

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

**Fundamentals of Machine Woodworking II**

<b>PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.</b>			
<b>Module: FUNDAMENTALS OF MACHINE WOOD WORKING II</b>		<b>Module Code: CMW -13</b>	<b>Contact Hours 4hrs theory and 6hrs practical</b>
<b>Module Specification: Theoretical Content:</b>			
<b>General Objective 1.0: Understand the working principle of a mortising machine, its construction and be able to use it for mortising operations.</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
1	1. Explain the working principles of a mortising machine. 2. Describe the layout and general design of the machine. 3. Differentiate between the two main types of cutters used on the machine a. Hollow chisel b. Chain cutter, and state the types of job each cutter is best suited. 4. Describe types of clamping devices and attachments for the mortising machine.	<ul style="list-style-type: none"> <li>• Explain the working principles of a mortising machine, describe the layout and general design of the machine, differentiate between the two main types of cutters used on the machine, Hollow chisel and chain cutter and their uses.</li> <li>• Set up the machine for normal and repetitive mortising operations and carry out mortising operations to given specifications.</li> </ul>	<ul style="list-style-type: none"> <li>• Mortising machine and charts showing the various parts of the machine,</li> <li>• Maintenance equipment, oil, brush etc.</li> </ul>
<b>General Objective 2.0: Tenoning Machine</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
2	2.1 Explain the working principles of the single-end tenoning machine in its various forms. 2.2 Describe the spur cutters and state their functions. 2.3 Develop the shape of scribing cutter for a moulding operation.	<ul style="list-style-type: none"> <li>• Explain the working principles of the single end tenoning machine in its various forms, list the different cutter blocks that can be mounted on machine and the type of job each cutter is best suited for example: Split tapered cutter block, circular cutter block, - Scribing cutter.</li> </ul>	<ul style="list-style-type: none"> <li>• Mortising machine</li> <li>• Charts</li> <li>• Chalk board work</li> </ul>

<b>PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.</b>			
<b>Module: FUNDAMENTALS OF MACHINE WOOD WORKING II</b>		<b>Module Code: CMW -13</b>	<b>Contact Hours 4hrs theory and 6hrs practical</b>
<b>Module Specification: Theoretical Content:</b>			
<b>General Objective 2.0: Tenoning Machine</b>			
	2.4 Explain the principles and applications of backing piece, and stops for production work. 2.5 Explain the purpose of balancing each pairs of cutters on the balancing machine.	• Guide the students to carry out operation on sharpening and setting of profiles.	• Mortising machine • Charts • Chalk board
<b>General Objective 3.0: The Boring Machine</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
4.	3.1 Explain the basic principle of boring machine. 3.2 Identify major components of boring machine and state their functions: a. motor b. spindle c. table d. cramping device e. chuck f. leverage, hand or foot pedal 3.3 Explain and demonstrate the scope of operation of the boring machine. 3.4 Apply safety precautions related to boring machines, e.g. Isolate machine from power source, etc.	• 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.,	• Boring machine, • Charts • Chalkboard work.
<b>General Objective 4.0: Portable Electric Tools</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
5	4.1 Describe the common portable hand tools used in woodwork; a. Portable saw b. Portable planer c. Portable drill d. Portable sander e. Jig saw f. Drilling machine	• Explain the working principles of portable power tools • Present samples of the various machines for students to see. • Ask students to identify the parts and explain their functions.	• Portable power • Tools • Charts • Chalk board • Lesson note

<b>PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.</b>			
<b>Module: FUNDAMENTALS OF MACHINE WOOD WORKING II</b>		<b>Module Code: CMW -13</b>	<b>Contact Hours 4hrs theory and 6hrs practical</b>
<b>Module Specification: Theoretical Content:</b>			
	4.2 Explain how each of the tools listed in item 5.1 above works.		
<b>General Objective 5.0: Sanders</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
6	<p>5.1 Explain the principles of operation of the following hand machines:</p> <ul style="list-style-type: none"> <li>a. Overhead traveling belt</li> <li>b. Disc and bobbing sanders</li> <li>c. Drum sander</li> </ul> <p>5.2 Illustrate with sketches the working principles of the sanding machines.</p> <ul style="list-style-type: none"> <li>a. Overhead traveling belt</li> <li>b. Disc and bobbing sanders</li> <li>c. Drum sander</li> </ul> <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"> <li>• Explain the principles of operation of the following sanding machines: (a). overhead traveling belt.</li> <li>• Disc and bobbing sanders</li> <li>• Drum sander.</li> <li>• Carry out sanding operation with wood sawing machine.</li> </ul>	<ul style="list-style-type: none"> <li>• Charts/Pictures</li> <li>• Chalk board</li> <li>• Lesson note</li> </ul>
<b>General Objective 6.0: Planning Machines</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
7-8	<p>6.1 Explain the working principles of planning machines using annotated single line diagram.</p> <p>6.2 List the types of basic planning machines and their uses:</p> <ul style="list-style-type: none"> <li>a. Surface/overhand planer for surfacing and edging;</li> <li>b. Thicknesser for thicknessing and widening</li> </ul> <p>6.3. Plane stock to width and thickness on the thicknessing machines.</p> <p>6.4 Mortising machine.</p>	<ul style="list-style-type: none"> <li>• Explain the difference between Portable Power tools and heavy machines</li> <li>• Identify the main parts of the planning machine</li> <li>• Explain the related safety precautions to be observed</li> <li>• Guide the students to operate the planning machine.</li> </ul>	<ul style="list-style-type: none"> <li>• Planning machine</li> <li>• Charts, chalk board, tools and accessories.</li> </ul>

<b>PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.</b>			
<b>Module: FUNDAMENTALS OF MACHINE WOOD WORKING II</b>		<b>Module Code: CMW -13</b>	<b>Contact Hours 4hrs theory and 6hrs practical</b>
<b>Module Specification: Theoretical Content:</b>			
7-8	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.		
<b>General Objective 7.0: Circular Sawing Machine</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
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	<ul style="list-style-type: none"> <li>• Operate the drilling machine and use it to produce some furniture components.</li> <li>• Identify the main parts of the machine,</li> <li>• State safety Precautions related to the machine.</li> <li>• Keep the machine in good state after use.</li> </ul>	<ul style="list-style-type: none"> <li>• Drilling mc.</li> <li>• Circular saw mc.</li> <li>• Charts</li> <li>• Chalkboard work</li> </ul>
<b>General Objective 8.0: Carcase Construction</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
10-11	8.1 Explain the basic principles of carcase construction work. 8.2 Sketch and state the uses of common carcase, construction joints used in wood-work. a. Widening joints: i. butt ii. dowel iii. tongues and groove iv. slot-screw joints b. Angle Joints: i. mitre ii. lap joint iii. dovetail joint a. through dovetail b. lap dovetail	<ul style="list-style-type: none"> <li>• Make sketches of angle joints on charts or chalkboard.</li> <li>• Exhibit Models of the joint.</li> <li>• List type of carcase.</li> <li>• State reasons for Carcase constructions.</li> <li>• List parts of carcase.</li> </ul>	<ul style="list-style-type: none"> <li>• Models</li> <li>• Charts</li> <li>• Chalk board work.</li> </ul>

<b>PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.</b>			
<b>Module: FUNDAMENTALS OF MACHINE WOOD WORKING II</b>		<b>Module Code: CMW -13</b>	<b>Contact Hours 4hrs theory and 6hrs practical</b>
<b>Module Specification: Theoretical Content:</b>			
<b>General Objective 8.0: Carcase Construction</b>			
10-11	c. Intermediate Joints i. housing joint ii. through housing iii. stop housing iv. pin-joint		
<b>General Objective 9.0: Frame Construction</b>			
<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
12	9.1 Explain the principles of frame construction 9.2 List factors that must be considered in frame construction: a. rigidity b. jointing method c. squareness of frame in all directions 9.3 Explain the principles of triangulation in relation to the rigidity of a square frame carcase.	<ul style="list-style-type: none"> <li>• Make sketches of framing joints.</li> <li>• State their possible uses.</li> <li>• Show models of the joints</li> <li>• Produce the joints using hand and machines,.</li> </ul>	<ul style="list-style-type: none"> <li>• Charts</li> <li>• Models</li> <li>• Tools and equipments.</li> </ul>
13	<b>Examinations: Practical = 70%; Theory = 30%</b>		

**PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.**

**Module: FUNDAMENTALS MACHINE OF WOODWORKING II**

**Module Code: CMW 13**

**Contact Hours:  
4hrs theory and  
6hrs practical**

**Module Specification: Practical Content:**

**General Objective 1.0: Safely operate the following machines to produce finished products efficiently.**

<b>Week</b>	<b>Specific Learning Outcome</b>	<b>Teacher Activities</b>	<b>Resources</b>
	<p>a. Install and remove cutters correctly</p> <p>b. Set up the machine for normal and repetitive morticing operations.</p> <p>c. Carry out morticing operations to given specifications.</p> <p>d. Apply routinely the safety and operational precautions related to the use of the machine.</p> <p>e. Grind and sharpen mortice chisels chaines.</p> <p>f. Set vertical and horizontal head adjustments</p> <p>g. Apply the safety and operational precautions related to the use of the tenoning machine.</p> <p>h. Produce templates for setting tenoning cutters.</p> <p>i. Set the machine to produce tenon for a mortice and tenon joint.</p> <p>j. Set tenons, square and step shoulders, single and double scribing.</p> <p>k. Set scribing cutters to produce the mould</p> <p>l. Adapt the machine for trenching, square tenoning and comb joints, turn tenon.</p> <p>m. Set up tenoning machine and produce miter tenons</p> <p>n. Design and produce suitable jig for the safe and accurate production of angle tenons.</p> <p>o. Balance each pair of cutters on the balancing machine.</p>	<ul style="list-style-type: none"> <li>• Set up the machine for normal and repetitive operations and carry out a given operations to given specifications.</li> <li>• Guide the students perform various stages of operation on the machines observing all safety and operational procedures</li> </ul>	<ul style="list-style-type: none"> <li>• The specific machine.</li> <li>• Materials.</li> <li>• Templates</li> <li>• Working drawing, etc.</li> </ul>

<b>PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.</b>		
<b>Module: FUNDAMENTALS MACHINE OF WOODWORKING II</b>	<b>Module Code: CMW 13</b>	<b>Contact Hours: 4hrs theory and 6hrs practical</b>
<b>Module Specification: Practical Content:</b>		
	<b>General Objective 1.0: Safely operate the following machines to produce finished products efficiently.</b>	
p. Undertake routing service and maintenance of the machine. q. Select bits suitable for given jobs.		
r. Mark out work pieces for boring operations s. Make simple jigs and fixtures for repetitive boring operations. t. Set machine for various boring machines- single holes, double etc. u. Carry out boring operatives to given specification v. Sharpen bits to correct profile and keenness w Replace worn bells. x. Undertake routine service and maintenance of the boring machine. y. Select the correct size of drill and fix on chuck z. Set up drilling machine and drill holes on timber to a given specification. a. Carry out the following operations on the surface planning machine; surfacing; edging; through and stopped rebating; chamfering and beveling b. Identify all the component parts of the overhead traveling belt, strain the belt, and explain the functions of the weighted lever. c. Use the fence or the table and the pressure pad d. Mount the belt, strain and track correctly on the overhead sander e. Adjust the work-table to convenient working height. f. Apply the belt to the face of the job using one of the following: g. Hand pad		

**PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN CARPENTRY AND JOINERY.**

**Module: FUNDAMENTALS MACHINE OF WOODWORKING II**

**Module Code: CMW 13**

**Contact Hours:  
4hrs theory and  
6hrs practical**

**Module Specification: Practical Content:**

<p>h. Mount and dismount bits correctly i. Traveling pressure pad j. Spiral contact mechanism k. Install a saw blade in a machine l. Carry out the following operations with the circular sawing machines. m. ripping stock to width n. cutting stock to length o. mitering p. rebating Using hand tools, construct the angles and widening joints: a. Make woodwork items involving the use of car-case joints - small bathroom cabinets, trinket box, etc. b. Test carcass for squareness and out of wind c. Lip edges of man-made boards using: d. veneer e. solid piece (plain or moulded) etc; f. Make simple car-case moulding, e.g. simple-edged moulding, chamfer, nosing and rounding. g. Sketch common carcass construction joints.</p>		
<p>a. Assemble frame b. Test the frame for squareness and out of wind c. Make projects using the joints listed in 8.4 picture, frame cabinet door etc. d. Types of Mouldings e. German mould f. Cavetto moulding g. Redeem or flutting h. Ovolo moulding, etc. Select the correct tools use and machine for their production</p>		
<p>13</p>	<p><b>Examinations: Practical 70% Theory 30%</b></p>	