



## EXAM INFORMATION

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**Items**

72

**Points**

74

**Prerequisites**

WOODWORKING

**Grade Level**

10-12

**Course Length**

ONE SEMESTER

**Career Cluster**

ARCHITECTURE AND CONSTRUCTION

MANUFACTURING

**Performance Standards**

INCLUDED

**Certificate Available**

YES

## DESCRIPTION

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The third instructional course in a sequence of courses that prepares individuals to apply technical knowledge and skills, set up and operate industrial woodworking machinery, and use such machinery to design and fabricate custom cabinets and architectural millwork. It stresses the safe use of trade hand and power tools and machinery used in the production of millwork items. Cabinets, such as kitchen and vanities are constructed, finished, and installed as part of this program.

## EXAM BLUEPRINT

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**STANDARD****PERCENTAGE OF EXAM**

1- Cabinetmaking, Manufacturing, Installation & Theory	22%
2- Safety	42%
3- Joinery	27%
4- Automated Manufacturing Processes	7%
5- Professional Development	2%



## STANDARD 1

STUDENTS WILL UNDERSTAND CABINETMAKING, MANUFACTURING, INSTALLATION, AND THEORY.

Objective 1 Understand the cabinetmaking industry.

1. Identify career opportunities in cabinetmaking/millwork manufacturing.
2. Identify career opportunities using career pathways in related millwork industries.
3. Describe the integration of cabinetmaking into construction schedules.

Objective 2 Students will understand the design, planning and estimation process.

1. Identify principles of design as they apply to kitchen layout.
  1. U-shape
  2. Peninsula
  3. Corridor
  4. L-shape
  5. Work triangle
2. Draw the necessary views of a selected project.
3. Create a material list for the selected project and determine the project cost.
4. Follow a procedure list for construction of a cabinet.
5. Extract pertinent cabinet information and specifications from a set of house plans.
6. Identify cabinet standards related to kitchen, vanity, and commercial type cabinets (quality standards, dimension standards, etc.).

Objective 3 Students will be able to understand and demonstrate basic math and measuring concepts.

1. Calculate the cost of a project,
2. Demonstrate the optimization of materials.
3. Demonstrate basic woodworking math proficiency.
4. Multiply two-digit numbers.
5. Calculate board feet and square feet.
6. Read and measure with a tape using sixteenths (1/16).

Standard 1 Performance Evaluation included below (Optional)

## STANDARD 2

STUDENTS WILL UNDERSTAND AND DEMONSTRATE THE SAFE USE OF CABINETMAKING TOOLS.

Objective 1 Understand and demonstrate the safe use of hand tools.

1. Describe the purpose and demonstrate the proper use of the following measuring and layout tools:
  1. Measuring tape
  2. Scratch awl
  3. Framing square
  4. Combination square
  5. Try square
  6. Sliding T-bevel
  7. Stud finder
  8. Scribe



9. Caliper (digital, dial)
2. Describe the purpose and demonstrate the proper use of the following cutting and shaping tools:
  1. Hand planes (block, smooth, jack)
  2. Wood chisel
  3. Wood file/rasp
  4. Hand saw
  5. Glue scraper
  6. Putty knife
  7. Card scraper
3. Describe the purpose and demonstrate the proper use of the following striking tools:
  1. Claw hammer
  2. Nail set
  3. Dead-blow hammer
4. Describe the purpose and demonstrate the proper use of the following drill bits:
  1. Twist
  2. Spade
  3. Countersink
  4. Driver bits: Phillips, Square, Flat
  5. Centering bit (Vix bit)
  6. Hole saw
  7. Multi spur bit

## Objective 2

Understand and demonstrate the safe use of portable power tools.

1. Describe the purpose and demonstrate the proper use of the following portable power tools.
  1. Pneumatic/power nail gun
  2. Power drills
  3. Impact driver
  4. Router
  5. Finish sander
  6. Belt sander
  7. Orbital sander
  8. Biscuit jointer
  9. Hand jig saw
  10. Reciprocal saw

## Objective 3

Understand and demonstrate the safe use of power machines.

1. Describe the purpose and demonstrate the proper use of the following sawing machines.
  1. Table saw
  2. Power Miter saw
  3. Band saw
2. Describe the purpose and demonstrate the proper use of the following surfacing machines.
  1. Surface planer
  2. Jointer
3. Describe the purpose and demonstrate the proper use of the following sanding machines:
  1. Disc sander
  2. Wide belt sander
  3. Spindle sander
  4. Edge sander
4. Describe the purpose and demonstrate the proper use of the following shaping machines:
  1. Router
  2. Shaper
  3. Lathe
  4. CNC



5. Describe the purpose and demonstrate the proper use of the following drilling machines:
  1. Drill press
  2. Line boring machine

## Objective 4

Understand wood products, characteristics and procedures.

1. Describe the parts of a tree and the significance that it has in cabinet construction.
  1. Bark
  2. Sap wood
  3. Pith
  4. Annual (growth) rings
  5. Lignin
2. Describe and identify natural defects.
  1. Warp (cup, twist, bow, crook)
  2. Cracks
  3. Bark inclusions
  4. Knots
3. Understand the methods of seasoning and drying lumber.
  1. Standard moisture content levels for kiln and air dried lumber
  2. The effects of moisture on materials (expansion and contraction)
4. Distinguish between softwoods and hardwoods.
5. Identify the difference between solid wood and manufactured materials and describe the use of each.
6. Identify wood species and their specific characteristics.
  1. Alder
  2. Cherry
  3. Oak
  4. Walnut
  5. Maple
  6. Poplar
  7. Pine
  8. Mahogany
  9. Red Cedar
7. Identify STRAND manufactured wood products.
  1. Plywood
  2. Particle board
  3. MDF
  4. Baltic Birch
  5. Melamine
  6. Plastic laminate
8. Identify the common grades of lumber and sheet goods.
  1. FAS
  2. Select
  3. #1COM

Standard 2 Performance Evaluation included below (Optional)



## STANDARD 3

STUDENTS WILL UNDERSTAND AND DEMONSTRATE THE USE OF JOINERY.

Objective 1 Understand and demonstrate the use of joinery.

1. Identify the basic woodworking joints.
  1. Butt
  2. Miter
  3. Rabbet
  4. Dado
  5. Dovetail
  6. Groove (plough)
  7. Pocket
  8. Blind dado
2. Construct the basic wood joints used in cabinetmaking.

Objective 2 Understand and demonstrate the use of cabinet components and hardware.

1. Identify the cabinet components of a face frame and cabinet box.
  1. Stile
  2. Rail
  3. Mullion
  4. Base
  5. Toe kick
  6. Side
  7. Skin
  8. Shelf
  9. Web frame
  10. Kicker
  11. Drawer guide/glide
  12. Nailer
  13. Molding
  14. Filler strip
  15. Edge banding
  16. Bottom
  17. Back
2. Identify the door options in cabinetmaking.
3. Identify the components of a drawer.
4. Identify and properly install common cabinet/furniture hardware such as:
  1. Hinges - offset, overlay, European, butt
  2. Drawer guides
  3. Pulls and knobs
  4. Shelf supports
5. Assemble a cabinet with the proper adhesive and fasteners.
6. Layout and construct cabinet doors.
7. Cut out and construct drawers.
8. Install door and drawer.
9. Identify basic construction methods.
  1. Frame and panel
  2. Casework construction
  3. Face frame
  4. European 32mm



- Objective 3** Understand and demonstrate finishing, installation, and transportation techniques.
1. Understand and properly apply the basic rules of sanding.
  2. Select and correctly use each specified grit size.
  3. Properly prepare a surface for Finishing.
  4. Properly apply stain, penetrating oil, and/or a clear finish
  5. Properly spray a clear coat.
  6. Understand basic cabinet installation techniques such as scribing, leveling, and shimming.

Standard 3 Performance Evaluation included below (Optional)

## STANDARD 4

STUDENTS WILL BE ABLE TO PERFORM AUTOMATED MANUFACTURING PROCESSES USING CNC EQUIPMENT.

- Objective 1** Understand X, Y, Z axis.
- Objective 2** Understand vector lines/drawings.
- Objective 3** Define G-code.
- Objective 4** Define 2D, 2.5D, and 3D.
- Objective 5** Understand post-processor.
- Objective 6** Create a tool path and use a CNC machine to make a cut.
- Objective 7** Define vector and raster.

Standard 4 Performance Evaluation included below (Optional)

## STANDARD 5

STUDENTS WILL BE ABLE TO UNDERSTAND AND APPLY PROFESSIONAL DEVELOPMENT SKILLS IN THE WORKPLACE.

- Objective 1** Understand the need for professional development in school and the workplace.
1. Complete a personal inventory.
  2. Set and meet goals.
  3. Be self-motivated.
  4. Know how to make decisions.
  5. Know how to manage time.
  6. Organize personal belongings and lab equipment.
  7. Learn to communicate verbally.
  8. Write effective communications.
  9. Establish a personal reading program.
  10. Develop effective work skills and attitudes.
  11. Master a working knowledge of SkillsUSA.\*
    1. Learn the acronym SkillsUSA.
    2. State the SkillsUSA motto.
    3. State the SkillsUSA creed.



4. Learn the SkillsUSA colors.
5. Describe the official SkillsUSA dress.
6. Describe the procedure for becoming a SkillsUSA officer.

**Objective 2** Understand the need for leadership skills.

1. Serve on a committee.
  1. Prepare an agenda.
2. Assist in planning a meeting.
3. Review basic parliamentary procedure.
4. Make a main motion.
5. Participate in a school project.
6. Attend a community meeting.
  1. Practice effective speaking.
7. Present a three- to five-minute talk.
8. Implement a leadership project.
  1. Master a working knowledge of SkillsUSA.
  2. Describe the meaning of the SkillsUSA emblem.
  3. State the SkillsUSA pledge.
  4. Describe the duties of a SkillsUSA officer.

**Objective 3** Understand the need for career planning.

1. Define your future occupation.
2. Survey employment opportunities.
3. Report on a trade journal article.
4. Explore opportunities for advanced training.
5. Conduct a worker interview.
6. Contact a professional association.
7. Explore entrepreneurship opportunities.
8. Give a talk about your career.
9. Review career goals.

**Objective 4** Understand the importance of employability skills and workplace habits.

1. Develop a list of work STRANDs to follow at school and on the job.
2. Evaluate your personal ethics.
  1. Evaluate your personal ethics against acceptable workplace ethics.
3. Build a job search network.
4. Find job leads.
5. Write a resume.
6. Create a job portfolio.
7. Complete a job application.
8. Write a business letter and memo.
9. Participate in an actual or simulated job interview.



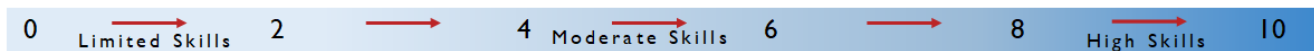
## Cabinetmaking Performance Standards (Optional)

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of **8 or higher** on the rating scale. Students may be encouraged to repeat the objectives until they average **8 or higher**.

Students Name \_\_\_\_\_

Class \_\_\_\_\_

### PERFORMANCE RATING SCALE



#### STANDARD 1 – Cabinetmaking, Manufacturing, Installation & Theory

Score:

- Understand cabinetmaking, manufacturing, installation, and theory.
  - Understand the cabinetmaking industry.
  - Understand the design, planning, and estimation process.
  - Understand and demonstrate basic math and measuring concepts.

#### STANDARD 2 – Safety

Score:

- Understand and demonstrate the safe use of cabinetmaking tools.
  - Understand and demonstrate the safe use of hand tools.
  - Understand and demonstrate the safe use of portable power tools.
  - Understand and demonstrate the safe use of power machines.
  - Understand wood products, characteristics, and procedures.

#### STANDARD 3 – Joinery

Score:

- Understand milling and assembly.
  - Understand and demonstrate the use of joinery.
  - Understand and demonstrate the use of cabinet components and hardware.
  - Understand and demonstrate finishing, installation, and transportation techniques.

#### STANDARD 4 – Automated Manufacturing Processes

Score:

- Perform automated manufacturing processes using CNC equipment.
  - Understand X, Y, Z axis.
  - Understand vector lines.
  - Define G-code.
  - Define 2D, 2.5D, and 3D.
  - Understand post-processor.
  - Create a tool path and use a CNC machine to make a cut.
  - Define vector and raster.

### PERFORMANCE STANDARD AVERAGE SCORE: