WOODWORKING I (17006)

Grade Level:	10-11-12
Prerequisite:	Must take semesters in sequence. Must pass first semester to take 2nd semester.
Length:	1 Year
Period(s) Per Day:	1
Credit:	1
Credit Requirement Fulfilled:	Vocational/Elective Career Tracking: Woodworker, carpenter, cabinet maker, draftsman, furniture designer, craftsman, artist, graphic designer, CNC machinist Montana Career Pathway: Design & Construction

Course Description:

Students will develop lifelong working habits and a strong respect for safety in a working environment. Employability skills such as: work ethic, punctuality, teamwork, organization, resource management, problem solving and showing pride in your work are emphasized.

Students will learn techniques to successfully and safely operate the following: hand tools, table saw, joiner, planer, power miter saw, router, drills, lathe, stationery and hand sanders. They will be taught about commonly used building materials, wood species, fasteners and wood properties. Students will gain experience using several types of finishing products and techniques. Modern technology and graphic design programs will be used to enhance student projects via CNC, plotters and/or laser engraving. Students will gain confidence and practical experience developing a project 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 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.

Course Objectives and Expectations:

1. Acquire an appreciation for building, working with wood, and create an interest for a career path or lifelong skill.
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 a working environment as well as our everyday routines.

Student Objectives:

The Students will be able to:

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

Course Outline:

Work habits, Workplace Ethics
Scale Reading, Measurement, and Applied Math
Tool and Machine Identification, Safety, and Operation
Materials Identification and Characteristics
Mechanical Drawing
Wood Joints, Adhesives, and Fasteners
Wood Finishing, 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 Construction – Hand Tool Projects and Machined Projects
Career Exploration – Outlooks, Wages, Conditions, Training, & Interviews

Pacing and Montana Standards for Career and Vocational Technical Education:

Work Habits, Work ethics, and Employability Skills	3.II.2-3, 5.II.3
Scale Reading	5.II.1
Math in Woodworking	5.II.1
Mechanical Drawing, Plan research and Development	4.II.1
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
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
Career Exploration	1.II.1-2

Course Outline and Assessments:

First Semester

Work Ethic and Workplace Etiquette

I. Employability Skills
   a. Expectations and Examples
   b. Weekly evaluations
II. Workplace Etiquette
   a. Examples and class discussion
   b. Scenarios, consequences and moral dilemmas

Scale Reading and Math in woodworking

I. Scale Reading Procedure
   a. Types of scale and graduations
   b. Line heights
   c. Practice worksheets and tests
   d. Measurement tools and standards in woodworking
II. Math in woodworking
   a. Adding and subtracting fractions
   b. Multiplying and dividing fractions
   c. Changing decimals to a useable fraction
   d. Real world math examples in manufacturing

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 required Hand Tool Block lab

Wood Identification and Terminology

I. Identification
   a. Hardwoods-oak, walnut, mahogany, cherry, birch, etc.
   b. Softwoods-pine, fir, cedar
   c. Engineered Wood – materials, sheet goods and alternative products

III. Terminology, Measuring and Defects

   a. Warps, splits, knots, checks, and etc.
   b. Common woodworking terminology and visual aids
   c. Board Feet—thickness, width, and length terminology
   d. Material Calculations and Material Cost Calculations Lab

Tool and Machine Identification and Operation

I. Hand Tools
   a. Identification, safety and demonstrations

b. Using hand tools-hand tool block

II. Machine Identification: parts, correct operation, safety
   a. Jointer and Planer
   b. Power Miter Saw
   c. Table Saw
   d. Band Saw
   e. Drill Press
   f. Router
   g. Lathe

III. Machined Block
   a. draw orthographically
   b. discuss procedure
   c. machine experience and safe operation demonstration
   d. Milling rough lumber to square stock – Sequence and procedure

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

II. Adhesives
   a. Types, pros/cons, safety
   b. Clamping and tapes

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

Class Mass Production Project Construction

I. Project Plan Sheet
   a. Plan of Procedure
   b. Bill of Materials
   c. Summary of build process. Pros/Cons of mass production

<u>Second Semester</u>

Modern Technology in Production

I. Laser Engraver
   a. Benefits and limitations of technology in woodworking
   b. Intro to our CAD program, operation and personalized logo

c. Machine safety and operation

CNC Machining

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

Wood Finishing

I. Sanding
   a. types of grit and sizing
   b. machines, tips, techniques and procedure
II. Finish
   a. Basic types oil, clear, water based
   b. Safety
   c. Application

Wood Carving

I. Safety
   a. thumb guard, gloves and procedure
II. Carving
   a. Pull cut, push cut
   b. Intro to Power carving

Individual Custom Manufacturing Project Construction

I. Project Plan Sheet
   a. Plan of Procedure
   b. Bill of Materials
   c. Safe and Efficient Project Construction

Career Exploration

I. Bureau of Labor and Statistics Resources
   a. Career Outlooks and growth
   b. Regional and national wages and working conditions

II Other Resources

   a. Qualifications, schooling and training opportunities
   b. Interview

Timeline:

Employability Skills and Work Etiquette	1 week
Scale Reading and Math	1 week
Mechanical Drawing	1 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 Finishing	1 week
Modern Technology	1 ½ weeks
Project Construction	18 ½ weeks
Wood Carving	1 ½ weeks
Woodworking DVDs and videos	1 ½ weeks
Career Exploration	1 week

Resources:

Montana Standards for Career and Vocational Technical Education

- 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 Satistic
- New Yankee Workshop with Norm Abram: New Yankee Workshop