

Title 7: Education K-12

Part 155: Mississippi Secondary Curriculum Frameworks in Career and Technical Education, Manufacturing, Furniture Design and Manufacturing



2022 Furniture Design & Manufacturing

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The Research and Curriculum Unit (RCU), located in Starkville, as part of Mississippi State University (MSU), was established to foster educational enhancements and innovations. In keeping with the land-grant mission of MSU, the RCU is dedicated to improving the quality of life for Mississippians. The RCU enhances intellectual and professional development of Mississippi students and educators while applying knowledge and educational research to the lives of the people of the state. The RCU works within the contexts of curriculum development and revision, research, assessment, professional development, and industrial training.

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Ms. Rosemary G. Aultman, Chair
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Standards

Standards and alignment crosswalks are referenced in the appendix. Depending on the curriculum, these crosswalks should identify alignment to the standards mentioned below, as well as possible related academic topics as required in the Subject Area Testing Program in Algebra I, Biology I, English II, and U.S. History from 1877, which could be integrated into the content of the units. Mississippi's CTE furniture design and manufacturing is aligned to the following:

National Center for Construction Education and Research (NCCER) Learning Series

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Common Career Technical Core Standards for the Manufacturing Career Cluster

The Common Career Technical Core (CCTC) is a set of high quality and rigorous standards for Career and Technical Education (CTE). There are 16 career clusters with corresponding pathways that describe student knowledge and skill upon completion of the chosen pathway as well as career practices that apply to all pathways within the cluster.

careertech.org/manufacturing

International Society for Technology in Education Standards (ISTE)

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iste.org

College- and Career-Ready Standards

College- and career-readiness standards emphasize critical thinking, teamwork, and problem-solving skills. Students will learn the skills and abilities demanded by the workforce of today and the future. Mississippi adopted Mississippi College- and Career-Readiness Standards (MCCRS) to provide a consistent, clear understanding of what students are expected to learn and so teachers and parents know what they need to do to help them.

mdek12.org/oae/college-and-career-readiness-standards

Framework for 21st Century Learning

In defining 21st-century learning, the Partnership for 21st Century Skills has embraced key themes and skill areas that represent the essential knowledge for the 21st century: global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; environmental literacy; learning and innovation skills; information, media, and technology skills; and life and career skills. *21 Framework Definitions* (2019).

battelleforkids.org/networks/p21/frameworks-resources

Preface

Secondary CTE programs in Mississippi face many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing applied learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments. This document provides information, tools, and solutions that will aid students, teachers, and schools in creating and implementing applied, interactive, and innovative lessons. Through best practices, alignment with national standards and certifications, community partnerships, and a hands-on, student-centered concept, educators will be able to truly engage students in meaningful and collaborative learning opportunities.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, *Mississippi Code of 1972*, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, Ch. 487, §14; Laws, 1991, Ch. 423, §1; Laws, 1992, Ch. 519, §4 eff. from and after July 1, 1992; Strengthening Career and Technical Education for the 21st Century Act, 2019 [Perkins V]; and Every Student Succeeds Act, 2015).

Mississippi Teacher Professional Resources

The following are resources for Mississippi teachers:

Curriculum, Assessment, Professional Learning

Program resources can be found at the RCU's website, rcu.msstate.edu.

Learning Management System: An Online Resource

Learning management system information can be found at the RCU's website, under Professional Learning.

Should you need additional instructions, call the RCU at 662.325.2510.

Executive Summary

Pathway Description

Furniture design and manufacturing is an instructional program designed to provide entry-level skills for students to become employed in the industry of upholstered furniture making, including skills in operation and care of tools, furniture styles, frame making, upholstery, sewing, and basic educational skills that are essential to the successful performance in this industry.

Grade Level and Class Size Recommendations

It is recommended that students enter this program as 10th graders. Exceptions to this are a district-level decision based on class size, enrollment numbers, and student maturity. A maximum of 25 students is recommended for classroom-based courses, while a maximum of 15 students is recommended for lab-based courses.

Student Prerequisites

For students to experience success in the program, the following student prerequisites are suggested:

1. C or higher in English (the previous year)
 2. C or higher in high school-level math (last course taken, or the instructor can specify the level of math instruction needed)
 3. Instructor approval and TABE reading score (eighth grade or higher)
- or**
1. TABE reading and math score (eighth grade or higher)
 2. Instructor approval
- or**
1. Instructor approval

Assessment

The latest assessment blueprint for the curriculum can be found at rcu.msstate.edu/curriculum/curriculumdownload.

Teacher Licensure

The latest teacher licensure information can be found at mdek12.org/oel/apply-for-an-educator-license.

Professional Learning

If you have specific questions about the content of any of the training sessions provided, please contact the RCU at 662.325.2510.

Course Outlines

Option 1—Four 1-Carnegie Unit Courses

This curriculum consists of four 1-credit courses, which should be completed in the following sequence:

- 1. Furniture Design and Manufacturing I—Course Code: 993502**
- 2. Furniture Design and Manufacturing II—Course Code: 993503**
- 3. Furniture Design and Manufacturing III—Course Code: 993504**
- 4. Furniture Design and Manufacturing IV—Course Code: 993505**

Course Description: Furniture Design and Manufacturing I

This course is an introduction to furniture manufacturing. Topics covered include safety, tool, and equipment; math, drawings, and materials handling. This course is requisite to Furniture Design and Manufacturing II.

Course Description: Furniture Design and Manufacturing II

This course is a continuation of Furniture Design and Manufacturing I. Topics covered include measuring, laying out, and cutting fabrics; sewing procedures; patterns, and layouts; cutting and assembling frames, and furniture upholstery. This course is requisite to Furniture Design and Manufacturing III.

Course Description: Furniture Design and Manufacturing III

This course is a continuation of Furniture Design and Manufacturing II. Topics covered include furniture padding, hardware, and support system components; advanced furniture frame patterns and layout; cutting and assembling frames; and measuring, laying out, and cutting fabrics. This course is requisite to Furniture Design and Manufacturing IV.

Course Description: Furniture Design and Manufacturing IV

This course is a continuation of Furniture Design and Manufacturing III. Topics include applying a working drawing and preparing a bill of materials.

Furniture Design and Manufacturing I—Course Code: 993502

Unit	Unit Name	Hours
1	Introduction to Furniture Manufacturing	7
2	Employability Skills	8
3	Fundamentals of Student Organizations	5
4	Communication Skills	8
5	Basic Safety	35
6	Introduction to Construction Math	25
7	Hand Tools	11
8	Power Tools	11
9	Introduction to Construction Drawings	20
10	Introduction to Materials Handling	10
Total		140

Furniture Design and Manufacturing II—Course Code: 993503

Unit	Unit Name	Hours
11	Furniture Frame Patterns and Layout I	25
12	Cutting and Assembling Frames I	25
13	Measuring, Laying Out, and Cutting Fabric I	25
14	Sewing Procedures I	25
15	Furniture Upholstering I	40
Total		140

Furniture Design and Manufacturing III—Course Code: 993504

Unit	Unit Name	Hours
16	Orientation and Safety	10
17	Tool and Equipment Identification and Use	30
18	Measurement	20
19	Furniture Padding, Hardware, and Support System Components	20
20	Furniture Frame Patterns and Layout II	30
21	Cutting and Assembling Frames II	30
Total		140

Furniture Design and Manufacturing IV—Course Code: 993505

Unit	Unit Name	Hours
22	Computerized Numerical Control	20
23	Measuring, Laying Out, and Cutting Fabric II	35
24	Sewing Procedures II	35
25	Furniture Upholstery II	50
Total		140

Option 2—Two 2-Carnegie Unit Courses

This curriculum consists of two 2-credit courses, which should be completed in the following sequence:

1. **Furniture Manufacturing & Upholstery I—Course Code: 993500**
2. **Furniture Manufacturing & Upholstery II—Course Code: 993501**

Course Description: Furniture Manufacturing & Upholstery I

This course is the entry level course of the secondary furniture manufacturing & upholstering program. Students in this course will gain foundation competencies related to orientation, safety, and leadership; tool and equipment identification and use; measurement, furniture frame patterns, and layout; and cutting and assembling frames in furniture manufacturing and upholstery. This course is a prerequisite to Furniture Manufacturing and Upholstery II.

Course Description: Furniture Manufacturing & Upholstery II

This course is the upper-level course of the secondary furniture manufacturing & upholstering program. Students in this course will gain additional skills related to upholstery tools; furniture padding, hardware, and support system components; measurement, layout, cutting of fabrics, sewing procedures, and upholstery in furniture manufacturing.

Furniture Manufacturing & Upholstery I—Course Code: 993500

Unit	Unit Name	Hours
1	Introduction to Furniture Manufacturing	7
2	Employability Skills	8
3	Fundamentals of Student Organizations	5
4	Communication Skills	8
5	Basic Safety	35
6	Introduction to Construction Math	25
7	Hand Tools	11
8	Power Tools	11
9	Introduction to Construction Drawings	20
10	Introduction to Materials Handling	10
11	Furniture Frame Patterns and Layout I	25
12	Cutting and Assembling Frames I	25
13	Measuring, Laying Out, and Cutting Fabric I	25
14	Sewing Procedures I	25
15	Furniture Upholstery I	40
Total		280

Furniture Manufacturing & Upholstery II—Course Code: 993501

Unit	Unit Name	Hours
16	Orientation and Safety	10
17	Tool and Equipment Identification and Use	30
18	Measurement	20
19	Furniture Padding, Hardware, and Support System Components	20
20	Furniture Frame Patterns and Layout II	30
21	Cutting and Assembling Frames II	30
22	Computerized Numerical Control	20
23	Measuring, Laying Out, and Cutting Fabric II	35
24	Sewing Procedures II	35
25	Furniture Upholstery II	50
Total		280

Career Pathway Outlook

Overview

Manufacturing is a vital industry in Mississippi, and manufacturing jobs in the state are projected to remain stable over the next ten years. Manufacturing in general employs nearly 12 percent of the workforce in the state. Furniture manufacturing, the second largest manufacturing industry in Mississippi, accounts for over 18,000 jobs (MDES, 2016). Other countries, such as China, regard furniture products made in the U.S. as being of the highest quality, thus providing Mississippi furniture manufacturers an opportunity to develop export markets and expand export sales (Franklin Furniture Institute of Mississippi State University, 2013). North Mississippi has the highest concentration of furniture manufacturers in the state (Seddon, 2014).

Needs of the Future Workforce

Furniture manufacturing jobs in the United States are expected to decrease over the next 10 years; however, most furniture manufacturing jobs in Mississippi are expected to remain stable or increase, except for finishers.

Table 1.1: Current and Projected Occupation Report

Description	Jobs, 2016	Projected Jobs, 2026	Change (Number)	Change (Percent)	Average Hourly Earnings, 2020
Upholsterers	260	290	30	11.5%	\$15.07
Furniture Finishers	20	10	-10	-50%	\$14.66
Cabinetmakers and Bench Carpenters	60	60	0	0%	\$13.25
Textile, Apparel, and Furnishings Workers, All Other	620	700	80	12.9%	N/A
Carpenters	3,610	3,710	100	2.8%	\$18.53
First-Line Supervisors of Production and Operating Workers	7,140	7,640	500	7%	\$28.85

Source: Mississippi Department of Employment Security; mdes.ms.gov (2020).

Perkins V Requirements and Academic Infusion

The furniture design and manufacturing curriculum meets Perkins V requirements of introducing students to and preparing them for high-skill, high-wage occupations in design and manufacturing fields. It also offers students a program of study, including secondary, postsecondary, and institutions of higher learning courses, that will further prepare them for furniture design and manufacturing careers. Additionally, this curriculum is integrated with academic college- and career-readiness standards. Lastly, it focuses on ongoing and meaningful professional development for teachers as well as relationships with industry.

Transition to Postsecondary Education

The latest articulation information for secondary to postsecondary can be found at the Mississippi Community College Board website, mccb.edu.

Best Practices

Innovative Instructional Technologies

Classrooms should be equipped with tools that will teach today's digital learners through applicable and modern practices. The furniture design and manufacturing educator's goal should be to include teaching strategies that incorporate current technology. To make use of the latest online communication tools—wikis, blogs, podcasts, and social media platforms, for example—the classroom teacher is encouraged to use a learning management system that introduces students to education in an online environment and places more of the responsibility of learning on the student.

Differentiated Instruction

Students learn in a variety of ways, and numerous factors—students' background, emotional health, and circumstances, for example—create unique learners. By providing various teaching and assessment strategies, students with various learning preferences can have more opportunity to succeed.

CTE Student Organizations

Teachers should investigate opportunities to sponsor a student organization. There are several here in Mississippi that will foster the types of learning expected from the furniture design and manufacturing curriculum. SkillsUSA is an example of a student organization with many outlets for furniture design and manufacturing. Student organizations provide participants and members with growth opportunities and competitive events. They also open the doors to the world of design and manufacturing careers and scholarship opportunities.

Cooperative Learning

Cooperative learning can help students understand topics when independent learning cannot. Therefore, you will see several opportunities in the furniture design and manufacturing curriculum for group work. To function in today's workforce, students need to be able to work collaboratively with others and solve problems without excessive conflict. The furniture design and manufacturing curriculum provides opportunities for students to work together and help each other complete complex tasks. There are many field experiences within the furniture design and manufacturing curriculum that will allow and encourage collaboration with professionals currently in the furniture design and manufacturing field.

Work-Based Learning

Work-based learning is an extension of understanding competencies taught in the furniture design and manufacturing classroom. This curriculum is designed in a way that necessitates active involvement by the students in the community around them and the global environment. These real-world connections and applications link to all types of students to knowledge, skills, and professional dispositions. Work-based learning should encompass ongoing and increasingly more complex involvement with local companies and industry professionals. Thus, supervised collaboration and immersion into the industry around the students are keys to students' success, knowledge, and skills development.

Professional Organizations

Association for Career and Technical Education (ACTE)

acteonline.org

SkillsUSA

skillsusa.org

Using This Document

Competencies and Suggested Objectives

A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies. The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.

Teacher Resources

Teacher resources for this curriculum may be found in multiple places. Many program areas have teacher resource documents that accompany the curriculum and can be downloaded from the same site as the curriculum. The teacher resource document contains references, lesson ideas, websites, teaching and assessment strategies, scenarios, skills to master, and other resources divided by unit. This document could be updated periodically by RCU staff. Please check the entire document, including the entries for each unit, regularly for new information. If you have something you would like to add or have a question about the document, call or email the RCU's instructional design specialist for your program. The teacher resource document can be downloaded at rcu.msstate.edu/curriculum/curriculumdownload.aspx. All teachers should request to be added to the Canvas Resource Guide for their course. This is where all resources will be housed in the future if they are not already. To be added to the guide, [send a Help Desk ticket to the RCU](#) by emailing helpdesk@rcu.msstate.edu.

Perkins V Quality Indicators and Enrichment Material

Some of the units may include an enrichment section at the end. If the furniture design and manufacturing program is currently using the Mississippi Career Planning and Assessment System (MS-CPAS) as a measure of accountability, the enrichment section of material will not be tested. If this is the case, it is suggested to use the enrichment material when needed or desired by the teacher and if time allows in the class. This material will greatly enhance the learning experiences for students. If, however, the furniture design and manufacturing program is using a national certification, work-based learning, or other measure of accountability that aligns with Perkins V as a quality indicator, this material could very well be tested on that quality indicator. It is the responsibility of the teacher to ensure all competencies for the selected quality indicator are covered throughout the year.

Unit 1: Introduction to Furniture Manufacturing

Competencies and Suggested Objectives

- | |
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| <ol style="list-style-type: none">1. Explain the local school rules and regulations. ^{DOK1}<ol style="list-style-type: none">a. Describe local school rules found in the student handbook.b. Describe the shop and facilities requirements. |
|---|

Note: This unit will be ongoing throughout the year. Time allotted for this unit will be distributed over the entire year.

Unit 2: Employability Skills

Competencies and Suggested Objectives	
1. Describe employment opportunities in the construction industry. ^{DOK1}	
a. Describe employment opportunities, including potential earnings, employee benefits, job availability, working conditions, educational requirements, required technology skills, and continuing education/training.	
b. Discuss the guidelines for developing a proper résumé.	
c. Demonstrate completing job applications.	
2. Examine the Mississippi Department of Employment Security (MDES) website and its applications relating to employment opportunities. ^{DOK1}	
a. Perform various searches through the MDES website, such as:	
• Number of jobs available for a specific area of expertise	
• Hourly wage	
• Percentage of jobs in the county	
• Percentage of jobs in the state	
3. Demonstrate appropriate interviewing skills. ^{DOK1}	
a. Identify interviewing skills such as speaking, dress, professionalism, and punctuality.	
b. Simulate a job interview.	
4. Describe basic employee responsibilities and appropriate work ethics. ^{DOK1}	
a. Compare and contrast employment responsibilities and expectations to local school and program policies and expectations.	
b. Define effective relationship skills.	
c. Describe workplace issues, including, but not limited to, sexual harassment, stress, and substance abuse.	

Unit 3: Fundamentals of Student Organizations

Competencies and Suggested Objectives	
1. Discuss the history, mission, and purpose of student organizations, including SkillsUSA. ^{DOK1}	<ol style="list-style-type: none"> a. Trace the history of the program area's student organization. b. Identify the mission, purpose, and/or goals of the program area's student organization.
2. Explore the advantages of membership in a student organization. ^{DOK1}	<ol style="list-style-type: none"> a. Discuss the membership process for the program area's student organization. b. Explain the activities related to the local chapter and the state and national organizations.
3. Discuss the organization's brand resources. ^{DOK1}	<ol style="list-style-type: none"> a. Identify the motto, creed, and/or pledge and discuss their meanings. b. Recognize related brand resources, such as: <ul style="list-style-type: none"> • Emblem • Colors • Official attire • Logos • Graphic standards
4. Describe the importance of effective communication skills. ^{DOK1}	<ol style="list-style-type: none"> a. Demonstrate verbal and nonverbal communication skills. b. Apply appropriate speaking and listening skills to class- and work-related situations.
5. Apply leadership skills to class- and work-related situations and 21st century skills. ^{DOK2}	<ol style="list-style-type: none"> a. Define leadership. b. Discuss the attributes of a leader. c. Identify the roles a leader can assume.
6. Utilize team-building skills in class- and work-related situations. ^{DOK2}	<ol style="list-style-type: none"> a. Define team-building. b. Discuss the attributes of a team. c. Identify the roles included in a team.
7. Discuss the various competitions offered through the program area's student organization. ^{DOK1}	<ol style="list-style-type: none"> a. Describe each of the competitions and the skills needed to accomplish the tasks. b. Perform the tasks needed to complete an assigned requirement for a competition.
Note: This unit will be ongoing throughout the year. Time allotted for this unit will be distributed over the entire year.	

Unit 4: Communication Skills

Competencies and Suggested Objectives
1. Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations. ^{DOK2} <ol style="list-style-type: none">Follow basic written and verbal instructions.Effectively communicate in on-the-job situations using verbal, written, or electronic communication.
2. Discuss the importance of good listening skills in on-the-job situations. ^{DOK2} <ol style="list-style-type: none">Apply the tips for developing good listening skills.

Unit 5: Basic Safety

Competencies and Suggested Objectives	
1.	Describe, define, and illustrate general safety rules for working in a shop/lab and how they relate to the construction industry. ^{DOK2} a. Describe how to avoid on-site accidents. b. Explain the relationship between housekeeping and safety. c. Explain the importance of following all safety rules and company safety policies according to OSHA standards. d. Explain the importance of reporting all on-the-job injuries, accidents, and near misses. e. Explain the need for evacuation policies and the importance of following them. f. Explain the causes of accidents and the impact of accident costs. g. Compare and contrast shop/lab safety rules to industry safety rules.
2.	Identify and apply safety around welding operations. ^{DOK1} a. Use proper safety practices when welding or working around welding operations. b. Use proper safety practices when welding in or near trenches and excavations. c. Explain the term “proximity work.”
3.	Display appropriate safety precautions to take around common jobsite hazards. ^{DOK1} a. Explain the safety requirements for working in confined areas. b. Explain the different barriers and barricades and how they are used.
4.	Demonstrate the appropriate use and care of personal protective equipment (PPE). ^{DOK1} a. Identify commonly used PPE items. b. Understand proper use of PPE. c. Demonstrate appropriate care for PPE.
5.	Explain fall protection and ladder, stair, and scaffold procedures and requirements. ^{DOK1} a. Explain the use of proper fall protection. b. Inspect and safely work with various ladders, stairs, and scaffolds.
6.	Explain the safety data sheet (SDS). ^{DOK1} a. Explain the function of the SDS. b. Interpret the requirements of the SDS. c. Discuss hazardous material exposures.
7.	Display appropriate safety procedures related to fires. ^{DOK1} a. Explain the process by which fires start. b. Explain fire prevention of various flammable liquids. c. Explain the classes of fire and the types of extinguishers. d. Illustrate the proper steps to follow when using a fire extinguisher. e. Demonstrate the proper techniques for putting out a fire.
8.	Explain safety in and around electrical situations. ^{DOK1} a. Explain the injuries that can result when electrical contact occurs. b. Explain safety around electrical hazards. c. Explain actions to take when an electrical shock occurs.
Note: Safety is to be taught as an ongoing part of the program. Students are required to complete a written safety test with 100% accuracy before entering the shop for lab simulations and projects. This test should be documented in each student’s file.	

Unit 6: Introduction to Construction Math

Competencies and Suggested Objectives
<ol style="list-style-type: none">1. Apply the four basic math skills using whole numbers, fractions, decimals, and percentages, both with and without a calculator. ^{DOK2}<ol style="list-style-type: none">a. Define basic geometric shapes used in the construction industry.b. Add, subtract, multiply, and divide whole numbers, decimals, and fractions with and without a calculator.c. Convert whole numbers to fractions and convert fractions to whole numbers.d. Convert decimals to percentages and convert percentages to decimals.e. Convert fractions to decimals.f. Convert fractions to percentages.g. Demonstrate reading a standard and metric ruler and a tape measure.h. Recognize and use metric units of length, weight, volume, and temperature.

Unit 7: Hand Tools

Competencies and Suggested Objectives
<ol style="list-style-type: none">1. Demonstrate the use and maintenance of hand tools. ^{DOK2}<ol style="list-style-type: none">a. Identify, visually inspect, and discuss the safe use of common hand tools.b. Discuss safety rules.c. Select and demonstrate the use of hand tools.d. Explain the procedures for maintenance.

Unit 8: Power Tools

Competencies and Suggested Objectives
<ol style="list-style-type: none">1. Demonstrate the use and maintenance of power tools. ^{DOK2}<ol style="list-style-type: none">a. Identify, visually inspect, and discuss the safe use of common power tools.b. Discuss safety rules.c. Select and demonstrate the use of power tools.d. Explain the procedures for maintenance.

Unit 9: Introduction to Construction Drawings

Competencies and Suggested Objectives
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- | |
|---|
| <ol style="list-style-type: none">1. Read, analyze, and understand basic components of a drawing. ^{DOK3}<ol style="list-style-type: none">a. Recognize and identify terms, components, and symbols commonly used on drawings.b. Relate information on construction drawings to actual locations on the drawings.c. Recognize different types of drawings.d. Interpret and use drawing dimensions. |
|---|

Unit 10: Introduction to Materials Handling

Competencies and Suggested Objectives
<ol style="list-style-type: none">1. Safely handle and store materials. ^{DOK1}<ol style="list-style-type: none">a. Define a load.b. Establish a pre-task plan prior to moving a load.c. Demonstrate proper materials-handling techniques.d. Choose the appropriate materials-handling equipment for a task.e. Recognize hazards and follow safety procedures required for materials handling.f. Identify and demonstrate commonly used knots.

Unit 11 Furniture Frame Patterns I

Competencies and Suggested Objectives
1. Identify terms and materials commonly used in frame manufacturing. ^{DOK1} a. Define terms associated with frame patterns. b. Identify woods to use in different applications on frames.
2. Identify types and styles of upholstered furniture. ^{DOK1} a. Describe types of furniture. b. Describe the most common furniture styles.
3. Create a working drawing. ^{DOK3} a. Read a working drawing, including dimensions and different features. b. Develop a working drawing, including concept and dimensions, manually or by using a computer.

Unit 12: Cutting and Assembling Frames I

Competencies and Suggested Objectives
1. Cut frames for upholstered furniture to specifications. ^{DOK2} <ol style="list-style-type: none">Cut parts to length using the miter saw.Cut parts to width using the table saw.Perform scroll cuts using the bandsaw.Drill holes for dowel pins with the drill press.
2. Assemble frame parts to specifications using fastening devices. ^{DOK2} <ol style="list-style-type: none">Assemble chair frames.Assemble ottoman/foot-stool frames.Assemble slipper bench frames.

Unit 13: Measuring, Laying Out, and Cutting Fabric I

Competencies and Suggested Objectives	
1. Identify parts of furniture being manufactured. ^{DOK1}	
a. Identify parts of upholstered furniture, including front seat, bottom band, inside arm, inside back, back band, outside arm, outside back, and skirt.	
2. Measure parts of furniture. ^{DOK2}	
a. Measure parts of furniture with instruments or gauges to ensure compliance with specifications.	
3. Apply fabric-cutting procedures. ^{DOK2}	
a. Lay out fabric.	
b. Cut the fabric following the required steps.	

Unit 14: Sewing Procedures I

Competencies and Suggested Objectives
1. Identify types and basic parts of sewing machines. ^{DOK1} <ol style="list-style-type: none">Identify types of sewing machines.Identify basic parts of a sewing machine.Describe each part of a sewing machine and the tasks they perform.
2. Operate a sewing machine. ^{DOK2} <ol style="list-style-type: none">Thread a sewing machine.Perform a sewing procedure, including sewing pull, welting, zippers, dart, and corner.Observe the maintenance procedures for a sewing machine, according to manufacturer's specifications.

Unit 15: Furniture Upholstery I

Competencies and Suggested Objectives	
1. Identify the steps in furniture upholstery. ^{DOK1}	
a. Identify the steps in basic seat construction.	
b. Identify the steps in basic arm construction.	
c. Identify the steps in basic back construction.	
d. Identify the steps in basic outside trim construction.	
2. Perform the steps in furniture upholstery. ^{DOK2}	
a. Perform the steps in basic seat construction.	
b. Perform the steps in basic arm construction.	
c. Perform the steps in basic back construction.	
d. Perform the steps in basic outside trim construction.	

Unit 16: Orientation and Safety Review

Competencies and Suggested Objectives	
1. Review and explain the local school rules and regulations. ^{DOK1}	
a. Describe local school rules found in the student handbook.	
b. Describe the shop and facilities requirements.	
2. Review and describe SkillsUSA activities pertaining to furniture manufacturing. ^{DOK1}	
a. Describe the purposes of the SkillsUSA organization.	
b. Describe the leadership development activities of SkillsUSA.	
c. Describe the personal development activities associated with SkillsUSA.	
3. Review the safety requirements for upholstered manufacturing. ^{DOK1}	
a. Describe personal safety rules for working in a shop/lab and industry, including OSHA regulations.	
b. Describe the general workplace safety rules.	
c. Describe the proper use of fire extinguishers and classes of fires.	
d. Identify standard industry Safety Color-Coding System.	
e. Describe procedures for safely handling heavy objects.	
f. Describe accident-reporting procedures.	
4. Review hazardous materials that may be found on a job site and describe procedures for handling, avoidance, or removal of materials. ^{DOK1}	
a. Review and interpret an SDS.	

Note: Safety is to be taught as an ongoing part of the program. Students are required to complete a written safety test with 100% accuracy before entering the shop for lab simulations and projects. This test should be documented in each student's file.

Unit 17: Tool and Equipment Identification and Use

Competencies and Suggested Objectives	
1. Demonstrate the use of hand tools found in upholstered furniture manufacturing. ^{DOK2}	<ol style="list-style-type: none">a. Identify hand tools used in frame building.b. Demonstrate use of hand tools used in frame building.
2. Demonstrate the use of power tools in upholstered furniture frame manufacturing. ^{DOK2}	<ol style="list-style-type: none">a. Identify types of air-powered fasteners used in furniture manufacturing.b. Demonstrate the use of air-powered fasteners used in furniture manufacturing.c. Identify power tools used in frame building.d. Demonstrate the use of power tools used in frame building.e. Identify machines used in frame building.f. Describe the operation of machines used in frame building.g. Describe the safety rules of each machine used in frame building.h. Demonstrate the use of each machine used in frame building.i. Perform maintenance procedures on each machine used in frame building.
3. Identify furniture upholstery tools and fasteners. ^{DOK1}	<ol style="list-style-type: none">a. Identify types of hammers used in upholstery work.b. Identify types of upholstery needles.c. Identify types of stuffing devices.d. Identify staple fasteners.e. Identify cutting devices.
4. Demonstrate the safe use of furniture upholstery tools. ^{DOK2}	<ol style="list-style-type: none">a. Demonstrate the safe use of upholstery hammers.b. Demonstrate the safe use of upholstery needles.c. Demonstrate the safe use of upholstery stuffing devices.d. Demonstrate the safe use of upholstery staple fasteners.e. Demonstrate the safe use of upholstery cutting devices.

Unit 18: Measurement

Competencies and Suggested Objectives
1. Identify types of measuring devices used in furniture manufacturing. ^{DOK1} <ol style="list-style-type: none">Identify types of measuring devices used in furniture manufacturing, including tape measure, rule, square, and compass.Demonstrate ability to use types of measuring devices used in furniture manufacturing, including tape measure, rule, square, and compass.
2. Perform mathematics essential to furniture manufacturing occupations. ^{DOK2} <ol style="list-style-type: none">Calculate fractions, including addition, subtraction, multiplication, and division.Calculate board feet measurements in lumber.

Unit 19: Furniture Padding, Hardware, and Support System Components

Competencies and Suggested Objectives
<p>1. Identify padding and hardware components used in upholstered furniture manufacturing.^{DOK2}</p> <ul style="list-style-type: none">a. Describe types of furniture padding and hardware components used in upholstery work.b. Describe factors upon which seating comfort depends, including foam density and spring gauge.c. Compare the properties of padding materials used in upholstered furniture.
<p>2. Apply support system components.^{DOK2}</p> <ul style="list-style-type: none">a. Determine the type of springs or support system to be used.b. Install support system components.
<p>3. Apply upholstered furniture padding.^{DOK2}</p> <ul style="list-style-type: none">a. Determine the type of padding to be used.b. Transfer the measurements from pattern to padding, according to specifications.c. Cut padding, according to specifications.d. Apply padding to frame and fasten according to specifications.
<p>4. Prepare a bill of materials for the padding, hardware, and support system of a sofa.^{DOK2}</p> <ul style="list-style-type: none">a. Itemize the materials.b. Determine quantities.c. Determine costs.d. Evaluate cost efficiency of materials by comparison.

Unit 20: Furniture Frame Patterns and Layout II

Competencies and Suggested Objectives
1. Use a working drawing to lay out and cut materials for a frame. ^{DOK2} <ol style="list-style-type: none">Demonstrate the process of laying out patterns for the greatest yield.Demonstrate the process of laying out patterns and duplicating parts, manually or on a computer.
2. Prepare a bill of materials for the manufacture of a furniture frame. ^{DOK2} <ol style="list-style-type: none">Itemize the materials and supplies.Determine quantities.Determine costs.

Unit 21: Cutting and Assembling Frames II

Competencies and Suggested Objectives	
1.	Cut frames for upholstered furniture to specifications. ^{DOK2} <ol style="list-style-type: none">Cut parts to length using the miter saw.Cut parts to width using the table saw.Perform scroll cuts using the bandsaw.Drill holes for dowel pins with the drill press (reference Unit 7).
2.	Assemble frame parts to specifications using fastening devices. ^{DOK2} <ol style="list-style-type: none">Assemble sofa and chair frames.

Unit 22: Computerized Numerical Control

Competencies and Suggested Objectives
1. Describe computerized numerical control (CNC), including the codes and the input of a pre-written program. ^{DOK1} <ol style="list-style-type: none">Describe the operations of CNC.Describe codes used in a CNC machine.
2. Safely operate a CNC machine. ^{DOK 2} <ol style="list-style-type: none">Download the program.Execute the program.

Unit 23: Measuring, Laying Out, and Cutting Fabric II

Competencies and Suggested Objectives
1. Identify parts of furniture being manufactured. ^{DOK1} <ol style="list-style-type: none">Identify parts of upholstered furniture, including front seat, bottom band, inside arm, inside back, back band, outside arm, outside back, and skirt.Measure parts of furniture.
2. Apply fabric-cutting procedures. ^{DOK2} <ol style="list-style-type: none">Develop a manual or computerized pattern for part layout.Lay out fabric.Cut the fabric following the required steps.Observe automated fabric cutting equipment.

Unit 24: Sewing Procedures II

Competencies and Suggested Objectives	
1. Identify types and basic parts of sewing machines. ^{DOK1}	
a. Identify types of sewing machines.	
b. Identify basic parts of a sewing machine.	
c. Describe each part of a sewing machine and the task it performs.	
2. Operate a sewing machine. ^{DOK2}	
a. Thread a sewing machine.	
b. Perform a sewing procedure, including sewing pull, welting, boxing, zippers, dart, pleat, and corner.	
c. Demonstrate the maintenance procedures for a sewing machine, according to manufacturer's specifications.	
3. Create a sew drawing. ^{DOK2}	
a. Create a sew drawing for upholstered furniture, either manually or using a computer.	

Unit 25: Furniture Upholstery II

Competencies and Suggested Objectives
1. Identify the steps in furniture upholstery. ^{DOK1} <ol style="list-style-type: none">Identify the steps in advanced seat construction.Identify the steps in advanced arm construction.Identify the steps in advanced back construction.Identify the steps in advanced outside trim construction.
2. Perform the steps in furniture upholstery. ^{DOK2} <ol style="list-style-type: none">Perform the steps in advanced seat construction.Perform the steps in advanced arm construction.Perform the steps in advanced back construction.Perform the steps in advanced outside trim construction.

Student Competency Profile

Student's Name: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student, and it can serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Introduction to Furniture Manufacturing		
	1.	Explain the local school rules and regulations.
	2.	Explain the opportunities, requirements, and working conditions for employment in the upholstered furniture manufacturing industry.
Unit 2: Employability Skills		
	1.	Describe employment opportunities in the construction industry.
	2.	Examine the Mississippi Department of Employment Security (MDES) website and its applications relating to employment opportunities.
	3.	Demonstrate appropriate interviewing skills.
	4.	Describe basic employee responsibilities and appropriate work ethics.
Unit 3: Fundamentals of Student Organizations		
	1.	Discuss the history, mission, and purpose of student organizations, including SkillsUSA.
	2.	Explore the advantages of membership in a student organization.
	3.	Discuss the organization's brand resources.
	4.	Describe the importance of effective communication skills.
	5.	Apply leadership skills to class- and work-related situations and 21st century skills.
	6.	Utilize team-building skills in class- and work-related situations.
	7.	Discuss the various competitions offered through the program area's student organization.
Unit 4: Communication Skills		
	1.	Demonstrate the ability to follow verbal and written instructions and communicate effectively in on-the-job situations.
	2.	Discuss the importance of good listening skills in on-the-job situations.

Unit 5: Basic Safety		
	1.	Describe, define, and illustrate general safety rules for working in a shop/lab and how they relate to the construction industry.
	2.	Identify and apply safety around welding operations.
	3.	Display appropriate safety precautions to take around common jobsite hazards.
	4.	Demonstrate the appropriate use and care of personal protective equipment (PPE).
	5.	Explain fall protection, ladder, stair, and scaffold procedures and requirements.
	6.	Explain the safety data sheet (SDS).
	7.	Display appropriate safety procedures related to fires.
	8.	Explain safety in and around electrical situations.
Unit 6: Introduction to Construction Math		
	1.	Apply the four basic math skills using whole numbers, fractions, decimals, and percentages, both with and without a calculator.
Unit 7: Hand Tools		
	1.	Demonstrate the use and maintenance of hand tools.
Unit 8: Power Tools		
	1.	Demonstrate the use and maintenance of power tools.
Unit 9: Introduction to Construction Drawings		
	1.	Read, analyze, and understand basic components of a drawing.
Unit 10: Introduction to Materials Handling		
	1.	Safely handle and store materials.
Unit 11: Furniture Frame Patterns and Layout I		
	1.	Identify terms and materials commonly used in frame manufacturing.
	2.	Identify types and styles of upholstered furniture.
	3.	Create a working drawing.
Unit 12: Cutting and Assembling Frames I		
	1.	Cut frames for upholstered furniture to specifications.
	2.	Assemble frame parts to specifications using fastening devices.

Unit 13: Measuring, Laying Out, and Cutting Fabric I		
	1.	Identify parts of furniture being manufactured.
	2.	Measure parts of furniture.
	3.	Identify fabric-cutting procedures.
Unit 14: Sewing Procedures I		
	1.	Identify types and basic parts of sewing machines.
	2.	Operate a sewing machine.
Unit 15: Furniture Upholstery I		
	1.	Identify the steps in furniture upholstery.
	2.	Perform the steps in furniture upholstery.
Unit 16: Orientation and Safety Review		
	1.	Review and explain the local school rules and regulations.
	2.	Review and describe SkillsUSA activities pertaining to furniture manufacturing.
	3.	Review the safety requirements for upholstered manufacturing.
	4.	Review hazardous materials that may be found on a job site and describe procedures for handling, avoidance, or removal of materials.
Unit 17: Tool and Equipment Identification and Use		
	1.	Demonstrate use of hand tools found in upholstered furniture manufacturing.
	2.	Demonstrate the use of power tools in upholstered furniture frame manufacturing.
	3.	Identify furniture upholstery tools and fasteners.
	4.	Demonstrate the safe use of furniture upholstery tools.
Unit 18: Measurement		
	1.	Identify types of measuring devices used in furniture manufacturing.
	2.	Perform mathematics essential to furniture manufacturing occupations.
	2.	Demonstrate the safe use of furniture upholstery tools.
Unit 19: Furniture Padding, Hardware, and Support System Components		
	1.	Identify padding and hardware components used in upholstered furniture manufacturing.
	2.	Apply support system components.
	3.	Apply upholstered furniture padding.
	4.	Prepare a bill of materials for the padding, hardware, and support system of a sofa.

Unit 20: Furniture Frame Patterns and Layout II		
	1.	Use a working drawing to lay out and cut materials for a frame.
	2.	Prepare a bill of materials for the manufacture of a furniture frame.
Unit 21: Cutting and Assembling Frames II		
	1.	Cut frames for upholstered furniture to specifications.
	2.	Assemble frame parts to specifications using fastening devices.
Unit 22: Computerized Numerical Control		
	1.	Describe computerized numerical control (CNC), including the codes and the input of a pre-written program.
	2.	Safely operate a CNC machine.
Unit 23: Measuring, Laying Out, and Cutting Fabric II		
	1.	Identify parts of furniture being manufactured.
	2.	Apply fabric-cutting procedures.
Unit 24: Sewing Procedures II		
	1.	Identify types and basic parts of sewing machines.
	2.	Operate a sewing machine.
	3.	Create a sew drawing.
Unit 25: Furniture Upholstery II		
	1.	Identify the steps in furniture upholstery.
	2.	Perform the steps in furniture upholstery.

Appendix A: Industry Standards

Common Career and Technical Core Standards

Crosswalk for Furniture Design and Manufacturing											
Industry Standards Units 1-10	Units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10
NCCER Core											
BSM						X					
ICM							X				
IHT								X			
IPT									X		
BLU										X	
COM					X						
EMP			X								
IMH											X
Manufacturing											
MN 1		X		X							
MN 2											
MN 3				X							
MN 4		X									
MN 5				X							
MN 6				X							
Production											
MN-PRO 1											
MN-PRO 2				X							
MN-PRO 3											
MN-PRO 4				X							
MN-PRO 5				X							

Industry Standards Units 11-19	Units	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16	Unit 17	Unit 18	Unit 19
Manufacturing										
MN 1										
MN 2		X							X	
MN 3		X	X	X		X	X	X		X
MN 4					X					
MN 5		X	X	X		X	X	X		X
MN 6		X	X	X	X	X	X	X	X	X
Production					X					
MN-PRO 1										
MN-PRO 2		X	X	X	X	X	X	X		X
MN-PRO 3			X	X	X	X			X	X
MN-PRO 4		X	X	X	X	X				X
MN-PRO 5		X	X	X	X	X	X	X		X

Industry Standards Units 11-19	Units	Unit 20	Unit 21	Unit 22	Unit 23	Unit 24	Unit 25			
Manufacturing										
MN 1										
MN 2		X								
MN 3		X	X	X	X	X	X			
MN 4										
MN 5		X	X	X	X	X	X			

MN 6		X	X	X	X	X	X			
Production										
MN-PRO 1				X		X				
MN-PRO 2		X	X	X	X	X	X			
MN-PRO 3			X	X	X	X	X			
MN-PRO 4		X	X	X	X	X	X			
MN-PRO 5		X	X	X	X	X	X			

NCCER CORE

BSM – BASIC SAFETY (00101-15)

ICM – INTRODUCTION TO CONSTRUCTION MATH (00102-15)

IHT – INTRODUCTION TO HAND TOOLS (00103-15)

IPT – INTRODUCTION TO POWER TOOLS (00104-15)

BLU – INTRODUCTION TO CONSTRUCTION DRAWINGS (00105-15)

COM – BASIC COMMUNICATION SKILLS (00107-15)

EMP – BASIC EMPLOYABILITY SKILLS (00108-15)

IMH – INTRODUCTION TO MATERIALS HANDLING (00109-15)

Common Career and Technical Core Standards

Career Cluster Manufacturing

- MN 1 Evaluate the nature and scope of the Manufacturing Career Cluster and the role of manufacturing in society and in the economy.
- MN 2 Analyze and summarize how manufacturing businesses improve performance.
- MN 3 Comply with federal, state, and local regulations to ensure worker safety and health and environmental work practices.
- MN 4 Describe career opportunities and means to achieve those opportunities in each of the Manufacturing Career Pathways.
- MN 5 Describe government policies and industry standards that apply to manufacturing.
- MN 6 Describe the various manufacturing processes.

Career Cluster Production

- MN-PRO 1 Diagnose production process problems and take corrective action to meet production quality standards.
- MN-PRO 2 Manage safe and healthy production working conditions and environmental risks.

- MN-PRO 3 Make continuous improvement recommendations based on results of production process audits and inspections.
- MN-PRO 4 Coordinate work teams when producing products to enhance production process and performance.
- MN-PRO 5 Demonstrate the safe use of manufacturing equipment.