>9.5 Explain the methods of preventing natural and artificial defects in timber.</p>	<ul style="list-style-type: none"> • Identify the various types of defects in timber - natural and artificial. • State the merits and demerits of the various methods of wood conversion. • Mention the natural and artificial defects in timber and explain their effects. 	<ul style="list-style-type: none"> • Chalk board. • Samples of defects infested woods. • Lesson note • Pictures of defects infested woods.

General Objective 10.0 Know Technical Terms In Furniture Work.

Week	Specific Learning Outcome:	Teacher Activities	Resources
10	<p>10.1 Make a list of Technical Terms used in furniture making e.g. Pot life, blooming, bleaching, staining, padding, tacking etc.</p> <p>10.2 Define technical terms used in Furniture Making.</p> <p>10.3 Identify the following Nigerian timbers - mahogany obeche, (cedar), afara, abura, etc and their uses.</p>	<ul style="list-style-type: none"> • Define the related glossaries in furniture making. 	<ul style="list-style-type: none"> • Chalk board. • Lesson notes.

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FURNITURE DESIGN AND CONSTRUCTION I		Module Code CFC - 11	Contact Hours:
Module Specification: Theoretical Content.			
General Objective 11.0: Know the Adhesives used in Woodwork			
Week	Specific Learning Outcome:	Teacher Activities	Resources
11-12	11.1 Explain the principles of adhesion 11.2 Classify adhesives into interior and exterior types: Interior: - animal, Vegetable and thermo-plastic glues; Exterior:- Phenol formaldehyde (cascamite) 11.3 State the composition of the adhesive listed above. 11.4 Prepare and apply adhesives. 11.5 Cure glue lines by normal temperature and artificial heating methods.	<ul style="list-style-type: none"> • Define and explain the types of adhesives and glues used in woodworking and their application. • Show samples of different adhesives to students. 	<ul style="list-style-type: none"> • Chalk board • Lesson note • Samples of adhesive materials.
13	Examination: Practical: - 70%: Theory - 30%		

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FURNITURE DESIGN AND CONSTRUCTION - I	Module Code: CFC 11	Contact Hours 252
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Module Specification: Practical Content.

General Objective 1.0: Design, mark-out and prepare wood for the specified furniture item to be produced.

Week	Specific Learning Objective:	Teacher Activities	Resources
1-5	<ol style="list-style-type: none"> 1. Carry out a simple design of own choice of furniture item. 2. Carry out some design work applying specific design principles to the various design elements. 3. Use the anthropometrics principles to determine various sizes of different types of furniture e.g. chairs, stools, tables, etc. 4. Saw timber to given length and width 5. Use hand tools to make simple joint 6. Plane timber to size by following the proper sequence: <ol style="list-style-type: none"> i. Plan the face side and mark ii. Plan face edge square to the face size and mark. iii. Gauge to correct width and remove waste. iv. Gauge to correct thickness and remove waste v. Plane one end. 	<ul style="list-style-type: none"> • Guide the students to produce design of own choice of furniture item • Draw the pictorial view of a chosen piece of furniture. • List the procedures for timber preparation:-e.g. sawing, planning, marking out, etc. • Guide the students to prepare a given piece of timber material to specification. 	<ul style="list-style-type: none"> • Drawing instruments and equipment. • Tools • Materials, etc.
6 & 7	<ol style="list-style-type: none"> 7. Select tools for marking out: <ol style="list-style-type: none"> a. Try square; b. Pencil; c. Rule d. Gauges e. Compasses f. Marking knife. g. Mark-out stock accurately to given specifications. h. Prepare materials. 	<ul style="list-style-type: none"> • Select marking out tools and demonstrate the steps for accurate marking out. • Observe the students as they perform similar operations. 	<ul style="list-style-type: none"> • Marking out tools. • Materials. • Cutting List

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION		
Module: FURNITURE DESIGN AND CONSTRUCTION - I	Module Code: CFC 11	Contact Hours 252
Module Specification: Practical Content.		
8-12	<p>8. Select and apply various grades of abrasive paper to prepare specified surfaces for finishing.</p> <p>9. Apply base coating, e.g. wood filler, undercoat and sanding sealer.</p> <p>10. Apply lacquer or paint by spraying or by hand brush</p> <p>11. Maintain and clean spray equipment</p> <p>13 Identify the types of common manufactured boards: Plywood, lamin-board, etc.</p> <p>14 State the structural properties each type of manufactured board.</p> <p>15 Handle and store board materials correctly</p>	<ul style="list-style-type: none"> • Explain the need for safety wear during surface preparation. • Explain the importance of fan extractors. • Carry out surface preparation and spray finish a given job. • Ask students to perform similar task. • Bring samples of plywood, block board etc. to the class and explain their composition and application. <ul style="list-style-type: none"> • Marking out tools. • Materials. • Cutting List
Examinations: Theory 30%; Practical 70%		

Furniture Design and Construction II

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FURNITURE DESIGN AND CONSTRUCTION - II

MODULE: CFM I2

GOAL: The module is designed to provide the trainee with the knowledge and skill to enable him design and construct stools, chairs and tables

General Objectives:

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

1. Design and construct stools
2. Design and construct chairs
3. Design and construct simple tables and desks

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FURNITURE DESIGN AND CONSTRUCTION - II	MODULE: CFC I2	Contact Hours 216
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Module Specification: Theoretical Content.

General Objective 1.0 Be able to construct basic woodwork, joints e.g. Mortise & Tenon, Butt Dowelling, Housing, Tongue and Grove.

Week	Specific Learning Outcome	Teacher Activities	Resources
1-2	1.2 Draw the following joints a. Bare faced mortise and tenon joints b. Bull joints c. Dowelling d. Housing joints e. Tongue and Grove f. Half-lap dovetailed joint	<ul style="list-style-type: none"> • Ask the students to produce drawing of joints in different views. • Give assignment to students and assess them 	<ul style="list-style-type: none"> • Tools & equipments • Chalk board • Models of specific joints.

General Objective 2.0: Be able to produce Stool And Carcase Construction

Week	Specific Learning Outcome	Teacher Activities	Resources
3 - 5	2.1 Translate abstract thoughts into sketches. 2.2 Know the basic difference between solid wood and carcase construction 2.3 Identify the various angles of inclination. 2.4 Determine the relative angles, shapes and proportions of the various parts. 2.5 Produce the sketches into working/production drawings. 2.6 Select construction materials for a given designed furniture item.	<ul style="list-style-type: none"> • Use question and answer technique to explain the difference between solid wood and framed carcase construction • Sketch examples of solid and carcase constructions of common furniture item. • Give similar assignment to students. 	<ul style="list-style-type: none"> • Chalk board • Models. • Drawings • Lesson note

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FURNITURE DESIGN AND CONSTRUCTION - II		MODULE: CFC I2	Contact Hours 216
Module Specification: Theoretical Content.			
General Objective 3.0: Know the methods of Production of Chairs			
Week	Specific Learning Outcome	Teacher Activities	Resources
6 - 7 8 - 9	3.1 Identify various types of chairs e.g. dining chair, easy chair, and rocking chair. 3.2 Design and prepare production drawing of a chosen type of chair. 3.3 Identify the various types of tables e.g. dining table, reading table, conference table etc. 3.4 Design and prepare production drawing of specific type of table. 3.5 Prepare cutting list.	• Sketch a typical dining chair, office chair, etc. • Sketch model of dining or office table, etc.	• Chalk board • Lesson note • Drawings
General Objective 4.0: Understand the Principles of Finishing			
Week	Specific Learning Outcome	Teacher Activities	Resources
10 - 11	4.1 Explain the purposes of finishing wood surface: hygiene, preservation, and aesthetics. 4.2 Name and state the composition of common materials used for finishing wood surfaces.	• Explain the reasons for good surface finish. • Show students samples of wood finishing materials and explain their composition and application.	• Chalk board • Lesson note
General Objective 5.0: Fitting And Fastening			
Week	Specific Learning Outcome	Teacher Activities	Resources
12	5.1 Differentiate between fastenings, holdings and pulling: 5.2 Fastenings: - Screws, nails, corrugated fasteners, bolts and nuts; 5.3 Holding and pulling:- hinges, handles, locks, catches, stays, etc. 5.4 Explain how fasteners are used to hold two parts together. 5.5 State the properties of materials used for common fittings - brass, mild steel, aluminium, plastics, etc. 5.6 Select appropriate fasteners and fittings and fix/fit on finished furniture item.	• Make free hand sketches of different types of fittings and other ironmongeries. • Use question and answer method to explain and differentiate between “fastenings” and “fittings”.	• Chalk board • Samples of fittings and fastenings, e.g. locks handles etc.
13	Examination: Practical - 70% Theory - 30%		

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FURNITURE DESIGN AND CONSTRUCTION - II		MODULE: CFC I2	Contact Hours 216
Module Specification: Practical Content.			
General Objective 1.0: Be able to construct basic woodwork, joints e.g. Mortise & Tenon, Butt Dowelling, Housing, Tongue and Grove			
Week	Specific Learning Objective:	Teacher Activities	Resources
1-2 3	1.0 Construct the following joints: <ol style="list-style-type: none"> a. Bare-faced mortised and tenon joints b. Butt joints c. Dowelling d. Housing joints e. Dovetailed joint f. Carry out the following operations: g. Pocket screwing h. Counter-boned screwing and pelleting i. Rebating and mitring. 	<ul style="list-style-type: none"> • Produce sample of a chosen wood joint and ask the students to produce same, observing the relevant procedures. • Guide students to produce specific joint. 	<ul style="list-style-type: none"> • Tools • Materials • Samples of given joints.
General Objective 2.0: Production of working drawing			
Week	Specific Learning Objective:	Teacher Activities	Resources
4 - 6	2.1 Design and prepare production drawings of chosen model. 2.2 Prepare cutting list from nominal sizes to finish sizes e.g. legs, top rails, stretcher rails, tops, etc. 2.3 Select and mark out joints e.g. mortise and tenon joint, dowelling, tongue and groove, pocket screwing and counter-boring with nails bits. 2.4 Produce the required joints 2.5 Assemble the units with adhesives and fasteners 2.6 Scrape and sandpaper the stool in readiness for finishing 2.7 Finish in spray or polish.	<ul style="list-style-type: none"> • Guide the trainees to prepare production drawing and cutting list of a given furniture item. 	<ul style="list-style-type: none"> • Drawing board. • T-Squares, pencils • Set Square and

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FURNITURE DESIGN AND CONSTRUCTION - II		MODULE: CFC I2	Contact Hours 216
Module Specification: Practical Content.			
General Objective 3.0: Production of chairs			
Week	Specific Learning Objective:	Teacher Activities	Resources
7 - 9	3.1 Use templates for marking-out and shaping with ring fence on spindle moulder. 3.2 Select and mark out joints e.g. mortise and tenon and dowelling joint. 3.2 Assemble the units with adhesive and fasteners 3.3 Use angle brackets for fortifying the joints. 3.4 Scrape and sand paper in readiness for finishing 3.5 Finish in spray, polish or decorative paper.	<ul style="list-style-type: none"> • Produce sample of template while the students observe • Ask students to produce template using hand and machine methods 	<ul style="list-style-type: none"> • Chalk board • Tools & Equipments • Models. • Materials
General Objective 4.0: Design a chosen table			
Week	Specific Learning Objective:	Teacher Activities	Resources
10 - 11	4.1 Prepare cutting list of the chosen table from the design. 4.2 Prepare working drawing using scale 1:10, 1:20; 1:50 etc. 4.3 Produce the components and their joint e.g. mortise & tenon 4.4 Assemble components. 4.5 Finish with French polish, spray or paint by hand brush, etc.	<ul style="list-style-type: none"> • Ask students to chose type of table, produce working drawings, cutting list, etc and prepare materials ready for assembly 	<ul style="list-style-type: none"> • Tools & equipment • Materials.
General Objective 5.0: Finishing			
Week	Specific Learning Objective:	Teacher Activities	Resources
12	5.1 Prepare the wood surface for finishing by scrapping, sand-papering 5.2 Apply wood finish by hand	<ul style="list-style-type: none"> • Guide the students to prepare a given wood surface ready for finishing 	<ul style="list-style-type: none"> • Finishing materials • Tool & equipment.
13	Examinations: Practical 70% Theory 30%		

Furniture Design and Construction III

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: FURNITURE DESIGN AND CONSTRUCTION - III

MODULE: CFC I3

GOAL: The module is designed to provide the trainee with the knowledge and skill to enable him construct cabinet and bed

General Objectives:

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

1. Know the wood material and ironmongery used in cabinetwork and be able to select them.
2. Design and construct the cabinet carcass
3. Construct drawers, shelves and bases, and beds.
4. Understand and apply the methods of lipping and veneering to cabinet finishing

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FURNITURE DESIGN & CONSTRUCTION III		MODULE CFC I3	Contact Hours:
Module Specification: Practical /Theory			
General Objective 1.0. Be Able to design, construct and finish item(s) of furniture.			
Week	Specific Learning Outcome	Teachers Activities	Resources
1-2	<p>1.1 Distinguish between natural and man-made board materials, e.g. timber, plywood, particleboard, block board, etc.</p> <p>1.2 Identify the materials required for furniture such as plywood - 6mm, 18mm, & 25mm plywood block board etc.</p> <p>1.3 Select furniture fittings e.g. locks, hinges, nubs, handles, castors, track stays, catches and bolts, etc.</p>	<ul style="list-style-type: none"> • Distinguish between natural and artificial materials, e.g. timber, plywood, particleboards, block-board, etc. • Display samples of manufactured boards of different sizes and make and explain their composition and application. 	<ul style="list-style-type: none"> • Samples of timber, plywood, particle board and block-board, etc.
General Objective 2.0: Carry out Cabinet Carcase construction			
Week	Specific Learning Outcome	Teachers Activities	Resources
3-7 8-10	<p>2.1 Identify the different types of cabinets e.g. wardrobe, side furniture, chest of drawers, sideboard, etc.</p> <p>2.2 Design a chosen type of carcase</p> <p>2.3 Prepare cutting list</p> <p>2.4 Select and prepare the joints - dowelling joint, etc.</p> <p>2.5 Assemble carcase with adhesive and glue blocks.</p> <p>2.6 Construct drawers with lap dovetail, grooving, housing, pinning, dowelling joint.</p> <p>2.7 Identify the various methods of securing drawers into the carcase e.g. runner or slide and fix them.</p> <p>2.8 Construct and fix shelves (permanent, loose, adjustable).</p>	<ul style="list-style-type: none"> • Guide the students to prepare cutting list, select and prepare material ready for assembling • Guide the students in the preparation of materials for drawers and shelves. 	<ul style="list-style-type: none"> • Woodwork tools. • Finishing materials and fittings. • Tools

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: FURNITURE DESIGN & CONSTRUCTION III		MODULE CFC I3	Contact Hours:
Module Specification: Practical /Theory			
3-7 8-10	2.9 Construct and fix various types of doors e.g.: - plane panel, raised panel, glazed door, sliding doors, etc. 2.10 Design and construct box plinth, stool plinth, cabriole leg and metal legs. 2.11 Design and construct bed ends and rails.		
General Objective 3.0: Lipping and veneering			
Week	Specific Learning Outcome	Teachers Activities	Resources
11-12	3.1 Demonstrate the purpose of lipping 3.2 Demonstrate the purpose of veneering 3.3 Identify and apply the lipping and veneering to specified furniture item. 3.4 Scrap and glaze paper ready for finishing. 3.5 Select and apply appropriate finishing materials and ironmongery to selected project.	<ul style="list-style-type: none"> • Give the students some specific projects involving lipping and veneering activity and guide/supervise them in performing the task 	<ul style="list-style-type: none"> • Veneers • Tools • Samples of finished project with lipping and veneering work.
13	Examination: Practical - 70% Theory - 30%		

Upholstery Design and Construction

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: UPHOLSTERY DESIGN AND CONSTRUCTION

MODULE: CFC I4

GOAL: The module is aimed to provide the trainee with the skill to enable him design and construct a complete upholstered furniture

General Objectives:

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

1. Understand the required factors for consideration in carcass design
2. Design carcass
3. Understand the basic principles of upholstery
4. Cut and sew upholstery fabrics and leather materials.
5. Fix sewn material
6. Design and construct and upholstery

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: UPHOLSTERY DESIGN AND CONSTRUCTION	Module CFM - 14	Contact Hours:
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Module Specification: Theoretical Content.

General Objective: 1.0 Design and Constructions of Upholstery Car-case

Week	Specific Learning Outcome	Teacher Activities	Resources
1-3	1.1 Translate ideas to sketches 1.2 Translate sketches to pictorial drawings 1.3 Translate pictorial drawings to working drawings. 1.4 Name the parts of carcass in side back post, bottom back rail etc. 1.5 Know tolerance for stuffing, springing and covering. 1.6 Explain method of assembling.	<ul style="list-style-type: none"> • Illustrate how ideas could be translated to sketches and from sketches to pictorial drawings e.g. oblique, isometric, perspective, projections. • Demonstrate simple free hand sketches in various views. • Give assignment on free hand sketching to students. 	<ul style="list-style-type: none"> • Drawings • Models • Lesson note

General Objective 2.0: Know the Basic Principles Of Upholstery Construction

Week	Specific Learning Outcome	Teacher Activities	Resources
4-6	2.1 Explain the basic principles of upholstery construction. 2.2 Explain the purpose of frames and how to achieve strength and rigidity. 2.2 Outline the requirements in chair frames to support the type of upholstery such as loose seat, show-wood, stuff over. 2.4 Recognize the characteristics of the various kinds of upholstery springing and suspension. 2.5 Name the main types of adhesive and fasteners used in upholstery e.g. rubber based solution, polyurethane, tack nails, stud, staple pin, etc. 2.6 Identify and use hand tools used in upholstery, e.g. hammer, scissors, web-stretcher, needles and awls, ripping chisels, mallet stapler, knife, measuring tape, rule, etc.	<ul style="list-style-type: none"> • Give necessary explanations on the basic principles of upholstery construction. 	<ul style="list-style-type: none"> • Chalkboard • Glue/tack nails • Sewing machine • Measuring tape etc. • Lesson note

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

Module: UPHOLSTERY DESIGN AND CONSTRUCTION	Module CFM - 14	Contact Hours:
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Module Specification: Theoretical Content.

4-6	<p>2.7 Describe the operational principles and use of the following power hand tools, stapling gun (pneumatic and electric, powered cutters, electric iron, foam cutter, drills (pneumatic and electric), bottom mould.</p> <p>2.8 List the main parts of the sewing machine, e.g. edging machine.</p> <p>2.9 Explain the operation of the sewing machine</p>		
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General Objective 3.0: Know Upholstery fabric

Week	Specific Learning Outcome	Teacher Activities	Resources
7-9	<p>3.1 Explain the need for accurate measurement and correct sewing tolerance.</p> <p>3.2 Explain the behaviour of covering materials under the cutting process and recommend the necessary tolerance for shrinkage or overstretching.</p>	<ul style="list-style-type: none"> • State the importance of accurate measurement and the provision of correct sewing allowances. 	<ul style="list-style-type: none"> • Fabrics & leatherettes materials. • Tools and equipments

General Objective 4.0: Know how to fix Upholstery materials

Week	Specific Learning Outcome	Teacher Activities	Resources
10	4.1 Fix upholstery fabric or leatherette.	<ul style="list-style-type: none"> • State and describe methods of fixing upholstery fabrics or leatherette. 	<ul style="list-style-type: none"> • Rubber web, spring, tack nail.

General Objective 5.0: Upholstery Furniture

Week	Specific Learning Outcome	Teacher Activities	Resources
11-12	<p>5.1 State the sequence of upholstery construction: framing, webbing, springing, butt, fox edging, stuffing, and fabric covering.</p> <p>5.2 State the sequence of assembling the carcass.</p> <p>5.3 State the methods and apply of webbing, e.g. spacing, weaving, etc.</p>	<ul style="list-style-type: none"> • State sequence of padding, cutting, sewing, tacking etc 	<ul style="list-style-type: none"> • Materials • Tools • Lesson notes

13	Examination: Practical - 70% Theory - 30%		
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PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: UPHOLSTERY DESIGN AND CONSTRUCTION		Module Code: CFC I4	Contact Hours 240
Module Specification: Practical Content.			
General Objective 1.0: Design and Construct Upholstery Car-case and apply upholstery Materials.			
Week	Specific Learning Objective:	Teachers Activities	Resources
1-3	1.1 Translate pictorial drawings into production drawings. 1.2 Interpret and prepare blue prints 1.3 Select and prepare cutting list from nominal to finished sizes; arm front and back, arm top, arm bottom, back top and bottom, seat front, spring or web bearer, seat sides, side and back panels (arm). 1.4 Use templates for marking out and shaping of necessary parts on the band-saw machine, dowelling, butt joints, mortise and tenon joint with fasteners. 1.5 Assemble backrest, armrest and the seat separately. 1.6 Remove arise where necessary 1.7 Apply preservatives to the assembled parts.	<ul style="list-style-type: none"> • Guide students to interpret blue print, prepare cutting list, mark out components and construct joints e.g. <ul style="list-style-type: none"> i. Dowelling joints ii. Butt joints iii. Mortise and tenon • Guide trainee to assemble frames, select preservatives and apply to the assembled parts. 	<ul style="list-style-type: none"> • Templates or pattern • Materials e.g. wood, foam, leatherettes etc.
General Objective 2.0: Know Upholstery Construction			
Week	Specific Learning Objective:	Teachers Activities	Resources
4-6	2.1 Select springs and webs e.g. single cone, double one, serpentine (zigzag) helical, tension spring, rubber, canvass, jutes, etc. 2.2. Identify and compare the properties of upholstery and bedding fittings, e.g. latex foam, plastic foam, natural fibres, synthetic fibres. 2.3. Identify and use hand tools used in upholstery work e.g. hammer, scissors, web-stretcher, needles and awls, ripping, chisels, mallet staple, knife, measuring tape rule., 2.4. Demonstrate the operational principles and use of the following power hand tools, stapling gun (pneumatic and electric), powered cutters, electric iron, foam cutter drills (pneumatic and electric), bottom mould.	<ul style="list-style-type: none"> • Describe characteristics of various kinds of upholstery materials. • Perform various upholstery operations with students' participation. 	<ul style="list-style-type: none"> • Tools & equipments • Drawings • Cutting list • Jigs

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION			
Module: UPHOLSTERY DESIGN AND CONSTRUCTION		Module Code: CFC I4	Contact Hours 240
Module Specification: Practical Content.			
General Objective 3.0: Upholstery Work			
Week	Specific Learning Objective:	Teachers Activities	Resources
7-9	3.1 Cut fabric and leatherette to size and shape as per template. 3.2 Identify the parts of a sewing machines 3.3 Identify and attach the following: pipe foot, gathering foot, zip fastener foot. 3.4 Select the correct type of needle and thread for given kinds of materials. 3.5 Adjust the sewing machine to suit the fabric or leatherette. 3.6 Sew, pipe and hem the fabric or leatherette to size and shape.	<ul style="list-style-type: none"> • Demonstrate how to use template to cut fabric and leatherette materials to sizes and shapes. • Guide trainees in the use of machine to sew, pipe and hem the fabric. 	<ul style="list-style-type: none"> • Template • Sewing machine • Fabrics. Etc.
General Objective 4.0: Upholstery Covering			
Week	Specific Learning Objective:	Teachers Activities	Resources
10	4.1 Stretch fabric or leatherette to remove arises and tack them. 4.2 Check for correct fitting 4.3 Assemble the parts e.g. arm rest to seat and back 4.4 Cover bottom and fix castors and guide.	<ul style="list-style-type: none"> • Guide the students to assemble the armrest, seat and back. • Demonstrate how to cover the bottom and fix castors and glide. 	<ul style="list-style-type: none"> • Rubber, web spring tack nail • Fabric • Seat cover, back rest • Leatherette, web.
General Objective: 5.0: Upholstery Work			
Week	Specific Learning Objective:	Teachers Activities	Resources
11-12	5.1 Design and upholstered furniture e.g. Arm chair, poof etc. 5.2 Apply webbing, e.g. spacing, weaving, etc. 5.3 Demonstrate knowledge of spring lacing, stitching, stuffing and burlap. 5.4 Cut and sew to patter. 5.5 Cover with fabric or leatherette, etc, observing Y-cut, notching, etc.	<ul style="list-style-type: none"> • Guide students to design and construct upholstery furniture to factory standard. 	<ul style="list-style-type: none"> • Materials • Tools & equipment • Drawings.
13.	Examinations - Theory 30% Practical 70%		

Advanced Courses

Advanced Furniture Design and Construction

PROGRAMME: ADVANCE NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING

Module: ADVANCED FURNITURE DESIGN AND CONSTRUCTION

Module Code: CFC 21

GOAL: The module is designed to provide the trainee with further knowledge and skill to enable him design, draw and produce complex furniture as a Master craftsman.

General Objectives:

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

1. Know various complex furniture items and their uses
2. Design and develop production drawings of complex furniture
3. Produce a chosen complex furniture
4. Produce an upholstery carcass of a chosen design
5. Prepare jigs, fixtures and mould
6. Produce a built-in furniture
7. Appreciate a good surface finish of furniture item and produce one.
8. Carry out inspection of finished product to maintain standard and quality

PROGRAMME: ADVANCE NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED FURNITURE DESIGN AND CONSTRUCTION		Module Code: CFC 21	Contact Hours:
Module Specification: Theoretical Content			
General Objective: 1.0 Know various complex Furniture items and their uses.			
Week	Specific Learning Objective:	Teachers Activities	Resources
1-4	1.1 Identify various types of complex furniture e.g. <ul style="list-style-type: none"> a. Conference tables b. Extending tables, c. Executive tables and chairs d. Convertible chair e. Cocktail cabinet f. Writing bureau g. Corner cabinet 1.2 Appreciate the geometrical shape of the above listed furniture items	<ul style="list-style-type: none"> • Identify and explain various types of complex furniture items such as: conference tables, extending table, executive tables, and chairs etc. • Ask the student to explain the difference between each of the tables. 	<ul style="list-style-type: none"> • Chalk board • Pictures of complex furniture • Drawings
5	1.3 Explain the principles and application of knock-down fittings 1.4 Explain the application of the following fittings and fixtures e.g. <ul style="list-style-type: none"> a. Swivel bases b. Convertible and collapsible attachments c. Bar counters and d. Reception counters 	<ul style="list-style-type: none"> • Explain the principles and application of knock down fittings, the applications of fittings and fixtures such as: bar counter, swivel bases etc. 	<ul style="list-style-type: none"> • Chalk • Samples of moulds, jigs and fixtures
General Objective 2.0 Jigs fixtures and mould			
Week	Specific Learning Objective:	Teachers Activities	Resources
6	2.1 Explain the purpose and application of jigs, fixtures and moulding	<ul style="list-style-type: none"> • Explain the difference between jigs, fixtures and moulds and state their uses. 	

PROGRAMME: ADVANCE NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED FURNITURE DESIGN AND CONSTRUCTION		Module Code: CFC 21	Contact Hours:
Module Specification: Theoretical Content			
General Objective 3.0: Good Surface Finish			
Week	Specific Learning Objective:	Teachers Activities	Resources
7 8	3.1 Explain the reaction of material on surfaces e.g. oxidation 3.2 Explain the methods of surfacing (hot or cold)e.g. by, a. Dipping b. Spraying c. Roller grain printing, etc 3.3 State the characteristics of nitro-cellulose, synthetic, enamel materials, etc. 3.4 Name the solvents required to remove paints from materials e.g. a. Painter remover b. Thinner c. Turpentine d. Pulling over 3.4 State the NSC quality control standard for furniture item	<ul style="list-style-type: none"> • Explain the importance of good finishing in furniture production. • Explain the hot or cold methods of surfacing by dipping, spraying, roller grain printing etc. • Explain the chemical composition of thinner, etc 	<ul style="list-style-type: none"> • Furniture item • Chalk board and charts.
General Objective 4.0: Estimating			
Week	Specific Learning Objective:	Teachers Activities	Resources
9-12	4.1 Understand the principles of estimating in furniture production. 4.2 Estimate the materials used in furniture item production such as; wood, adhesive, fittings, fabrics, finishing etc, Cost the items according to local price. 4.3 Understand the method of computing the final estimate taking into consideration labour cost, overhead cost and profit margin. 4.4 Make estimate for a simple furniture item	<ul style="list-style-type: none"> • Discuss estimating with students and guide them to draw up an estimate for a simple furniture project. • Produce an in-built furniture and finish it. • Make a cost estimate of the furniture item. 	<ul style="list-style-type: none"> • Text books • Chalk board Lesson notes.
TESTING Theory - 30% Practical - 70%			

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED FURNITURE DESIGN AND CONSTRUCTION		Module Code: CFC 21	Contact Hours:
Module Specification: Practical Content			
General Objective 1.0: Use tools and equipment safely to produce complex period furniture to industrial standard.			
Week	Specific Learning Objective:	Teacher Activities	Resources
1-4	1.1 Translate imagination of complex furniture into sketches, e.g. beds, counters and cupboard 1.2 Inculcate briefs and data into the sketches. 1.3 Develop sketches into pictorial projections 1.4 Develop sketches into production drawings. 1.5 Provide blue prints.	<ul style="list-style-type: none"> • Illustrate imaginative ideas of complex furniture into sketches. • Guide the students on how to translate imaginative thoughts into sketches, develop the sketches into pictorial projects and then into working drawings. 	<ul style="list-style-type: none"> • Sketches, • Drawings • Materials, etc. • Tools.
General Objective 2.0: Produce Complex Furniture			
Week	Specific Learning Objective:	Teacher Activities	Resources
5-7	2.1 Set out and mark out the shapes 2.2 Cut out the shapes 2.3 Lay out the methods of construction 2.4 Application of joint e.g. mortise and tenon, tongue and grove. Etc. 2.5 Join and assemble all components applying all the principles of construction. 2.6 Construct jigs, fixtures and mould.	<ul style="list-style-type: none"> • Select specific complex furniture, set out and mark out the shapes. • Ask the students to cut the shapes and lay out the methods of construction using the various types of joints, e.g. mortise and tenon tongue and groove, etc. • Guide the students to construct jigs, fixtures and moulds. 	- do -

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED FURNITURE DESIGN AND CONSTRUCTION		Module Code: CFC 21	Contact Hours:
Module Specification: Practical Content			
General Objective 3.0: Carcase of Chosen Design			
Week	Specific Learning Objective:	Teacher Activities	Resources
8	3.1 Recognise a good carcase arrangements e.g. circular or semi-circular shape. L-shape, U-shape, Serpentine shape. 3.2 Construct a complex carcase applying all the principles of construction e.g. corner upholstered divan bed	<ul style="list-style-type: none"> • Select a good carcase arrangements for example, U-shape, L-shape, circular or semicircle shape etc. • Guide the students to construct the carcase of any of the shapes • Apply all the principles of construction. 	- do-
General Objective 4.0: Built In Furniture			
Week	Specific Learning Objective:	Teacher Activities	Resources
9	4.1 Prepare ground work for panelling or partitioning 4.2 Fix the wall plugs or masonry walls. 4.3 Construct boards and panels.	<ul style="list-style-type: none"> • Explain the basic method of groundwork for panelling or partitioning. • Guide the students to construct boards and panels and fix wall plugs on masonry walls. 	<ul style="list-style-type: none"> • Tools and materials like masonry nails, wood etc.
General Objective 5.0: Good Surface Finish			
Week	Specific Learning Objective:	Teacher Activities	Resources
10-11	5.1 Prepare and treat surfaces 5.2 Apply wax polishing 5.3 Use spraying equipment and brush, rollers, etc	<ul style="list-style-type: none"> • Guide the students to produce a given furniture surface, apply, spray finish to industry standard using any acceptable method. • Explain the hot or cold methods of surfacing by dipping, spraying, roller grain printing etc. • List type of solvents and their applications in relation to list, spraying equipment, brush and rollers etc. 	<ul style="list-style-type: none"> • Finishing Equipment and materials.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED FURNITURE DESIGN AND CONSTRUCTION		Module Code: CFC 21	Contact Hours:
Module Specification: Practical Content			
General Objective 6.0: Inspection of Finished Products			
Week	Specific Learning Objective:	Teacher Activities	Resources
	6.1 Appreciate a good finish within standard 6.2 Detect defect in finished furniture item 6.3 Recognize and approve well-finished products.	<ul style="list-style-type: none"> • Guide students to appreciate a good finish. • Explain and identify defect in finish furniture item. 	<ul style="list-style-type: none"> • Sample of well finished furniture items like stools, chairs, beds and storing units.
13	Examination: Practical - 70% Theory - 30%		

Advanced Machine Wood Working

PROGRAMME: ADVANCE NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING

Module: ADVANCED MACHINE WOOD WORKING

Module Code: CM W 22

GOAL: The module is designed to provide the trainee with further knowledge and skill in the use, maintenance and repair of (a) Straight line edgers (b) Double-end tenoning machine (c) Moulding machine

General Objectives:

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

1. Apply all safety precautions involved in the operation of straight line edgers, moulding machines and double and tenoning machines
2. Understand the working principle of a straight line-edging machine and be able to use it to carry out various woodworking processes.
3. Maintain straight-line edgers in proper working conditions.
4. Understand the working principle of a moulding machine and be able to use the machine to carry out various moulding operations.
5. Maintain the moulding machine its accessories and cutters in proper working conditions.
6. Understand the working principle of a double end tenoning machine and be able to use the machine in the production of component parts of joinery or furniture items
7. Maintain the double-end tenoning machine in proper working conditions.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED MACHINE WOODWORKING		Module Code: CMW 22	Contact Hours:
Module Specification: Theoretical Content			
General Objective 1.0: Apply all safety precautions involved in the operation of straight line edger, moulding and double end tenoning machines:			
WEEK	Specific Learning Outcome	Teachers Activities	Resources
1-4	1.1 Explain the working principles of the straight line edging machine 1.2 List the sequence of operations of straight line edging machine 1.3 List the merits and demerits of design of overhead and under-head machines 1.4 State reasons why it is not necessary to fix the riving knife. 1.5 State the range of purposes for the variations in feed speed.	<ul style="list-style-type: none"> • Introduce students to the straight line-edging machine. • Ask the students to identify and explain the functions of the parts 	<ul style="list-style-type: none"> • Charts/posters • Chalkboard • Edging Machine
General Objective 2.0: The Moulding Machine			
WEEK	Specific Learning Outcome	Teachers Activities	Resources
	2.1 Explain the working principles of a moulding machine e.g. Spindle moulder 2.2 Describe the layout of the 4, 5, and 6 heads moulding machine e.g. four sided moulding machine 2.3 Identify the parts of the machine and the functions of the various heads and parts 2.4 List and explain the different types of feeds e.g. hand feed. 2.5 Describe the purpose of serrated, and smooth feed rollers. 2.6 Explain and state the uses of hopper feed attachment and feeding table 2.7 State the purpose of profile blocks, mount and use them on the machine	<ul style="list-style-type: none"> • Explain the different types of moulding machines and their scope of functions. • Explain types of profiles and their uses. 	<ul style="list-style-type: none"> • Chalk board • Charts • Slides • Audio visual aid. • Chalk board • Tools & equipments and accessories.

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED MACHINE WOODWORKING		Module Code: CMW 22	Contact Hours:
Module Specification: Theoretical Content			
General Objective 3.0: Double-end Tenoning Machine			
WEEK	Specific Learning Outcome	Teachers Activities	Resources
	3.1 Explain the difference between the single-end and the double-end tenoning machines 3.2 Explain the working principles of the double-end tenoning machines. 3.3 Identify and describe the various parts and accessories of the machine e.g. fixed, adjustable dogs, etc.	<ul style="list-style-type: none"> • Explain the difference between double-end and single-end tenoning machines, explain their working principles and describe their of various parts. 	- do -
General Objective 4.0: Wood Lathe Turning Machine			
WEEK	Specific Learning Outcome	Teachers Activities	Resources
	4.1 Explain the working principles of the turning lathe machine 4.2 Identify wood turning lathe tools and explain their various shape and their uses e.g. gauge, skew, spear point. Painting tool, round nose tool. 4.3 Explain the functions of the parts of the wood turning lathe machine, e.g. beds, head stock, tail stock, drawing stand, tool rest, etc.	<ul style="list-style-type: none"> • Explain the difference between a wood turning lathe and a metal turning lathe. • Describe the working principles and tools and their functions. 	- do -
13	Examination: Practical - 70% Theory - 30%		

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED MACHINE WOODWORKING		Module Code: CMW 22	Contact Hours: 120
Course Specification: Practical Content			
General Objective 1.0: Apply all safety precautions involved in the operation of straight line edger, moulding machines and double end-tenoning Machines and operate the machines to accomplish any given furniture construction operation.			
WEEK	Specific Learning Outcome	Teacher Activities	Resources
1-2	1.1 Isolate the machines from source of power before and after operations; 1.2 Wear protective clothing during all operations; 1.3 Adjust the pressure bar to the thickness of the timber while operating straight line edger to avoid tendency of timber to kick backwards; 1.4 Locate and secure the cutter blocks, cut-off saws, guards and adjust pressure beam in double end tenoning machine before operating it.	<ul style="list-style-type: none"> • Guide the students to carry out the various operations on machines to accomplish a given task, observing the necessary safety and operational procedures. • Carry out routine maintenance of the machines. 	<ul style="list-style-type: none"> • Materials • Machines and accessories
General Objective 2.0: Features & Principles Of Operation Of Straight Line Edger			
WEEK	Specific Learning Outcome	Teacher Activities	Resources
3	2.1 Set up straight line edging machine for safe operation adjust saws, fences, pressure beams, before switching on machine; 2.2 Carry out all straight-line edger operations accurately.	- do -	- do-.
General Objective 3.0: Straight Line Edger Maintenance			
WEEK	Specific Learning Outcome	Teacher Activities	Resources
4-5	3.1 Clean up and oil saws; 3.2 Set and sharpen saws by machine 3.3 Remove saw dust from the machine and keep the surrounding clean using electric blower 3.4 Oil and grease regularly the nipples and roller bearings of the machine 3.5 Oil and grease the moveable parts to minimize friction		

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED MACHINE WOODWORKING		Module Code: CMW 22	Contact Hours: 120
Course Specification: Practical Content			
General Objective 4.0: The Moulding Machine			
WEEK	Specific Learning Outcome	Teacher Activities	Resources
6	4.1 Remove and mount each block on the machine correctly. 4.2 Prepare setting plates; 4.3 Set cutters on each block using any of the following methods: (a) Using templates (b) setting from a given mould 4.4 Grind, hone and sharpen cutters to predetermined shapes; 4.5 Set the machine for any form of moulding operations	- do	- do
7	4.6 Operate and adjust the hopper feed attachment and feeding table; 4.7 Set and use the splitting saws on the beading head in production line. 4.8 Use the machine to produce various types of moulding	- do -	- do -
General Objective 5.0: Moulding Machine Maintenance			
WEEK	Specific Learning Outcome	Teacher Activities	Resources
	5.1 Sharpen cutters regularly and properly NOTE: Cutters must be balanced before fitting into cutter blocks. 5.2 Use electric blower or other devices to clean the machine regularly.	- do -	- do -

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED MACHINE WOODWORKING		Module Code: CMW 22	Contact Hours: 120
Course Specification: Practical Content			
General Objective 6.0: Double-end Tononing Machine			
WEEK	Specific Learning Outcome	Teacher Activities	Resources
9	6.1 Set up the double-end tononing machine 6.2 Produce various components of joinery or furniture items using the double end-tononing machine.	- do -	- do -
General Objective 7.0: Maintenance Of Double-End Tenoning Machine			
WEEK	Specific Learning Outcome	Teacher Activities	Resources
10	7.1 Plan the servicing of the machine with particular attention to cleaning of the chains, tracks or slots regularly; 7.2 Clean and lubricate the machine.	- do -	- do -
General Objective 8.0: Wood Lathe Turning Machine			
WEEK	Specific Learning Outcome	Teacher Activities	Resources
11-12	8.1 Operate the hand turning lathe. 8.2 Produce furniture components e.g. turned table leg, bed leg, and stool leg. Etc. 8.3 Apply safety rules/ precautions e.g. wearing of apron, goggles, hand gloves, etc. 8.4 Clean machine after use. 8.5 Grease and oil machine after use.		
Examination:- Theory 30% Practical 70%			

Advanced Upholstery Design/Period furniture design and construction

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING	
Module: ADVANCED UPHOLSTERY DESIGN AND CONSTRUCTION AND PERIOD FURNITURE	Module Code: CFC 22
GOAL: This module is designed to provide to provide the trainee with further knowledge and skill to enable him design and construct complex furniture and auto upholstery.	
General Objectives:	
<ol style="list-style-type: none">1. On completion of this module, the trainee should be able to:2. Design and develop complex upholstered furniture and auto upholstery3. Construct an auto-upholstery4. Construct a complex upholstery furniture	

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED UPHOLSTERY DESIGN AND CONSTRUCTION AND PERIOD FURNITURE		Module Code: CFC 22	Contact Hours:
Module Specification: Theoretical Content			
General Objective 1.0: Understand history of Period Furniture.			
Week	Specific Learning Outcome	Teachers Activities	Resources
1-5	1.1 Narrate the history of period furniture starting from the Gothic, the renaissance and the contemporaries.	<ul style="list-style-type: none"> • Explain the history of furniture styles beginning from the earliest time of Renaissance to the contemporaries. • Explain the type of materials used e.g. bronze, wood which were made by the Egyptian, Greeks, Italians etc. 	<ul style="list-style-type: none"> • Text book • Lesson note • Chalk board • Pictures
General Objective 2.0: Furniture Styles			
Week	Specific Learning Outcome	Teachers Activities	Resources
	2.1 Explain the traditional styles of furniture and how they originated 2.2 Explain the provincial styles of furniture and how they originated 2.3 Explain the contemporary styles of furniture and how they originated. Identify period furniture items. 2.4 Comprehend the complexity of period furniture - coronation chair, carve doors and panels, curved chair backs, etc. 2.5 Explain methods of cutting shapes and figures	<ul style="list-style-type: none"> • Name the furniture styles and explain the traditional styles of furniture and how the originated were their furniture carved from wood • Explain the contemporary styles of furniture and how they originated. • Identify types of furniture made during the: 13th and 14th century (Italian Style), 15th and 16th century (Renaissance style, 17th century (Baroque style) etc 	<ul style="list-style-type: none"> • Text book • Lesson note • Chalk board • Pictures
General Objective 3.0: Complex Upholstered Furniture			
Week	Specific Learning Outcome	Teachers Activities	Resources
11-12	3.1 Translate imaginative concepts into sketches. 3.2 Translate sketches to pictorial projections and working drawing	<ul style="list-style-type: none"> • Sketch a design and draw to required specification a model upholstery armchair. • Translate the imaginative sketch into real physical model. 	<ul style="list-style-type: none"> • Text book • Lesson note • Chalk board • Pictures

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED UPHOLSTERY DESIGN AND CONSTRUCTION/PERIOD FURNITURE		Module Code: CFC 22	Contact Hours: 23 6
Module Specification: Practical Content			
General Objective: Understand history of period furniture and produce period furniture up to factory standard			
Week	Specific Learning Objective	Teacher Activities	Resources
1-4 5	1.1 Draw and produce a variety of templates, e.g. cabriole legs, turned and fluted legs, etc. 1.2 Use the templates to mark and cut the required shape. 1.3 Dress shapes with hand tools and machines. 1.4 Select and mark out joints. 1.5 Assemble simple period furniture. 1.6 Draw and develop templates for various shapes. 1.7 Produce creative construction for beauty of period furniture. 1.8 Use hand and power tools to produce variety of shapes and figures on the surface of period furniture, e.g. engraving machine, carving chisel. 1.9 Join and assemble the furniture units together.	<ul style="list-style-type: none"> • Ask the students to produce: (a) sketches and designs (b) templates (c) selected joints. • Guide the students to develop and produce templates using power tools and hand tools. 	<ul style="list-style-type: none"> • Drawing instruments • Tools and equipments • Materials • Tool & equipments
General Objective 2.0: Complex Upholstered Furniture			
Week	Specific Learning Objective	Teacher Activities	Resources
6-9	2.1 Determine appropriate sizes from preliminary free hand sketches. 2.2 Translate to pictorial projections and working drawing 2.3 Develop patterns and Cut to shape. 2.4 Interpret the working diagram of the complex furniture e.g. period furniture 2.5 Construct the complex upholstered furniture following a stated sequence	- do -	- do -

PROGRAMME: ADVANCED NATIONAL TECHNICAL CERTIFICATE IN FURNITURE MAKING			
Module: ADVANCED UPHOLSTERY DESIGN AND CONSTRUCTION/PERIOD FURNITURE		Module Code: CFC 22	Contact Hours: 23 6
Module Specification: Practical Content			
General Objective 3.0: Auto Upholstery			
Week	Specific Learning Objective	Teacher Activities	Resources
10-12	3.1 Apply serpentine or coil spring with necessary clips 3.2 Stitch and weave springs 3.3 Burlap the springs 3.4 Stuff the frame 3.5 Cut and sew to pattern 3.6 Cover the frame and secure with clips	<ul style="list-style-type: none"> • Ask the student to make sketches of a chosen car seat. • Identify types of springs used for car seats and method of padding seats. • Carry out stuffing, burl-aping of the springs. • Demonstrate how patterns are cut, sewing, covering and securing of seats with clips. Guide the students to design and produce a chosen car seat to industry standard. 	<ul style="list-style-type: none"> • Tools and equipment • Materials
13	Examination: Theory 30% Practical 70%		

Guidelines for text book writers

NATIONAL/ADVANCED TECHNICAL CERTIFICATE IN FURNITURE DESIGN AND CONSTRUCTION

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 point where emphasis is needed.
4. Line spacing should be set to 1.5 lines
5. Headings and subheadings should be emboldened
6. Photographs, diagrams and charts should be used extensively throughout the book, and these items must be up-to-date
7. In all cases the material must be related to industry and commerce, using real life examples wherever possible so that the book is not just a theory book. It must help the students to see the subject in the context of the 'real world'
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 be drawn from Nigeria wherever possible, so that the information is set in a country context.
10. Each chapter should end with student self-assessment questions (SAG) so that students can check their own mastery 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 and aims 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 of 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.

Tools and Equipment List

LIST OF EQUIPMENT FOR FURNITURE DESIGN AND CONSTRUCTION

<i>S/NO</i>	<i>TOOLS</i>	<i>QUANTITY REQUIRED</i>
1	Paint brushes (sets)	10
2	Putty knives	10
3	Marking gauge	20
4	Mortise gauge	20
5	Marking knives	30
	<u>Squares</u>	
6	Try square	25
7	Mitre square	25
8	Sliding bevel	25
9	Tape (metric) rule	30
10	Jack plane	25
11	Smoothing plane	25
12	Block plane	10
13	Rebate plane	10
14	Grooving/plough plane	10
15	Bull-nose plane	10
16	Jointing plane	5
17	Router Plane	5
18	Rip Saw	15
19	Crosscut/Hand saw	25
20	Tenon saw	20
21	Pane saw	15
22	Coping saw	20
23	Nest of saw/compass saw	15
24	Key-hole saw	10
25	Fret Saw	6
26	Dovetail/back saw	15
27	Firmer Chisel	20 sets
28	Bevel-edge Firmer Chisel	20 "

<i>S/NO</i>	<i>TOOLS</i>	<i>QUANTITY REQUIRED</i>
29	Mortise (set) chisel	20 “
30	Turning chisel	10 “
31	Centre Bits	5 sets
32	Auger Bits	5 sets
33	Twist Bits	10 “
34	Countersink	5 “
35	Rose	5 “
36	Gimlet	5 “
37	Ratchet braces	20 “
38	Breast drills	20 “
39	Drills Bits	20 “
40	Screw Driver (set of 6)	10 “
41	Mallet	20 “
42	Claw-hammer	10
43	Ball pein hammer	10
44	Warrington hammer	10
45	Bradawl	20
46	Pincers	20
47	‘F’ Cramp	10
48	Sash cramp	10
49	Gee (‘G’) cramp	20
50	Hand cramp	10
51	Corner cramp	10
52	Bench-hold fast	20
53	Triangular files (set)	15
54	Flat files	20
55	Scraper (flat)	30
56	Dividers	15
57	Round files (set)	10
58	½ Round files	10
59	Scraper (cabinet)	10
60	Dowelling Jig	5

<i>S/NO</i>	<i>TOOLS</i>	<i>QUANTITY REQUIRED</i>
61	Rasps	10
62	Sewing machine	2
63	Scissors	10
64	Staplers	10
65	Needles (set) curved and straight	20
66	Tack hammer	10
67	Gimlets	5
68	Pliers	5
69	Magnetic hammer	10
70	Knives	5
71	Ripping chisel	10
72	Mallets	10
73	Screw drivers	2 sets
74	Tape measures	10
75	Webbing strainer	20
76	Spring cutter	5
77	Spanners & Wrenches	2 sets
78	Work benches	5
79	Storage cub boards	2
80	Button making machines	1

List of Participants

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

PROJECT TEAM MEMBERS

S/No.	NAME	DESIGNATION
1.	Engr. Dr. Nuru A. Yakubu	National Project Coordinator & Executive Secretary, NBTE
2.	Dr. M.S. Abubakar	Technical Coordinator
3.	Engr. S.C. Odumah	Curriculum Development Coordinator
4.	Mr. B.N. Niriyyus	Staff Development Coordinator
5.	Engr. Dr. S.N. Mumah	Information & Communication Technology Coordinator
6.	Isa Alhaji Sulaimanu	Project Accountant
7.	Mal. A.D.K. Muhammad	Project Officer

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