

WOODWORKING II (17006)

| | |
|-------------------------------|--|
| Grade Level: | 11-12 |
| Prerequisite: | Must have excelled in Woodworking I and have instructor recommendation. Must take semesters in sequence. |
| Length: | 1 Year |
| Period(s) Per Day: | 1 |
| Credit: | 1 |
| Credit Requirement Fulfilled: | Vocational/Elective <u>Career Tracking:</u> Woodworker, carpenter, cabinet maker, draftsman, furniture designer, craftsman, artist, graphic designer, CNC machinist <u>Montana Career Pathway:</u> Design & Construction |

Course Description:

Woods II is for the enthusiastic woodworker who excelled in Woods I. Woods II students will be refreshed on all safety tests and taught advanced operational techniques. Students will also learn methods to maintain, and calibrate the shop equipment. Woods II students will be held to a higher standard in all employability skill areas such as work ethic, punctuality, teamwork, organization, resource management, problem solving and showing pride in your work. More challenging woodworking methods will be taught, and a more independent build process is expected from start to finish. Grades will be based on safety tests, unit quizzes, project progress, employability skills, and the student's ability create or read a detailed design, make precise measurements, add/subtract fractions, calculate materials/cost, and write a plan of procedure. Emphasis is placed on the completion of their projects. Reference the Woods 1 course outline for foundational skills.

Course Objectives and Expectations:

1. Continue development, appreciation, and polish skills for a career path or lifelong skill in woodworking or related career paths.
2. Develop employability skills that translate to any career path such as: work ethic, punctuality, teamwork, organization, critical thinking and problem solving.
3. Develop good work habits such as following a detailed set of plans, time and resource management, and demonstrating pride in their work.
4. Encourage student confidence and interest by completing a wood working project from start to finish that requires hard work and dedication.
5. To create a greater awareness and respect for safety in our everyday routines.

Student Objectives:

The Students will be able to:

1. identify all woodworking tools and machines, pass a safety test and properly operate.
2. use drafting technology for creating or reading a working drawing.
3. develop a detailed plan of procedure for constructing a wood working project
4. calculate an accurate bill of materials for a woodworking project.
5. Identify and properly use different construction materials.
6. identify and use correctly different advanced wood joints and fasteners.
7. research careers paths, qualifications, wages, work conditions, and job growth outlooks

Course Outline:

Work habits, Workplace Ethics
Scale Reading, Measurement, and Advanced Applied Math
Tool and Machine Identification, Safety, Operation, Maintenance, and Calibration
Materials Identification and Characteristics, Supply and Demand, Forestry, Milling
Mechanical Drawing, Project Design
Wood Joints, Adhesives, and Fasteners
Wood Finishing, Epoxy Resins, Wood Carving, Artistic Woodworking
Modern Technology in Woodworking (Laser engraving, Template Plotter, CNC, etc.)
Project Videos and Instructor Demonstrations
Plan of Procedure, Material and Cost Calculations, Project Invoicing
Project Construction – Hand Tool Projects and Machined Projects
Cabinet Making - Frame & Panel Construction, Specialty Hardware
Career Exploration – Montana Pathway: Design & Construction specific

Pacing and Montana Standards for Career and Vocational Technical Education:

| | |
|--|--|
| Work Habits, Work ethics, and Employability Skills | 3.II.2-3, 5.II.3, 3.III.2 |
| Scale Reading | 5.II.1 |
| Math in Woodworking | 5.II.1, 5.III.1 |
| Mechanical Drawing, Plan research and Development | 4.II.1, 2.III.2 |
| Tool and Machine Identification and Operation | 4.II.1-3, 5.II.4 |
| Wood Joints and Fasteners | 4.II.1-3, 5.II.4 |
| Wood Identification | 4.II.1-3, 5.II.4 |
| Wood Finishing, Carving | 4.II.1-3, 5.II.4 |
| Modern Manufacturing Technology | 4.II.2, 4.III.2 |
| Group Mass Production Project Construction | 2.II.2-4, 3.II.1, 3.II.4, 3.II.6, 4.II.1-3, 5.II.4 |
| Individual Custom Project Construction | 2.II.2-4, 4.II.1-3, 5.II.4, 5.III.3-4 |

Course Outline and Assessments:

First Semester

Work Ethic and Workplace Etiquette

- I. Employability Skills
 - a. Expectations and Examples
 - b. Leadership and Teamwork Expectations
 - c. Weekly evaluations
- II. Workplace Ethics and Etiquette
 - a. Examples and class discussion and experiences
 - b. Scenarios, consequences and moral dilemmas
 - c. Short essay questions and opinions

Scale Reading and Math in woodworking

- I. Scale Reading Procedure
 - a. Types of scale and graduations, advanced precision and specialty tools
 - b. Practice worksheets and tests, online resources
 - c. Measurement methods, tips, tricks and standards in woodworking
- II. Math in woodworking
 - a. Adding and subtracting fractions and imperial measurements
 - b. Multiplying and dividing fractions and imperial measurements
 - c. Changing decimals to a useable fraction and back to a decimal
 - d. Complex “real world” math demonstrations and assignment

Mechanical Drawing

- I. Orthographic and Isometric drawing standards, tools and techniques
 - a. Mechanical drawing demonstration and practice
 - b. Draw a working orthographic and isometric drawing of the Box Joint Caddy Lab

Wood Identification and Terminology

- I. Identification
 - a. Hardwoods-oak, walnut, mahogany, cherry, birch, etc.
 - b. Softwoods-pine, fir, cedar
 - c. Engineered Wood – Production methods, materials and alternative products
 - d. Lumbering – Quarter sawn, plain sawn, tools & techniques, tree anatomy
 - e. Seasoning – Green, kiln dried
 - f. Forestry – Selective harvest, resource management, supply & demand
 - g. Materials ID Lab, research, and test

- II. Terminology, Measuring and defects
 - a. Warps, splits, checks, knots and etc.
 - b. Common woodworking terminology (kerf, chamfer, dado...) and visual aids
 - c. Board Feet—thickness, width, and length terminology
 - d. Advanced material calculations and cost lab
 - e. Terminology quizzes with visual aids

Tool and Machine Identification and Operation

- I. Hand Tools
 - a. Identification, safety and demonstrations
 - b. Using hand tools- Box Joint Caddy (hand tool joinery lab)
- II. Machine Identification: anatomy, setup, correct operation, safety, maintenance, and calibration. Safety tests and demos are dated and filed for each student.
 - a. Jointer and Planer – Instructor Demo, Student Demo, Test
 - b. Power Miter Saw - Instructor Demo, Student Demo, Test
 - c. Table Saw - Instructor Demo, Student Demo, Test
 - d. Band Saw - Instructor Demo, Student Demo, Test
 - e. Drill Press - Instructor Demo, Student Demo, Test
 - f. Shaper - Instructor Demo, Student Demo, Test
 - g. Router - Instructor Demo, Student Demo, Test
 - h. Lathe - Instructor Demo, Student Demo, Test
- III. Advanced Machine Block
 - a. discuss procedure
 - b. machine experience and safe operation demonstration
 - c. Milling rough lumber to square stock – Sequence and procedure lab and test

Wood Joints, Adhesives and Fasteners

- I. Eight Basic Joints: usage and construction
 - a. Butt
 - b. Miter
 - c. mortise and tenon
 - d. tongue and groove
 - e. dado
 - f. rabbet
 - g. lap
 - h. dovetail
 - i. Advanced Joinery demonstration and examples
 - j. Joinery jigs and mass production methods
- II. Adhesives
 - a. Types, pros/cons, safety, specialty products
 - b. Clamping and tapes

- III. Fasteners
 - a. Types, Uses, Characteristics, and Identification
 - b. Fasteners ID and Practice Labs

Class Mass Production Project Construction (Advanced)

- I. Project Plan Sheet
 - a. Plan of Procedure
 - b. Bill of Materials
 - c. Efficient and safe build procedure
 - d. Summary of build process. Pros/Cons of mass production

Second Semester

Modern Technology in Production

- I. Laser Engraver
 - a. Benefits and limitations of technology in woodworking
 - b. CAD program operation and personalized logo graphic design
 - c. Machine safety and operation

CNC Machining

- a. CAD and CAM operation
- b. Machine safety, demonstration and class lab

Template and Design Plotter

- a. Operation and applications

Wood Finishing

- I. Sanding
 - a. types of grit and sizing
 - b. machines, Advanced tips, techniques and procedures
 - c. air quality & chemical stripper safety discussion
- II. Finishing
 - a. Oil, clear, water based, Specialty
 - b. Paints
 - c. Distressed, rustic, and weathered Finishes
 - d. Safety
 - e. Application methods, tips, and tools

Wood Carving

- I. Safety
 - a. thumb guard, gloves and procedure
- II. Carving
 - a. Pull cut, push cut

- b. Power carving
- c. Chip carving

Individual Projects- Custom Manufacturing

- I. Project Plan Sheet
 - a. Plan of Procedure
 - b. Bill of Materials
 - c. Invoicing Materials and Labor
 - d. Summary of build process and results – Pros/Cons of Custom Manufacturing

Cabinet Making

- I. Types, Industry Standards, Methods and Techniques
 - a. Frame and Panel Construction
 - b. Face Framing
 - b. Specialty Hardware
 - c. Drawers

Career Exploration – Montana Career Pathway: Design & Construction

- I. Bureau of Labor and Statistics Resources
 - a. Career Outlooks and growth
 - b. Regional and national wages and working conditions
 - c. Qualifications, schooling and training opportunities
 - d. Interview

Timeline:

| | |
|---|-----------|
| Employability Skills and Work Ethics | ½ week |
| Scale Reading and Math | 1 week |
| Mechanical Drawing | ½ week |
| Hand Tools | 1 ½ weeks |
| Machine Safety and Operation | 3 ½ weeks |
| Wood Joinery and Fasteners | 2 weeks |
| Material Identification and properties | 1 week |
| Wood properties, characteristic, forestry | 1 week |
| Wood Finishing | 1 week |
| Modern Technology | 1 ½ weeks |
| Project Construction | 17 weeks |
| Wood Carving | 1 ½ weeks |
| Woodworking DVDs and videos | 1 ½ weeks |
| Cabinet Making | 1 ½ weeks |
| Career Exploration | 1 week |

Resources:

- Montana Standards for Career and Vocational Technical Education
- Nancy Macdonald
Woodworking 2ⁿ edition
Cengage
- Mark D. Feirer, John L. Feirer,
Wood Technology & Processes 5th edition
Glencoe McGraw-Hill
- Bureau of Labor and Statistic [Bureau of Labor and Statistic](#)
- New Yankee Workshop with Norm Abram [New Yankee Workshop](#)