

230 – FURNITURE MAKING

Examination Structure

For this trade, the following are the trade – related courses:

191 – Metalwork (CME 11- 12)

193 – Building/Engineering Drawing (CTD 11 – 14)

The trade will also be examined under this component

231 – Furniture Making (CFM 11, 12 & 13 and CFM 14)

Examination Scheme:

231 – Furniture Making (CFM 11, 12, 13, 14 & CMW 11-13)

The examinations will comprise of two papers as follows:

231-Paper I: SECTION A: Theory paper consisting of 40 Compulsory objective questions to be answered in 40 minutes, each question carries one mark.

SECTION B: This paper comprises of five structured questions with drawing and design. Candidates will be required to answer any three for 60 marks in two hours.

231-2 Paper II: Practical work for 6½ hours duration for 100 marks.

Topic / Objective	Contents	Activities / Remarks
<p>1.0 General Safety</p> <p>1. List, name and identify sources of hazards, accidents and safety wears and equipment in a wood workshop.</p> <p>2. Apply the safety rules and safety measures in case of accident in a wood workshop.</p>	<p>1. Safety precautions when handling and using hand tools, power tools and machines.</p> <p>2. Sources of accidents in the workshop.</p> <p>3. Safety wears and equipment e.g. goggles, fire extinguishers etc. Materials handling, clothing, health, hazards, movement, machines operations, fire etc.</p> <p>4. First aid.</p>	<p>1. Make simple safety devices to protect the students from injury when using cutting tools, machines etc. Keep the first Aid box in the workshop. Keep a record of accidents. Show film on safety In industry. Make chart on safety procedures.</p>
<p>2.0 Wood Work Hand Tools</p> <p>1. Identify, classify and state types of hand tools and safety precautions to be observed in using the tools.</p> <p>2. State the uses and maintenance of the tools.</p> <p>3. Prepare timber to a given specification using hand tools.</p>	<p>Hand tools classification and uses</p> <p>1. Geometrical and marking – out tools:- Try square, dividers, gauges.</p> <p>2. Cutting tools:- jack, smooth, try planes. Spoke – shave etc. Chisels: Firmer, pair mortice etc. Boring: ratchet and wheel braces bits; drills and countersinks.</p> <p>3 Impelling tools; hammer, mallet etc. Maintenance of all tools. Sharpening plane cutters, chisels, drills, saw teeth set, cleaning and lubricating and storing</p> <p>4 Holding and supporting tools: G-crimp, F-crimp, bench vice etc.</p>	<p>1. Use tools in performing practical exercises.</p> <p>2. The use of oil stone to sharpen tools.</p> <p>3. Emphasize on the students' safety.</p>
<p>3.0 Timber Preparation</p> <p>1. Explain and demonstrate the principles and the sequence of cutting and plane all surfaces and edges to flatness and squareness with its mark.</p>	<p>1. Sequence of preparing timber to size.</p> <p>2. Wood work bench tools: Jack plane, hand saws, marking guage, try square, rules, smoothing plane etc.</p>	<p>1. Practical operations involved should be followed in sequence.</p>

Topic / Objective	Contents	Activities / Remarks
4.0 Marking Out 1. Interpret simple working drawings of wood work projects. 2. Identify convention of representation using on working drawings.	1. Sketching and developing of working drawing 2. Conventional representation used in woodwork.	1. Produce a working drawing for a project.
5.0 Portable Electric Tools 1. List and describe common portable hand tools. 1. Explain their operations and uses.	1. Common portable hand tools e.g.: (a) Portable saw (b) Portable planer (c) Portable drill (d) Portable sander (e) Jigsaw 2. Operations: Planing, sawing, miltreing, Drilling, sand-papering, rebating etc.	1. Practical demonstration
6.0 Wood Working Machines 1. List, state and explain Wood working machines, its purpose, working principles of each machine and observe safety precautions.	1. Basic wood-working machines: - various parts - working principles. 2. Surface planing, thicknessing, circular saw, mortising, cross cutting; drilling, simple-ended tenoning machine etc.	1. Practical demonstration 1. Operate woodworking/ machines to perform various operations.
2. Carry out various operations and maintenance of the machines.	1. Uses: of drum dust, fume and dust extractors. 2. Maintenance of machines and tools, e.g. clean lubricate all machines tools, set oil levels, replace burnt fuse, bulb and worn out drive belts etc.	
7.0 Common Wood Work Joints 1. Identify common wood work joints and their uses. 2. Construct common	Types of woodwork joints. 1. Widening joints 2. Angle joints 3. Frame joints	1. Sketch the guards, fences and other protective parts. 2. Make projects to embody joints in each group 3. Emphasise the

Topic / Objective	Contents	Activities / Remarks
wood work joints		practical application of the joints. 4. Students should not be allowed to use machines without their instructor, supervisor in the workshop.
8.0 Construct Common Woodwork joints and Frame Construction 1. Identify the various types of frame construction and state where applicable. 2. Identify the various types of carcase construction and state where each is applicable.	1. Types of frame constructions. 2. Types of carcase constructions e.g. simple framed carcase etc. 3. Construction factors to be considered e.g. rigidity, jointing method, squareness of frame e.g. Butt and dowel joint, mortice and tenon joint, mitre and feather joints.	1. Working drawing of project is needed. 1. Exercise in framed and carcase constructions.
9.0 Timber Growth and Structures 1. Describe the growth and structure of a tree 2. Explain the various methods of conversion. Seasoning 3. Describe the various methods of seasoning timber. 4. State the advantages and disadvantages of each method.	1. Timber growth and structure. 2. Felling and conversion of timber. 3. Seasoning of timber. 4. Types of Nigerian timbers and their properties e.g. Abura, Agba, Mahogany etc.	<ul style="list-style-type: none"> - Visit a sawmill. - Use charts showing various methods. - Show samples of Nigerian timber.
5. Identify the various types of Nigerian timbers and state their properties.	1. Timber defects and causes e.g. splits, warp, twist, case-hardening, collapse etc. Fungus, white ants, woodborers.	1. Show samples.
1.0 Manufactured	1. Common manufactured boards	1. Examine some

Topic / Objective	Contents	Activities / Remarks
<p>Boards</p> <p>1. Identify common manufactured boards and state their uses.</p>	<p>and their uses. Plywood, lamin-board, block-board, chip board etc.</p> <p>2. Properties e.g. grain, figure density etc.</p>	<p>samples of boards.</p> <p>2. Collect specimens.</p>
<p>12.0 Adhesives</p> <p>1. State and describe types of adhesive and their composition e.g. protein, synthetic resin etc.</p> <p>2. Prepare glue for use.</p>	<p>1. Main types of adhesive: protein, synthetic resin and contact, animal vegetable and thermoplastics glues (PVC, ponal).</p> <p>2. Properties, preparation and application of each type.</p>	<p>1. Apply the different types of adhesive to on-going projects.</p> <p>2. Show the students different types of adhesive.</p>
<p>13.0 Fittings and Fastenings</p> <p>1. List and identify various types of fittings.</p> <p>2. Explain and state the properties of the fasteners and materials used for common fitting.</p>	<p>1. Types of fitting, e.g. hinges, locks, handles, catches etc.</p> <p>2. Selection and application of fittings.</p> <p>3. Properties of materials used for common fitting e.g. brass, mild steel, aluminium, plastics etc.</p>	<p>1. Examine different types of each hardware.</p> <ul style="list-style-type: none"> - Make freehand sketches; - Make projects; using various types of fittings and fasteners. <p>2. Demonstrate correct methods of fixing fittings.</p>
<p>14.0 Wood Finishing</p> <p>1. Explain the purposes and state types of wood finishing materials.</p>	<p>1. Purposes of finishing wood.</p> <p>2. Types of wood finishes e.g. paints varnishes, pigments etc.</p>	<p>1. Prepare the surface.</p>
<p>1. Name the composition of finishing materials.</p> <p>3. Prepare wood surface for finishing.</p>	<p>3. Composition of common wood finishing materials.</p>	<p>1. Apply finishes to on-going job.</p>

FUNDAMENTALS OF MACHINE WOOD WORKING I (C.M.W. – 12)

Topic/Objective	Contents	Activities/Remarks
<p>1.0 Pull-Over Cross Cutting Machine</p> <p>1. Describe the main features; and working principles, metal properties, operation and safety precautions of pull-over cross cutting machine.</p> <p>2. Identify the various cutters and accessories, mount and dismount cutters, saw blades sharpen, operate the machine.</p> <p>2. Carry out some routine service and maintenance on the machine.</p>	<ol style="list-style-type: none"> 1. Features of a pull-over, cross cutting machine. 2. Principles of operation. 3. Safety precautions. 4. Various cutters and accessories. 5. Machine mounting. 6. Routine service and maintenance. 	<p>Making of basic wood work joints and demonstrations.</p> <p>Cross-cutting timber to required rough length. Square and regular cutting. Strict adherence to safe working and the use of safety devices must be emphasized at all times.</p> <p>Cutting operations: straight and angular. Trenching operations.</p> <p>Clean and oil the machine.</p>
<p>2.0 Circular Saw</p> <p>1. List, identify and explain features, parts, scope and principle of operating circular saw.</p> <p>2. State safety instructions, fix and remove saw and riving knife; construct jigs, and fixtures, change speed, change, sharpen blade and lubricate the machine parts.</p>	<ol style="list-style-type: none"> 1. Main features of circular ripping saw. <ul style="list-style-type: none"> - Scope and operating principles. 2. Types of saws and their uses. <ul style="list-style-type: none"> - Shapes of saw teeth, hook, gullet etc. guards, riving knife, push stick, safe operational technique. 3. Jigs or fixtures. 4. Saw speed calculation. 5. Machine operations. 6. Machine lubrication. 	<ul style="list-style-type: none"> - Cutting to the width. - Adjusting of fence and guard. - Rise and fall table exercises in ripping, deeping, grooving, rebating, tenoning, etc. <p>Emphasis on safety regulations as stipulated by Federal Ministry of Labour.</p> <p>Use jigs and fixtures for projects.</p> <p>Application of push stick while sawing.</p>

Topic/Objective	Contents	Activities/Remarks
<p>3.0 Dimension Saw Bench</p> <p>1. State the features and working principles of saw bench, its operation, state safety precautions and identify the metal/materials used in the manufacture of components parts.</p> <p>2. Calculate spindle speed and peripheral speed of saw, mount the saw blades, and lubricate the machine parts.</p>	<p>1. Features of dimension saw.</p> <ul style="list-style-type: none"> - Principles of operation. - Necessary safety precautions. - Metal/materials used in the manufacture of components. <p>2. Set the blade into spindle and tighten it.</p> <ul style="list-style-type: none"> - cross-cutting to length mitring. - mitring - tongue and groove. - rebating, ripping etc. <p>3. Maintenance, cleaning etc.</p> <p>4. Calculation of spindle and peripheral speed of the saw blade.</p>	<p>Instruction and demonstration for correct and safe use.</p> <p>Sawing exercise to cover straight and angular work.</p> <p>Any adjustment should be done before switching on the machine.</p> <p>Safety precautions and regulations to be observed.</p> <p>Routine service as given by the manufacturer.</p>
<p>4.0 Surface Planer</p> <p>1. State and list some of the precautions and common materials used in manufacturing the machine and explain the scope and principles of operation of the surface planer.</p> <p>2. Observe the safety precautions involved while operating the machine, explain the purpose of devices and calculate the speed of the cutter.</p>	<p>1. The surface planer – materials used in the manufacture of the components e.g. cutters, table, block, etc.</p> <p>2. Arrangement and functions of various parts and methods of adjusting tables and fence. Methods used and patent devices for resetting cutters.</p> <p>3. Necessary safety precautions.</p> <p>4. Planing ‘out of wind’, squaring, bevelling, rebating, use of back stops, push blocks and springs for safe working and to reduce accident risk.</p> <p>5. Mount and dismount the cutters.</p> <p>6. Maintenance.</p>	<p>Demonstration the safe operation of the machine.</p> <p>Exercises on surfacing and squaring stock.</p> <p>Exercises to include bevelling and tapering with the use of back stop.</p> <p>Correct adjustment and setting of guard.</p> <p>Setting of cutter in machine sharpening etc. Planing, the surface and edge of timber, tapering and stopped rebating, etc.</p> <p>Sketch the machine lubricate machine.</p>
<p>3. Explain the cutting action of the blades,</p>		

Topic/Objective	Contents	Activities/Remarks
operate the surface planer, replace and remove cutters – routine service of the surface planer.		
<p>5.0 Thicknessing and Combination Planing Machines</p> <p>1. Describe and identify the features, functions of component and hazards of the machines.</p> <p>2. Explain and outline the safety and the principles of operating the machines.</p> <p>2. Identify operating faults, calculate the speed of cutter block and feed rollers, sharpen and set cutter and perform routine service.</p>	<p>1. Working principles of thickness and combination planing machine.</p> <p>2. Types of cutter blocks used and methods of sharpening and resetting cutters, power source etc, use of jigs.</p> <p>3. Causes of accidents and remedies.</p> <p>4. Operational faults.</p> <p>5. Calculation of the number of cutter mark per 25cm, high or low cutter speed.</p> <p>6. Maintenance work.</p>	<p>Features of design. Sectional and solid feed tools and pressure. Correct adjustment of feed rollers and pressure bars.</p> <p>Demonstrate the uses of the machine.</p> <p>Sharpening, honing, whetting etc.</p> <p>Demonstration on knife grinding and balancing to be emphasized.</p> <p>Mount and dismount cutters correctly. Lubricate cutters.</p>
<p>1.0 Rods, Route Sheet and Cutting List</p> <p>1. List and explain types of rods, route sheets, the purposes and limitations and prepare setting out rod.</p> <p>2. Explain set-out rods, the purposes of a cutting list and type of cutting list.</p>	<p>1. Types of rods, route sheet and cutting lists – purposes.</p> <p>2. Workshop use of rods, route sheet etc. for production.</p> <p>2. Differentiate between height and width rods – door, steel kitchen units, bookshelves etc.</p> <p>4. Determining the cost of job.</p> <p>5. Exploded orthographic and pictorial view and sketching.</p> <p>6. Route sheet preparation.</p>	<p>Full-size rods of the job, pattern or boards, scale and detailed drawing to conform with joinery and furniture produced with correct form of cutting lists.</p> <p>Differentiate between a rod and route sheet by making them on board. Selection of materials, consideration must be given to design and safety in all forms of machine exercise.</p>
3. Draw and sketch exploded orthographic		

Topic/Objective	Contents	Activities/Remarks
<p>and pictorial view and working drawing and prepare route sheets for the production of joinery and furniture items.</p>		
<p>7.0 Narrow Band Saw</p> <ol style="list-style-type: none"> 1. Identify and explain the parts and working principles of narrow band saw, safety precautions, method of straining the saw blade and principles involved. 2. Set up and use the machine for various operations, jigs, calculate the length of the blades, braze or butt weld the blades and perform routine service of the narrow band sawing machine. 	<ol style="list-style-type: none"> 1. Narrow band saw machine. <ul style="list-style-type: none"> - functions, the materials and uses of each of the part. <p>Ensure that wheels are clean. Both top and bottom wheels are covered before operation.</p> 2. Application of safety precaution e.g. isolate power before fixing the saw blades. 3. Straining of the saw blade. 4. Care of wheels, guides and guard, adjustment for efficient and safe working condition, making and setting of temporary fences. 5. Mounting of saw blade and tracking, setting of guides and guard. 6. Production of simple jigs. 	<p>Care of wheels and guide adjustment for efficient and safe working.</p> <p>Use of jigs.</p> <p>Exercise of sawings to straight lines and simple curves marked from item plate.</p> <p>Demonstration of safe operation of the machine.</p>

FUNDAMENTALS OF MACHINE WOODWORK II (C.M.W. – 13)

Topic / Objective	Contents	Activities / Remarks
<p>1.0 The Mortising Machine</p> <p>1. State and describe the working principles, layout, types of job each machine cutter performs and type of clamping devices.</p> <p>2. Install, set up cutters, for mortising operations, safety and operational precautions related to the use of the machine.</p> <p>3. Grind and sharpen mortise chisels and chains.</p>	<p>1. Working principles of a mortising machine.</p> <p>2. Types of cutters: (i) Hallow chisels. (ii) Chain cutter, method of driving single head and combined chain, pitch of chains, correct combination of sprocket wheel, guide and chain for accurate work.</p> <p>3. Different sizes of chisels. Use of stop bars for repetitive work.</p> <p>4. Grinding and sharpening of chisels.</p>	<p>Safety instruction.</p> <p>Fitting and using chisels, correct mortising procedure and chisel maintenance. Making of jigs for repetitive work. Practice in the use of various pitches of chains, carrying out mortising operation.</p> <p>Emphasize safe working rules and adjustment of cutting tools.</p>
<p>2.0 Tenoning Machine</p> <p>1. Explain the working principles of cutter blocks, state the types of job of each cutter, the spur cutters and state the relationship of tenoning – to mortising.</p> <p>2. Apply safety and operational precaution.</p> <p>3. Set up machine to produce tenons, backing piece, sharpen and cut off and balancing cutters.</p>	<p>1. Single-end tenoning machine. - Mount cutter on the machine. - Split tapered cutter block. - Circular cutter block. - Scribing cutter block. Spur cutters and its functions. Set vertical and horizontal adjustment. Setting of head and accurate set ups.</p> <p>2. Produce template for setting tenoning cutter.</p> <p>3. Shape of scribing cutter for moulding operation. Trenching square tenoning. Forked tenon and comb joints. - produce jig for safe and accurate production of angle tenon. Sharpening and setting saw. - purpose of balancing of cutters, oiling, lubrication and cleaning periodically.</p>	<p>Setting for tenons, square and stopped – shoulders, single and double scribes. Cutter making. Use of cut off saw. Saw and tenon cutter. Sharpening: Use of backing the fences for square.</p> <p>Method of trenching. Edge moulding and joints. Exercises on square tenoning. Make templates. Mortise and tenon joints on the machines. Set scribing cutter to produce mould. Instructions on safety and use of machine.</p> <p>Design the jig. Apply backing piece and stops fence.</p>

Topic / Objective	Contents	Activities / Remarks
		<p>Grind tenon, cutter scribing and spur cutters to the required profile.</p> <p>Put the cutters into the balancing machine, cleaning, oiling etc.</p>
<p>3.0 The Boring, Machine</p> <p>1. State the principles of boring machine. Identify major components, explain the scope of operation and safety precautions.</p> <p>2. Choose the suitable bits mount and remove it, mark out the work pieces with simple jigs and fixtures.</p> <p>3. Set the machine for various boring, sharpen bits, and replace worn belts and routine services.</p>	<p>1. Principles of operations of boring machine.</p> <p>2. Major components e.g. motor, chuck, spindle, pulleys, table, leverage clamping device etc.</p> <p>3. Selecting the bits in chuck. Check the work, make patterns, jigs and fixtures single and double hole.</p> <p>4. Maintenance.</p>	<p>Demonstrate the operations of the boring machine.</p> <p>Check the power before switch-on. Check the correct bits for sizes.</p> <p>Make simple jigs and fixtures.</p> <p>Carry out boring operation to given specification.</p>
<p>2. Apply safety precautions, adjust the work-table to working height and explain the working principles.</p> <p>4. Describe and explain main features of a dust extractors and safety operational techniques.</p> <p>4. Perform the routine service of sanding machines.</p>	<p>3. Apply the belt to the face of the job using hand pad, travelling pressure pad, spiral contact mechanism, features etc.</p> <p>4. State functions: floating pressure rollers, drum etc, dust extractors with the factory regulations.</p>	<p>Select the grade of sand paper for each drum, fit for sand paper on the drum.</p> <p>- observe safety regulations.</p> <p>- undertake service, oiling, cleaning etc.</p>

231 – FURNITURE MAKING

S/N	Topic/Objectives	Contents	Activities/Remarks
1.0	Design Elements 1. Define various design elements as they affect the quality of design. 2. Explain the basic application of the various design elements.	1. Design i.e. sketches, layout, pencil impress on sketch, pictures, drawing etc. 2. Basic element: objects, shape and form dimensions. 3. The quality of two and three dimensional object that processes dignity and stability	- Draw and design various elements, regular and irregular shapes.
2.0.	Design Principles Describe various design principle and its application of design elements in operations.	1. The Principles of design. 2. Balance, movement repetition emphasis contrasts unity etc. 3. The effect of shape form to be applied. 4. Design principles to various design elements of furniture articles.	- Carry out some simple design operation; stools chairs etc. - Rigidity principles. - Dimensions - Cabinets with case.
3.0.	Anthropometrics Principles Explain the mechanical, structural, standard/ sizes of human proportions as on different types of furniture.	1. Anthropometrics principles. 2. Determine various sizes of human pro-portions and dimensions. 3. Different types and sizes of chairs, stools, tables.	- Use the relationship of distance between one part of the body to another for construction of chairs, stools, table. - Sketches of the items: table, chairs, tools etc.
4.0	Timber Properties 1. Explain the mechanical, structural standard size, the strength and quality requirements of various timber materials 2. Describe various types of woodwork joints used in cabinetwork. 3. Determine and	1. Basic standard sizes of log, planks, boards etc. 2. Properties of timber used in cabinet works, elasticity, tensile. Etc. 3. Strength and quality needed, working characteristics; density, gravity of wood shrinkage and durability. 4. Sketches of joints, angle joint and M & T construction work. 5. Types of carcass joints and frame joints. Marking out spaces for various fittings and hardware.	- Identity the timber sizes - State type and indicate the standard sizes of timber refer to woodwork, laboratory test. - Dovetail, mortise and tenon, housing joints etc. - Fittings, hinges, locks, handle.

S/N	Topic/Objectives	Contents	Activities/Remarks
	sketch various types of fittings and hardware.		
5.0	Timber Sections 1. Explain economic effect of various shapes of timber section, and types of junctions between two different timber materials. 2. Explain the functional requirements in the choice of various joinery components and movement in timber	1. Economic effects are: the principles involving in methods of forming and shaping of curves, shaping, bending, materials, movement and defects in timber. 2. Types and used of fastening slot screw, bottoming methods etc. 3. (a). Relatives strengths of joints (b). Fits and tolerances required for various purposes. 4. The movement of timber: defects warping etc. 5. The factors for fittings: selection of appropriate fitting materials, and methods of constructing: a simple furniture	<ul style="list-style-type: none"> - Marking and cutting frame joints. - Use of joints, adhesives and fixing - Test for seasoning of timber - Demonstrate on furniture fittings fixtures
6.0	Joint Selection 1. Explain principles of jointing, important in cabinet work, use of glues screws and nails. 2. Identify and state the application of various joints as the factors affecting the choice of the point.	1. Principle of jointing, explain the structural and authentic qualities of the joint: Dovetail, housing, pinning etc. 2. Types of joint in cabinet making dovetail joints and housing joints. 3. Assemble with synthetic glues etc, fix the joints, state merit and demerits of the joints	<ul style="list-style-type: none"> - Exercises in joints employed for the construction of small articles of furniture demonstrating on mortise, bridge, tee, parts, etc. - Construct the following joints: <ul style="list-style-type: none"> a. bare faced mortise and tenon joints. b. Butt joints c. Dowelling d. Housing joints e. Tongue and groove f. Half-lap dovetail joints g. Pocket screwing h. Counter – bored screwing and pelleting

S/N	Topic/Objectives	Contents	Activities/Remarks
			<ul style="list-style-type: none"> i. Rebating j. Mitre joints - Emphasis on the working safety.
7.0.	Hand Tools Identify the various types of hand tools, operational principles, uses and maintenance of the tools	<ol style="list-style-type: none"> 1. Identify hand tools used for Tenoning, mortising dovetailing and housing. 2. Maintenance operations, safe keeping. 	<ul style="list-style-type: none"> - Exercise on a timber preparation and simple project furniture. - Clean, oil and store appropriately
8.0.	Production Materials <ol style="list-style-type: none"> 1. Translate the abstract thought into sketches in stool, car case design and construction. 2. Determine various angles with relative angles, shapes and the selection of construction materials. 	<ol style="list-style-type: none"> 1. Design and sketch the working drawing of tables, chairs, bedside, sideboards, wardrobe etc. Angles of inclination, dimensions, seat, height, areas, rigidity, shapes and proportions of the parts. 2. Constructional materials – wood, metal, plastic. Etc. 	<ul style="list-style-type: none"> - Draw and construct simple stool and cabinet. - Make the working drawings from sketches. - Make cutting list from working drawing and construct the project.
9.0	Preparation of Surface for Finishing. <ol style="list-style-type: none"> 1. State the purpose, working principles, types finishing materials and remove surface defects. 2. Outline and apply stain, filler, undercoat, sanding sealer, lacquer or paint by spraying or by hand brush. 3. Maintain and clean spray 	<ol style="list-style-type: none"> 1. The materials include wood, metal, plastic etc. 2. The purpose of finishing – decoration, preservation etc. filling, staining, sealing spraying, brushing, dipping etc. 3. Explain air compressors, air line dyers and fan extractors. 4. Grades of abrasives by number and number and O-grades system. 5. Types of fillers, and stains used in furniture finishing for matching uniformity of wood filler, undercoat, sanding sealer, lacquering or painting. 	<ul style="list-style-type: none"> - Prepare the wood surface for finishing by wood sandpaper to remove the surface blemishes. - Emphasis of the working safety to person, work and materials. - Exercise of filling, staining, base coating etc. - Spraying or hand brushing of the surface. - Use spraying room. Observe the personal safety in the room.

S/N	Topic/Objectives	Contents	Activities/Remarks
	equipment, use nose and mouth mask.	6. Prevention of health hazard.	Always use nose and mouth mask.
10	Production of Stools 1. List types of stools, various sizes and design production drawing. 2. Prepare cutting list, mark out and make the required joints with hand tools. 3. Assemble the units with adhesives, and fasteners, scrape and sandpaper the stool and apply spray, polish or paper decorative.	1. Types of stools – drinking stools, dressing stool, bar stool etc. Draw types of stools to standard sizes. 2. Prepare production drawing on chosen types e.g. bar stool, cutting list of legs top rails, stretcher rails top, etc. 3. Mark out joints on mortise, and tenon joints, dowelling, tongue, pocket screwing etc. 4. Assemble by applying glue and cramp with adhesives and fasteners. 5. Pre-finishing i.e. scraper, rubber, block, sandpapers rub along, polish or paper decorative for finishes.	<ul style="list-style-type: none"> - Produce the working rod. - Mark the required joints for the exercise - Cramp test for squareness - Scraping and papering exercises - Apply finishes
11	Production of chairs 1. Identify various types of chairs, design production drawing. 2. use templates for marking out the parts , choose and mark out shapes and joints with machines. 3. Assemble the units with adhesive and fasteners, angle brackets, scrape and sandpaper and apply finish in spray, polish or paper decorative.	1. The types of chairs, design; dimensions (seat heights, areas) etc. 2. Cutting list from normal sizes to finished sizes, front legs, back legs, arm rest, side rail, back and front rail etc. 3. Templates – cutting on band saw and shaping with ring fence on spindle moulder. 4. Mortise and tenons, doweling. 5. Adhesive and cramp test for squareness. Fortify with wood brackets for angles of the joint. Scrapes, sand paper etc. 6. Application of finishes	<ul style="list-style-type: none"> - Construct looses frame, platform, with spring, hessian, stuffing of filling, tacking, covering, back covering, fixing of tension spring, stitching. - Show method of cutting and sewing covering upholstery with soft cover.

S/N	Topic/Objectives	Contents	Activities/Remarks
12	Production of Desks 1. Design desk and prepare blue prints, cutting list mark out and prepare joints. 2. Make different parts components, assemble of the carcass, wooden legs. Metal frame and fix drawer in the carcass, scrape and sandpaper and finish.	1. Design – sketch the working drawing of writing desk. 2. Drawing and designing, etc, nominal sizes to finish. 3. sizes, components, (front, side, back and bottom) top. 4. Preparation of joints e.g. barefaced mortise and tenon, tongued and grooves, half lap dovetail, pocket screwing housing joints, mitering and rebating. 5. Application of glue and clamp 6. Fix drawer to carcass, preparation for finishing. 7. Spray polish and decorative paper	- Make different parts, carcass, wood legs top etc.
13	Cabinet Materials 1. Distinguish between natural and artificial materials required for cabinet. 2. Select and identify cabinet fittings.	1. The different materials – timber, plywood, particle boards, block board, etc. 2. Plywood and hardboard. 3. Cabinet fittings – locks, hinges, handle, castors slides, tracks. Stays catches, bolts, etc.	- Provision of the required materials
14	Cabinet Carcass Construction 1. Identify the different types of cabinet, design and prepare cutting list. 2. Identify and select the types of joints, ironmongery, finish, polish and paper decorative.	1. The types of cabinets – wardrobe, side cabinets, chest of drawers, sideboard, etc. 2. Drawing of cabinet carcasses. 3. Nominal cutting list. 4. The joints – dowelling, housing, dove tailing tongue and groove, etc. 5. Application of glue to the joints 6. Fixing ironmongery 7. Spraying and polishing.	- Prepare the wood for the job. - Make the joints - Assemble the carcass with glue, spray, polish, etc.
15	Construct Drawers, Shelves and Base and Beds. 1. Construct	1. Drawing of joints e.g. dovetail, housing pinning dovelling, groove for drawer using runner, slide etc.	- Design and construct the panels, boxes, beds and plinth.

S/N	Topic/Objectives	Contents	Activities/Remarks
	<p>drawers, various methods of securing it into the carcass and fix shelves.</p> <p>2. construct and fix various types of doors, and plinths, beds ends and rails.</p>	<p>2. Fixing shelves e.g. permanent, loose adjustable position.</p> <p>3. Fixing doors e.g. plane panel, raised panel, and glazed door.</p> <p>4. Box plinth, stool carbricole legs, metal legs, etc.</p> <p>5. Beds-ends and rails</p>	
16	<p>Lipping and Veneering</p> <p>1. Explain the purpose of lipping and veneering .</p> <p>2. Identify and apply the lipping and veneering, scraping, glass paper</p>	<p>1. To prevent edge tearing and provide attractive appearance.</p> <p>2. For aesthetic and economic purposes.</p> <p>3. Application of lipping and veneering to furniture.</p> <p>4. Use scraper for scrapping the edges.</p> <p>5. Glass paper and apply Lacquer.</p>	<p>- The student should glue veneers to the furniture articles and lip the edge with veneer or solid wood.</p>
17	<p>Design and Construction of upholstery Frame.</p> <p>1. Translate ideas to sketches and to pictorial drawings and to production drawings and prepare blue prints.</p> <p>2. Select and prepare cutting list and use templates for marking out and shaping of necessary parts on the band-saw machine.</p> <p>3. Mark out and construct joints assemble and remove axis.</p>	<p>1. Translation of ideas to sketches.</p> <p>2. Translation of sketches to pictorial drawing.</p> <p>3. Standard working drawings: choosing all elevations – front, side, plan and sectional drawing.</p> <p>4. Preparation of cutting list from the nominal sizes to finished sizes.</p> <p>5. Marking out and cutting shape e.g. using template, band-saw machine. Etc.</p> <p>6. Marking out and construction of joints e.g. dowelling, butt joints, mortise and tenon, and fasteners etc.</p> <p>7. Glues and its method of application.</p> <p>8. Application of preservatives</p>	<p>- Use thought to sketch a project, pictorial views.</p> <p>- Show diagrams of objects to sketch in the students' drawing books</p> <p>- Produce a working drawing on the blue print</p> <p>- Mark out the shape, cut the scope</p> <p>- Mark the joints. Cramp the joints for final assemble</p>

S/N	Topic/Objectives	Contents	Activities/Remarks
18	<p>Principles of Upholstery Construction. Explain the basic principle, the purpose of frame and out-line the requirements in chair frames in upholstery construction</p>	<ol style="list-style-type: none"> 1. The principles necessary to achieve strength and rigidity e.g. application of brackets and use of appropriate joints. 2. Types of upholstery supports e.g. loose seat: and show wood: stuff over, spring and suspension – spring system. 3. Principles of rigidity and standard sizes single cone. Double cone, serpentine (Zigzag) helical tension, spring. 4. Fixing arms using bolts. 5. Reinforcement necessary for rigidity bracket and timber thickness. 	<ul style="list-style-type: none"> - Fix the webs springs and final covering. - Referred to practical upholstery by C Howes, Woodwork in theory and practice by J. A. Walton.
19	<p>Frame Construction</p> <ol style="list-style-type: none"> 1. List the parts of carcase, tolerance for stuffing, springing and covering. 2. Explain methods of assembling. 	<ol style="list-style-type: none"> 1. The parts of carcase – side, back, post bottom, back rail, extra post, top, back rail, arm rest rail etc. 2. Stuffing springs, webs covering materials. 3. Method of assembling - jointing 	<ul style="list-style-type: none"> - Tools and equipment - Chalk board - Models of given joints - Free hand sketches in various views.
20	<ol style="list-style-type: none"> 1. Identify the types of various kinds of springing and suspension. Springs and webs. 2. Identify and compare the properties of upholstery and bedding fittings, the main types of adhesive and fasteners. 3. Identify and use hand tools and describe the operational principles and use of the powered 	<ol style="list-style-type: none"> 1. Upholstery materials: resilient quality possibility of reuse, aesthetic – value. 2. Types of springs and webs e.g. rubber, jute, black and white webs etc. 3. The properties of upholstery materials e.g. latex foam, plastic foam, natural fibres, synthetic fibres, coco fibres, hair etc. 4. Types of adhesives e.g. rubber based solution, polyurethane glue tacks stud, staple pins, etc. 5. Hand tools e.g. web-stretcher, needles and awls, ripping chisels, etc. 6. Operational principles of 	

S/N	Topic/Objectives	Contents	Activities/Remarks
	hand tools. 4. List and explain the operation of main types of sewing machines.	powered hand tools e.g. cutters, electric iron, foam cutter, drills stapling gun, (pneumatic and electric) powered cutters – moulding machines etc. 7. Operation of sewing machines sewing fabrics and leather.	
21	Upholstery Fabrics 1. Explain the accurate measurement and correct sewing allowances and properties of covering materials and also using template to cut the fabric and leather cloth to sizes. 2. Identify the parts of a sewing machine, types of needle, thread and adjust the sewing machine to suit its materials.	1. Behavior of covering materials under the cutting process and the necessary allowance for shrinkage or overstretching. 2. Properties of covering materials e.g. leather, fabrics, pile, fit woven, knitted and printed, natural and synthetic. 3. The parts of sewing machine – pipe foot, gathering foot, zip fastener foot, etc. 4. Needles – hands and machines 5. Operation of sewing machines e.g. perform different methods of joining up upholstered components (arm, back and seats) etc.	<ul style="list-style-type: none"> - Mark the fabric and give allowance. - Use scissors to cut the fabrics. - Select appropriate needles for a given kind of materials. - Operate the machine. - Application of needles; straight and curve needles.
22	Fix Sewn Materials 1. Identify methods of fixing stretch. Check for correct fitting and tack the covering materials 2. Assemble the parts, cover the bottom and fix the castors and glide	1. Methods of fixing upholstery covering materials. 2. Fixing castors and glides 3. Edge finishing 4. Positioning, buttoms and decorative tacks. 5. Types of dust materials and methods of fixing. 6. methods of bottom and back finishing.	<ul style="list-style-type: none"> - Cover the filling with fabric or leather cloth give temporary tacking. - Give final tack and assemble the members together. - Make a frame for upholstery.