



**Wood Manufacturing IV:
Skills for the Modern Woodworker**

Second Semester

Course Information

Grade(s):	11-12
Discipline/Course:	Technology Education
Course Title:	Wood Manufacturing IV: Skills for the Modern Woodworker, Semester II
Prerequisite(s):	Wood Manufacturing III: Turning the Tables (Full Year) <i>or</i> Wood Manufacturing IV: Skills for the Modern Woodworker, First Semester <i>or</i> Teacher's Permission
Course Description: Program of Studies	This course provides the student with an overview of wood use and advanced construction techniques. Each student will plan, design and construct an individualized project. The project builds on prior manufacturing courses and challenges the students' abilities.
Course Essential Questions:	<ul style="list-style-type: none"> ● Why are demonstrating positive work behavior, self-discipline and integrity important to success when competing large tasks? ● What are some innovative ways to use advanced wood joints to create unique and functional furniture? ● What is the best way to assemble a large project? ● What does one do if parts do not fit during assembly? ● How do you choose the right glue and clamping method for a particular project? ● How does one properly sand a large project? ● What steps are necessary to prepare a project for finishing? ● When is it best to choose one finish type over another; water based versus oil based? ● What are the different factors to consider when choosing hardware for a particular project? ● How can we use hardware to enhance the function and aesthetics of our woodworking projects? ● What is craftsmanship and how do you define and demonstrate mastery of the craft at the high school level? ● How can you identify the strengths and weaknesses of your own woodworking projects? ● How can you use feedback from others to improve your woodworking skills and project outcomes?

Course Enduring Understandings:	<ul style="list-style-type: none"> ● It is important to be patient and persistent when learning to work with wood. ● Specialty machinery can be used to create a variety of complex and intricate woodworking projects. ● There are a variety of construction and assembly techniques and it is important to choose the methods that are most appropriate for their project. ● Precision is essential when constructing and assembling woodworking components. ● Wood finishes are used to protect and enhance the appearance of wood and it is important to choose the “right” wood finish that is appropriate for the intended use of the product and the desired appearance. ● The proper sanding and finishing techniques can produce a beautiful and durable wood finish. ● Hardware can be used to add functionality and style to a project, as well as to provide a comfortable and safe user experience. ● The proper installation of hardware is essential for a finished and professional-looking project. ● Students should learn to identify the positives and negatives of their projects' construction, as well as the processes and techniques used. ● Woodworking techniques can be used to create both functional and artistic objects.
Duration/Credit:	Semester / 0.5 Credit
Course Materials/Resources:	Equipment and Consumables
FPS Course Academic Expectation(s):	UCT Using Communication (Media) Tools SE Synthesizing and Evaluating
Semester at a Glance (Units)	Unit 1: Project Construction (10 weeks) Unit 2: Joinery and Assembly (5 weeks) Unit 3: Finishing (2 weeks) Unit 4: Hardware (2 weeks) Unit 5: Project Review and Evaluation (1 week)

Unit Number and Title:	Unit 1: Project Construction
Duration:	10 weeks
Resource(s):	Equipment and consumables
Unit Overview:	Students will explore modern construction techniques as they apply to their project and use this knowledge to construct and produce the necessary parts. They will learn how to properly make and utilize several basic wood joints with a CNC router. In the process they will continue to learn and practice setting-up and adjusting a variety of other wood manufacturing power equipment.
Learning Goals	
Standard(s):	<p>CT Standards Wood Technology 2014</p> <p>WM.04 Explain and be able to demonstrate the methods involved in turning raw materials into useable products. WM.04.01, WM.04.06</p> <p>WM.05 Identify and assemble wood joinery and install mechanical fasteners. WM.05.01, WM.05.02, WM.05.06, WM.05.07, WM.05.08, WM.05.09, WM.05.11, WM.05.13, WM.05.14, WM.05.15</p> <p>WM.07 Set-up, adjusts, and maintains a variety of wood manufacturing power equipment. WM.07.01, WM.07.03, WM.07.12, WM.07.13, WM.07., WM.07.20, WM.07.24, WM.07.35</p> <p>WM.09 Fabricate Traditional and Modern Casework (wall, base, and utility cabinets) WM.09.02, WM.09.03, WM.09.07, WM.09.08, WM.09.09, WM.09.16</p> <p>WM.11 Fabricate Furniture WM.11.01, WM.11.02, WM.11.06, WM.11.07, WM.11.08</p>
Essential Question(s):	<ul style="list-style-type: none"> • Why are demonstrating positive work behavior, self-discipline and integrity important to success when competing large tasks? • What are some innovative ways to use advanced wood joints to create unique and functional furniture?

Enduring Understanding(s):	<ul style="list-style-type: none"> ● It is important to be patient and persistent when learning to work with wood. ● Specialty machinery can be used to create a variety of complex and intricate woodworking projects.
Learning Goal(s): Students will be able to use their learning to: (Content/ Skills)	<p>Content: (Students will know...)</p> <ul style="list-style-type: none"> ● the process for using a CNC router to machine parts. ● the process for laminating boards for different designs. ● proper techniques for using a lathe. ● different leg types and their construction. ● drawers and runner styles and their construction. ● table construction methods. ● mortise and tenon joinery and its variations. ● different rabbet variations. <p>Skills: (Students will be able to...)</p> <ul style="list-style-type: none"> ● transfer a CAD drawing to a CNC router to create cabinet parts. ● use a CNC router to machine parts. ● laminate boards by gluing and clamping. ● identify styles of table legs. ● construct legs by laminating squared up pieces of wood. ● square up a leg block and taper cut a leg. ● turn a leg on the lathe using the standard tools and technique and/or cut a Cabriole leg on the bandsaw. (optional) ● build an overlay, lip or flush drawer. ● construct at least one type of drawer mount. ● recognize at least three tabletop styles and construct one.

Unit Number and Title:	Unit 2: Joinery and Assembly
Duration:	5 weeks
Resource(s):	Equipment and Consumables
Unit Overview:	The students will be learning how to utilize various clamps, cauls, glues and mechanical fasteners in the assembly of their project.
Learning Goals	
Standard(s):	CT Standards Wood Technology 2014 WM.09 Fabricate Traditional and Modern Casework (wall, base, and utility cabinets) WM.09.03, WM.09.05, WM.09.06 WM.11 Fabricate Furniture WM.11.03, WM.11.06, WM.11.08
Essential Question(s):	<ul style="list-style-type: none"> ● What is the best way to assemble a large project? ● What does one do if parts do not fit during assembly? ● How do you choose the right glue and clamping method for a particular project?
Enduring Understanding(s):	<ul style="list-style-type: none"> ● There are a variety of construction and assembly techniques and it is important to choose the methods that are most appropriate for their project. ● Precision is essential when constructing and assembling woodworking components.
Learning Goal(s): Students will be able to use their learning to: (Content/ Skills)	Content: (Students will know...) <ul style="list-style-type: none"> ● the methods for assembling their project. ● the procedure for a good grain match for tops. ● techniques to mitigate grain movement to keep boards flat and in alignment. ● the proper use of square clamping blocks to aid in assembly.

Skills: (Students will be able to...)

- construct and assemble their project.
- glue and clamp up their project.
- demonstrate methods to fasten a top to a project.
- demonstrate the procedure for applying glue and clamping a project.
- use clamps and fasteners.
- properly drill holes and install wood screws.
- properly set nails in wood stock.

Unit Number and Title:	Unit 3: Finishing
Duration:	2 weeks
Resource(s):	Equipment and consumables
Unit Overview:	Students will learn how to properly sand and prepare their projects for finish. They will also learn about various types of finishes and their characteristics that make them better in certain circumstances. They will use this knowledge to choose and apply the finish on their table.
Learning Goals	
Standard(s):	CT Standards Wood Technology 2014 WM.16 Finish woodwork. WM.16.01, WM.16.02, WM.16.04, WM.16.07
Essential Question(s):	<ul style="list-style-type: none"> ● How does one properly sand a large project? ● What steps are necessary to prepare a project for finishing? ● When is it best to choose one finish type over another; water based versus oil based?
Enduring Understanding(s):	<ul style="list-style-type: none"> ● Wood finishes are used to protect and enhance the appearance of wood and it is important to choose the “right” wood finish that is appropriate for the intended use of the product and the desired appearance. ● The proper sanding and finishing techniques can produce a beautiful and durable wood finish.
Learning Goal(s): Students will be able to use their learning to: (Content/ Skills)	Content: (Students will know...) <ul style="list-style-type: none"> ● the benefits of different finishes, such as, top coats, hard waxes, and penetrating finishes. ● the method of creating their own wood putty from sawdust and glue. ● the uses of epoxy as design elements. ● the method for correctly mixing epoxy. ● the uses of cyanoacrylate adhesive to repair cracks and checks. ● pigments and dyes and how they are used in epoxy. ● the differences between color dyes and oil based stains.

Skills: (Students will be able to...)

- apply a protective finish to their wood project.
- understand the difference between stains, primer coats and top coats.
- utilize the correct solvent when cleaning brushes.
- sand their project to a “finished” smoothness utilizing correct abrasive papers.

Unit Number and Title:	Unit 4 – Hardware
Duration:	2 weeks
Resource(s):	Equipment and consumables
Unit Overview:	Students will learn how to utilize layout techniques to place hardware for maximum functionality.
Learning Goals	
Standard(s):	CT Standards Wood Technology 2014 WM.10 Identify types, finishes, and mechanisms of hardware WM.10.02, WM.10.04 WM.11 Fabricate Furniture WM.11.11
Essential Question(s):	<ul style="list-style-type: none"> • What are the different factors to consider when choosing hardware for a particular project? • How can we use hardware to enhance the function and aesthetics of our woodworking projects?
Enduring Understanding(s):	<ul style="list-style-type: none"> • Hardware can be used to add functionality and style to a project, as well as to provide a comfortable and safe user experience. • The proper installation of hardware is essential for a finished and professional-looking project.
Learning Goal(s): <i>Students will be able to use their learning to:</i> (Content/ Skills)	Content: (Students will know...) <ul style="list-style-type: none"> • the role of a drawer pull, knob, handle, or recessed hole play in the overall aesthetic of the project. • the different drawer runner constructions and their pros and cons. • the layout for the two points for a two point handle on a drawer front. • why and when a pilot hole and countersink might be necessary. Skills: (Students will be able to...) <ul style="list-style-type: none"> • lay out the location of knobs and/or handles.

- drill the proper holes to accommodate screws.
- mount knobs and handles to the drawer fronts.
- set a drawer square and level.
- apply pulls to cabinet doors and drawers.
- apply drawer slides to projects.
- apply latches and catches to projects.

Unit Number and Title:	Unit 5 - Project Review and Evaluation
Duration:	1 week
Resource(s):	Equipment and consumables
Unit Overview:	Students will reflect on the process of designing, building and finishing their table, evaluating the entire process in addition to the end product.
Learning Goals	
Standard(s):	<p>CT Standards Wood Technology 2014</p> <p>WM.04 Explain and be able to demonstrate the methods involved in turning raw materials into useable products.</p> <p>WM.04.01 Describe and interpret technical drawings.</p> <p>WM.04.02 Describe and prepare rough drawings and sketches.*(C14)</p> <p>WM.04.03 Explain and prepare a cut list or bill of material from a basic plan and assembly drawing.(C15)</p> <p>WM.05 Describe and demonstrate the attributes of wood design.</p> <p>WM.05.01 Utilize the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results.</p> <p>WM.05.02 Check and critique a design continually, and improve and revise the idea of the design as needed.</p> <p>WM.05.03 Design and create cabinet and wood products.</p> <p>WM.05.04 Develop a production plan, including the layout, bill of materials, and cost analysis, for the production of cabinets or wood products.</p>

Essential Question(s):	<ul style="list-style-type: none"> • What is craftsmanship and how do you define and demonstrate mastery of the craft at the high school level? • How can you identify the strengths and weaknesses of your own woodworking projects? • How can you use feedback from others to improve your woodworking skills and project outcomes?
Enduring Understanding(s):	<ul style="list-style-type: none"> • Students should learn to identify the positives and negatives of their projects' construction, as well as the processes and techniques used. • Woodworking techniques can be used to create both functional and artistic objects.
Learning Goal(s): <i>Students will be able to use their learning to:</i> (Content/ Skills)	<p>Content: (Students will know...)</p> <ul style="list-style-type: none"> • the elements that make a project successful. • the elements make a project aesthetically pleasing. • the procedure for assessing errors and mistakes of a finished project. <p>Skills: (Students will be able to...)</p> <ul style="list-style-type: none"> • self-evaluate woodworking projects. • identify quality aspects of completed work. • identify changes which could improve the process.