



# Wood Manufacturing Technology

Program of Studies  
2017-2018



## Wood Manufacturing Technology

Program Area Course Title	Post- Secondary Connection	Valid Course Code	Recommended Grade Level				Recommended Credit
			9	10	11	12	
Advanced Wood Processing	WMT 290	480733		X	X	X	1
Cabinet Making Technology	WMT 240	480731		X	X	X	1
CAD for Wood Technology		480725		X	X	X	.5
Intro to Computer Aided Drafting	CAD 100	480110	X	X	X	X	1
Co-op I (Wood)	WMT 199	480741			X	X	1
Furniture Technology	WMT 250	480721		X	X	X	1
Internship (Wood)	WMT 198	480744			X	X	1 - 3
Introduction to Panel Processing	WMT 230	480711		X	X	X	1
Lumber Grading and Drying	WMT 200	480716		X	X	X	1
Millwork Technology	WMT 260	480717		X	X	X	1
Special Problems (for Wood Manufacturing)	IEX 291	480795			X	X	1
Technical Drawing and Blueprint Reading	WMT 110	480719		X	X	X	.5
Wood Finishing	WMT 160	480720		X	X	X	.5
Wood Product Manufacturing	WMT 120	480740	X	X	X	X	1

### COMPLEMENTARY OR ADVANCED COURSEWORK BEYOND WOOD MANUFACTURING PATHWAY(S)

Upon completion of a pathway, additional coursework to enhance student learning is encouraged. Credits earned in Advanced or Complementary Coursework “Beyond the Pathway” may not be substituted for pathway courses in order to achieve Preparatory or Completer status.

- 480795 Special Problems (for Wood Manufacturing)
- 480718 Moulder/Grinder Oper.
- 480799 Special Topics – Wood Manufacturing Technology
- Career Options
- JAG Courses

# Overview of Wood Manufacturing Technology

## Purpose

The Wood Manufacturing Technology Program is designed to enhance the student's future by providing them with a broad range of specialized skills. Student's mastering the technical knowledge and skills required can be industry certified through Woodworking Career Alliance.

The Wood Manufacturing Technology Program prepares students by engaging them with science, mathematics, and critical thinking skills through the classroom and lab/shop training.

Wood Manufacturing Technology Education will:

- Operate as the venue for nationally recognized industry standard training.
- Provide a critical link in school to employment or postsecondary education.
- Develop stronger relationships with the community in terms of mutual advocacy, cooperative field experiences, employment placement, and support for relevant student organizations and competitions.
- Represent an important component in the education of all students.
- Require and promote critical thinking and problem solving.
- Offer an up to date curriculum based on standards that adapt to changes in the industry.
- Integrate academic skills to insure that students develop written and verbal communications skills, computational skills, and scientific/math problem-solving skills.

## Career Pathways

- *Wood Manufacturing*
- *Manufacturing TRACK*
- *Wood Manufacturing Engineering– (Hybrid pathway with additional Engineering)*

## Standards Based Curriculum

The Wood Manufacturing Curriculum is composed of standards-based competencies. All Wood Manufacturing programs incorporate industry and common core standards thus increasing the student's qualifications toward successful employment.

Alignment of the Wood Manufacturing curriculum with nationally recognized industry standards and the common core standards provides optimal preparation for students to acquire an industry certification.

Communities understand that this preparation provides better career opportunities for students and the demands of today's workforce for the 21<sup>st</sup> century.

## Kentucky Occupational Skill Standards

The Kentucky Occupational Skill Standards are the performance specifications that identify the knowledge, skills, and abilities an individual needs to succeed in the workplace. Identifying the necessary skills is critical to preparing students for entry into employment or postsecondary education. These standards describe the necessary occupational, academic, and employability skills needed to enter the workforce or post-secondary education in specific career areas. There is

an ongoing effort to continue to refine these standards by which exemplary Career and Technical Education Programs are evaluated and certified. This helps insure that curriculum meets industry specifications.


### **2017 – 2018 Valid Industry Certification and KOSSA List**

#### **Work Based Learning**

Cooperative experience, internships, shadowing and mentoring opportunities provide depth and breadth of learning in the instructional program and allow students to apply the concepts learned in the classroom. The Work Based Learning Manual is available on the KDE webpage: [www.education.ky.gov](http://www.education.ky.gov).

#### **Student Organizations and Competitions**

Participation in SkillsUSA competitions provides a vehicle for students to employ higher order thinking skills, interact with high-level industry representatives and enhance leadership skills through participation in regional, state and national competitive events and activities.

KENTUCKY CAREER PATHWAY/PROGRAM OF STUDY TEMPLATE									
COLLEGE/UNIVERSITY:		Morehead State University			CLUSTER:		Manufacturing		
HIGH SCHOOL (S):		Kentucky Community and Technical College Lincoln County ATC			PATHWAY:		Wood Technologist/Manufacturing Manager		
					PROGRAM:		Wood Manufacturing		
GRADE	ENGLISH	MATH	SCIENCE	SOCIAL STUDIES	REQUIRED COURSES RECOMMENDED ELECTIVE COURSES OTHER ELECTIVE COURSES CAREER AND TECHNICAL EDUCATION COURSES			CREDENTIAL CERTIFICATE DIPLOMA DEGREE	SAMPLE OCCUPATIONS
9					History and Appreciation of Visual and Performing Arts	WMT 120 Wood Product Manufacturing 480740	WMT 110 Tech Draw/Blueprint Reading 480719/480720		
	English I	Algebra I *See	Earth Science	Economics	WMT 100 Intro to Panel Processing	WMT 230 Intro to Panel Processing 480711	WMT 215 Lumber Grading and Drying 480716	Wood Career Alliance (Green Credential)	Cabinetmaker Helper Furniture maker Helper
	English II	Geometry	Biology	U.S. History	CAD 480110				
10			Physical Science	World	WMT 250 Furniture Making Technology			Wood Career Alliance (Green Credential)	Cabinet Maker Furniture Maker
	English III	Algebra II	Science	Geography	Technology 480721	480731	WMT 260 Millwork Technology		Maker
11					WMT 199 Coop I	WMT 299 Co-op II	WMT 199 Co-op I & II	TRACK Pre-Apprenticeship / High School Diploma *ONet Certificates	Wood CNC Operator/Programmer
	English IV Take ACT - Apply for admission to	4th Math for admission to	KCTCS						
	Year 13 Writing	Math	Science	Computer Applications	EFM 100 Personal Financial Management	ISX 100 Industrial Safety	WMT 290 Advanced Millwork Technology		
									
Year 14			Social		WPP 200	CAD 200			
	Communications	Math	Humanities	Interaction	WMT 280 Estimating Workplace Principles	Intermediate CAD	Wood Technologist Diploma	Wood Technologist	
Year 15						IET 327 Applied			

Year 16	Communications	Humanities	Psychology	Economics Material	IET 330 Industrial Design	IET 319 Quality Control	Industrial Management	IET 320	
	Arts and			Properties and	IET 317 Time and	IET 300 Technology Supervisory			
	Humanities	Math	Science	Testing	Motion Study	and Society	Practices	Bachelor's Degree	Manufacturing Manager

Recommended Elective Courses  
Other Elective Courses  
Career and Technical Education Courses  
Credit-Based Transition Programs (e.g. Dual/Concurrent Enrollment, Articulated Courses, 2+2+2)  
Revised Jan. 2005 (♦=High School to Comm. College) (\*=Com. College to 4-Yr Institution) (■=Opportunity to test out)

October, 2006-CTE/Kentucky Mandatory Assessments, Advising, and Additional Preparation  
**Note:** Categories of courses (e.g. Required, Recommended Electives, other Electives and career and Technical Education) apply to both secondary and postsecondary levels.

# WOOD MANUFACTURING CAREER PATHWAYS 2017-2018

## WOOD MANUFACTURING CIP 48.0703.02

**PATHWAY DESCRIPTION:** Cabinet makers are specific types of woodworkers who create and install cabinets in bathrooms, kitchens, other areas of homes and businesses. Typical duties of cabinet makers include designing custom cabinets, making cabinets, installing cabinetry, consulting with clients and other duties as needed. Cabinet makers are responsible for cutting and shaping wood, preparing surfaces and forming a completed product.

### BEST PRACTICE CORE

### EXAMPLE ILP-RELATED CAREER TITLES

Choose (4) **FOUR CREDITS** from the following:

- 480719 Technical Drawing and Blueprint Reading\*
- 480720 Wood Finishing\*
- 480740 Wood Product Manufacturing
- 480731 Cabinet Making Technology
- 480733 Advanced Wood Processing
- 480725 CAD for Wood Technology\*
- 480721 Furniture Technology
- 480110 Introduction to Computer Aided Drafting
- 480716 Lumber Grading and Drying
- 480711 Introduction to Panel Processing
- 480733 Advanced Wood Processing
- 480717 Millwork Technology
- 219901 Introduction to Engineering Design(PLTW)
- 480741 Co-op I (Wood) **OR**
- 480744 Internship (Wood)

Note: (PLTW) courses require an agreement between Project Lead the Way and the Local School District.

Note: (\*) Indicates half-credit (.5) course

Production Woodworker  
Machine Setter  
Millworker  
CNC Operator  
Wood Product Supervisor  
Furniture Maker  
Wood Technologist  
Wood Product Engineer

## WOOD MANUFACTURING CAREER PATHWAYS 2017-2018

### MANUFACTURING TRACK CIP 48.0500.99

**PATHWAY DESCRIPTION:** The Tech Ready Apprentices for Careers in Kentucky (TRACK) youth pre-apprenticeship program is a partnership between the Kentucky Department of Education's Office of Career and Technical Education and the Kentucky Labor Cabinet to provide secondary students with career pathway opportunities into employers who offer Registered Apprenticeship programs. Employers are able to tailor the program for their specific needs and select the Career and Technical Education courses and students for their apprenticeship pathway. Employers benefit by gaining future employees that have a good foundation and an interest in that occupation. Additionally, it enables students to receive a nationally recognized credential. Successful completion is determined by the employer. The student will be awarded an industry certification through The Kentucky Labor Cabinet. All on-the-job hours worked will be counted towards the registered apprenticeship.

<b>BEST PRACTICE CORE</b>	<b>EXAMPLE ILP-RELATED CAREER TITLES</b>
<p><i>Complete (4) FOUR CREDITS:</i></p> <ul style="list-style-type: none"> <li>A minimum of four (4) courses chosen from the partnering technical center's manufacturing course offerings. These courses are chosen by the employer sponsoring the Registered Apprenticeship. The employer must provide a student co-op opportunity.</li> </ul>	

NOTE: The specifics of the TRACK program vary and interested parties will need to confer with the Office of Career and Technical Education for the implementation process. There are no costs involved in the TRACK program except for student employee wages. For more information, please refer to:  
<http://education.ky.gov/CTE/cter/Pages/TRACK.aspx>

**CTE-ENGINEERING HYBRID CAREER PATHWAYS  
2017-2018**

**WOOD MANUFACTURING ENGINEERING  
CIP 03.0509.00**

**PATHWAY DESCRIPTION:** This pathway provides the opportunity to blend Career and Technical Education (CTE) courses with Engineering courses to help students apply technical skills along with science, technology, engineering, and math (STEM) skills to solve real-world problems. Wood Manufacturing Engineers design and create interior cabinets and wood products for homes and businesses. Wood Manufacturing Engineers consult with clients and Cabinetmakers for cutting, shaping wood, preparing surfaces and forming a completed product.

**BEST PRACTICE COURSES**

**EXAMPLE  
ILP-RELATED  
CAREER TITLES**

*Complete (2) TWO CREDITS:*

- 210221 Fundamentals of Engineering Design **OR**  
219901 Introduction to Engineering Design (PLTW)
- 210118 Advanced Technological Applications **OR**  
219904 Computer Integrated Manufacturing (PLTW)

*Choose (3) THREE CREDITS from the following:*

- 480731 Cabinet Making Technology
- 480725 CAD for Wood Technology
- 480721 Furniture Technology
- 480716 Lumber Grading and Drying
- 480740 Wood Product Manufacturing
- 480733 Advanced Wood Processing

Wood Product Supervisor  
  
Wood Technologist  
  
Wood Product Engineer

Note: 480731, 480725, 480721, 480716, 480740, and 480733 exist in the Wood Manufacturing Technology Program of Study.

Note: 210221, 219901, 210118, and 219904 exist in the Engineering Program of Study.

Note: (PLTW) courses require an agreement between Project Lead The Way and the Local School District.



## Advanced Wood Processing

Valid Course Code: 480733

**Course Description:** This course is a capstone experience for advanced wood processing technicians involving the integration of computer aided design and world-class manufacturing of wood products.

### Content/Process

#### Students will:

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Identify the basic parts of a CNC machining center.
5. Describe the career opportunities and job titles in CNC.
6. Identify the tasks that must be done to put a job into production.
7. Describe the tasks in the CNC process.
8. Identify standard and auxiliary axes on routers and boring machines using the "Right Hand Rule".
9. Describe the characteristics of and differences between position and reference points.
10. Calculate coordinate points using absolute Cartesian values.
11. Calculate coordinate points using incremental Cartesian values.
12. Locate and select coordinate values for reference points.
13. Identify data storage media in CNC.
14. Identify the components of a CNC system.
15. List the special features of CNC.
16. Select the tooling for a CNC job.
17. Select and use appropriate holding tools.
18. Perform routine maintenance.
19. Load code into the control of CNC machining center.
20. Align and coordinate the machine and tools.
21. Enter tool offsets and cutter geometry.
22. Test and run a program.
23. Write an operator setup document.
24. Select speeds and feeds for the type of tool and material to be machined.
25. Plan an efficient and safe program with good sequencing.
26. Identify proprietary differences in "G" and "M" codes.
27. Use the basic coded words in the program.

### Connections

- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 290
- WCA Industrial Standards

# Cabinet Making Technology

Valid Course Code: 480731

**Course Description:** This course is an overview of the cabinet and store fixture industries. Emphasis will be placed on the design and construction of face frame as well as frameless (32mm) systems. Students will plan and build a vanity, kitchen cabinet, or shop project which utilizes contemporary casework techniques.

*Prerequisites: Technical Drawing and Blueprint Reading - 480719*

*Wood Product Manufacturing - 480740*

## Content/Process

### Students will:

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Produce working drawings for a typical set of kitchen cabinets, both manually and with the aid of computer software.
5. Produce a cutting list needed to build a set of cabinets.
6. Demonstrate an understanding of both face and frame and 32mm systems of cabinet construction.
7. Identify standardized cabinet dimensions.
8. Differentiate between custom cabinetry and modular/mass-produced cabinetry.
9. Compare the cost of manufacturing components (doors and drawers) vs outsourcing.
10. Identify trade associations for the cabinet and store fixture industries and review standards and certification programs.
11. Manufacture a countertop using high pressure decorative laminate.
12. Fabricate a typical cabinetry project.
13. Install a typical base and wall cabinet.
14. Solve first-degree algebra equations.
15. Apply algebraic knowledge to solve verbal problems and formulas.
16. Solve simple plan and solid geometry problems.
17. Prepare a surface/product for the finishing process.
18. Identify the factors associated with finish quality of a wood product.
19. Differentiate between paints, varnish, lacquer, shellac, polyurethane, conversion varnish, and water-based products.
20. Demonstrate contemporary application techniques for both oil-based and water-based products.
21. Explain the theory and operation of various coating technologies.
22. Disassemble, re-assemble, and adjust a conventional spray gun.
23. Develop a finishing schedule for a variety of finishing materials applied to a variety of substrates.
24. Describe EPA and OSHA regulations as they pertain to the finishing industry.
25. Evaluate and specify drying equipment, fluid handling equipment, and exhaust/filtering systems.
26. Perform standardized tests on finished surfaces to determine durability.

## Connections

- Common Core Standards

- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 240
- WCA Industrial Standards

FINAL DRAFT

## CAD for Wood Technology

Valid Course Code: 480725

**Course Description:** This course is designed for the fundamental principles and capabilities of CAD, basic drafting conventions and operations that are relative to the Wood Manufacturing Industry.

### Content/Process

**Students will:**

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Produce line entities using various coordinate techniques.
5. Construct geometric shapes in two-dimensional space.
6. Develop detailed orthographic views as required.
7. Construct cross sections of various designs, with cross-hatching incorporated as desired.
8. Apply dimensions and annotations to drawings.
9. Move, copy, delete, and save drawings or portions of drawings.
10. Explore 3-D drawing techniques.

### Connections

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- WCA Industrial Standards

## Intro to Computer Aided Drafting

Valid Course Code: 480110

**Course Description:** Uses computer graphic workstation in the application of fundamental principles and capabilities of CAD, basic drafting conventions, and operations. An in-depth study of computer aided drafting commands, terminology, command utilization, and skill development.

### Content/Process

#### Students will:

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Describe, using correct computer terminology, basic computer functions, uses of computers in society and different types of software.
5. Discuss ethical computing issues, such as copyright, privacy, security, and property.
6. Use graphical user interface.
7. Use computer application programs.
8. Access information sources found on networks such as the Internet and gain experience with Web browsers, search sources, and sources of information related to his or her own field.
9. Demonstrate an awareness of different types of software applications.
10. Produce line entities using various coordinate techniques.
11. Construct geometric shapes in two-dimensional space.
12. Develop detailed orthographic views as required.
13. Construct cross sections of various designs, with cross-hatching incorporated as desired.
14. Apply dimensions and annotations to drawings.
15. Move, copy, delete, and save drawings or portions of drawings.
16. Use CAD to manipulate drawings by means of translation, rotation, scaling, zooming, panning, and windowing.
17. Explore 3-D drawing techniques.

### Connections

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: CAD 100
- WCA Industrial Standards

## Cooperative Education I (for Wood)

Valid Course Code: 480741

**Course Description:** Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.

*Prerequisites: Consent of the Instructor*

### Content/Process

**Students will:**

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Gain career awareness and the opportunity to test career choice(s).
5. Receive work experience related to career interests.
6. Integrate classroom studies with work experience.
7. Receive exposure to facilities and equipment unavailable in a classroom setting.
8. Increase employability potential.
9. Earn funds to help with education expenses.

### Connections

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 199
- WCA Industrial Standards

## **Furniture Technology**

### **Valid Course Code: 480721**

**Course Description:** Furniture design principles, structural considerations, joinery, fasteners, veneering, and use of specialized machines for complex operations are the focus of this course. Students will plan and build a piece of furniture which includes at least one drawer, a door and some veneering.

*Prerequisites: Technical Drawing and Blueprint Reading - 480719*

*Wood Product Manufacturing - 480740*

#### **Content/Process**

**Students will:**

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Analyze a piece of furniture for "good design" qualities.
5. Interpret working drawings and visualize the construction techniques.
6. Design a furniture project which allows for expansion and contraction of the wood using solid wood, plywood, veneer, or frame and panel construction techniques.
7. Identify, evaluate and specify traditional and contemporary construction techniques.
8. Calculate machine rates, set-up times, yields, and other production control elements.
9. Set-up and operate industrial woodworking equipment to perform common operations.
10. Evaluate a given production problem, formulate a plan of action and execute the plan to a satisfactory conclusion.
11. Develop skills related to the efficient operation of a rough mill, machine room and an assembly area.
12. Fabricate a piece of furniture which lends itself to specified production techniques.
13. Identify equipment capabilities and determine sequencing of operations.
14. Solve first-degree algebra equations.
15. Apply algebraic knowledge to solve verbal problems and formulas.
16. Solve simple plane and solid geometry problems.
17. Prepare a surface/product for the finishing process.
18. Identify the factors associated with finish quality of a wood product.
19. Differentiate between paints, varnish, lacquer, shellac, polyurethane, conversion varnish, and water-based products.
20. Demonstrate contemporary application techniques for both oil-based and water-based products.
21. Explain the theory and operation of various coating technologies.
22. Disassemble, re-assemble, and adjust a conventional spray gun.
23. Develop a finishing schedule for a variety of finishing materials applied to a variety of substrates.
24. Describe EPA and OSHA regulations as they pertain to the finishing industry.
25. Evaluate and specify drying equipment, fluid handling equipment, and exhaust/filtering systems.
26. Perform standardized tests on finished surfaces to determine durability.

#### **Connections**

- Common Core Standards

- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 250
- WCA Industrial Standards

FINAL DRAFT



**Internship (Wood)**  
**Valid Course Code: 480744**

**Course Description:** The Internship provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Internship do not receive compensation.

*Prerequisite: Consent of the Instructor*

**Content/Process**

**Students will:**

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Gain career awareness and the opportunity to test career choice(s).
5. Receive work experience related to career interests.
6. Integrate classroom studies with work experience.
7. Receive exposure to facilities and equipment unavailable in a classroom setting.
8. Increase employability potential.

**Connections**

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 198
- WCA Industrial Standards

## Introduction to Panel Processing

Valid Course Code: 480711

**Course Description:** This course provides an overview of the terminology, materials, processing equipment and related software utilized by panel processing manufacturers of residential and commercial case work. Emphasis will be placed on the design and fabrication of frameless cabinetry to the use of panel saws, edge banders, CNC boring equipment, and case clamps.

### Content/Process

#### Students will:

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Identify commercial and residential applications for panel materials.
5. Explain industry trends and panel processing equipment capabilities and techniques.
6. Identify, evaluate, and specify joinery and assembly techniques.
7. Operate various types of software for designing, cutting, and optimization for efficient use of panel goods.
8. Specify quality and quantity of materials required to fabricate frameless case work.
9. Properly layout component panels utilizing the 32mm system.
10. Set up and operate common panel processing equipment including a panel saw, edge bander, boring machine, and case clamp in a cellular manufacturing environment.
11. Generate basic machine codes and programs for running machine centers.
12. Fabricate a typical frameless piece of case work.
13. Develop and perform routine preventive maintenance on the panel saw, edge bander, boring machine, and the case clamp.
14. Develop an understanding of the different tooling requirements while working on various panel products.
15. Apply work site and lab safety procedures.
16. Apply personal safety rules and procedures.
17. Apply fire prevention rules and procedures.
18. Apply first aid procedures.
19. Explain how to obtain first aid certification.
20. Demonstrate hazardous communication procedures.
21. Describe and demonstrate universal precaution procedures.
22. Solve first-degree algebra equations.
23. Apply algebraic knowledge to solve verbal problems and formulas.
24. Solve simple plane and solid geometry problems.

### Connections

- Common Core Standards
- Common Core Technical Standards
- New Generation Science Standards
- Woodworkers Career Alliance (WCA)
- KCTCS Course: WMT 230
- CTSO - SkillsUSA
- KOSSA

# Lumber Grading and Drying

Valid Course Code: 480716

**Course Description:** This course prepares an individual to master the National Hardwood Lumber Association's rules for grading hardwoods and to apply those rules in a production setting. Students will identify species and use a deductive process to grade the lumber and assign it a monetary value. Students will also be introduced to hardwood lumber drying systems. Conventional dry kilns, dehumidification, vacuum, and solar kilns are illustrated. Current theories on drying lumber to minimize defects and increase quality are demonstrated. Computer controls are explained.

## Content/Process

### Students will:

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Use First Aid and perform CPR.
5. Describe basic lumber economics.
6. Identify woods by physical characteristics.
7. Describe career opportunities in the wood industry.
8. List the job titles in the wood industry.
9. Calculate the unit of "board feet".
10. Define cutting, clear-faced cutting, and sound cutting.
11. Calculate the percentage of clear wood in the clear-face cutting grades.
12. Identify requirements for the standard grade of "Firsts and Seconds".
13. Identify requirements for the standard grade of "FASIF".
14. Identify requirements for the standard grade of "#1 Common".
15. Identify requirements for the standard grade of "#2A Common".
16. Identify requirements for the standard grade of "#2B Common".
17. Identify requirements for the standard grade of "#3A Common".
18. Identify requirements for the standard grade of "#3B Common".
19. Identify requirements for the standard grade of "Selects".
20. Measure using a lumber rule.
21. Apply grading practices.
22. Apply safety techniques when operating a dry kiln.
23. Identify the basic components of a lumber dry kiln.
24. Identify types of dry kilns.
25. Apply sample selection techniques in preparation for loading.
26. Calculate the moisture content of samples/sections.
27. Calculate the oven-dried weight of samples.
28. Calculate the moisture of a sample.
29. Construct a drying schedule for a particular species and thickness.
30. Apply a drying schedule in a lab kiln for species and thickness.
31. Discuss the economics of equality versus time considerations when drying lumber.
32. Apply accelerated drying schedules.
33. Maintain drying records and charts.

## Connections

- Common Core Standards
- Common Core Technical Standards

- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 200
- WCA Industrial Standards

FINAL DRAFT

**Millwork Technology**  
**Valid Course Code: 480717**

**Course Description:** Design of molding, doors, and door frames; windows; stairs; and mantels are the focus of this course. Emphasis will be placed on construction principles, joinery, and fasteners for millwork assemblies. Students will build one or more millwork items.

*Prerequisites: Technical Drawing and Blueprint Reading - 480719*  
*Wood Product Manufacturing - 480740*

**Content/Process**

**Students will:**

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Interpret architectural prints and shop drawings.
5. Define the three levels utilized in the Architectural Woodworking Institute's Quality Standards.
6. Conduct field measurements of projects in process to verify dimensions.
7. Identify typical stock and custom millwork projects and products.
8. Select a profile, design a template, grind the knives, install the tooling, set-up the molder, run the stock, and troubleshoot the machine.
9. Calculate feed rates needed to meet AWI specifications for millwork.
10. Fabricate one or more millwork products to a specified quality level.
11. Recognize the common sizes, types, and construction techniques used to manufacture doors, windows, and stair parts.
12. Prepare a finishing sample which reflects AWI premium grade specifications.
13. Prepare a take-off and an estimate from a set of architectural plans.
14. Sharpen cutters on an abrasive wheel or stone.

**Connections**

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 260
- WCA Industrial Standards

## Special Problems (Wood)

Valid Course Code: 480795

**Course Description:** Allows the student to gain intermediate experience in their perspective fields through projects and tasks assigned by the instructor and based on applications the student may one day experience as a professional. Sets the foundation for more in-depth projects that will be included in the student's future portfolio. Focuses on various assignments and curriculum as determined by the program instructor

### Content/Process

**Students will:**

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Expand their portfolio of CAD drawings to enhance career opportunities.
5. Discuss occupation opportunities.

### Connections

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: IEX 291
- WCA Industrial Standards

## Technical Drawing and Blueprint Reading

Valid Course Code: 480719

**Course Description:** Fundamentals of multiview and pictorial drafting techniques; and reading and interpreting architectural, furniture, and cabinet drawings are the focus of this course. Students will apply blueprint reading skills by preparing materials and cutting lists for actual job.

### Content/Process

**Students will:**

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Develop freehand sketching techniques used to convey object size and shape.
5. Use and care for drafting equipment and supplies properly.
6. Layout and draw orthographic, sectional, isometric, oblique, and perspective drawings.
7. Read and interpret specifications from architectural plans and detail drawings.
8. Practice industry standards for dimensioning and notation.
9. Master basic geometric construction concepts and techniques.
10. Utilize the design process to develop a solution to a problem.
11. Prepare a bill of materials for a typical wood product by performing a materials take-off from an architectural drawing.
12. Create drawings needed for route sheets, subassembly, and final assembly sheets.

### Connections

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 110
- WCA Industrial Standards

## **Wood Finishing**

**Valid Course Code: 480720**

**Course Description:** This course is an overview of contemporary spray finishing materials and processes for millwork assemblies. Students will learn to set up and troubleshoot a variety of common finishing systems while experimenting with finishing materials and supplies.

### **Content/Process**

**Students will:**

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Prepare a surface/product for the finishing process.
5. Identify the factors associated with finish quality of a wood product.
6. Differentiate between paints, varnish, lacquer, shellac, polyurethane, conversion varnish, and water based products.
7. Demonstrate contemporary application techniques for both oil based and water based products.
8. Explain the theory and operation of various coating technologies.
9. Disassemble, re-assemble, and adjust a conventional spray gun.
10. Develop a finishing schedule for a variety of finishing materials applied to a variety of substrates.
11. Describe EPA and OSHA regulations as they pertain to the finishing industry.
12. Evaluate and specify drying equipment, fluid handling equipment, and exhaust/filtering systems.
13. Perform standardized tests on finished surfaces to determine durability.
14. Apply work site and lab safety procedures.
15. Apply personal safety rules and procedures.
16. Apply fire prevention rules and procedures.
17. Apply first aid procedures.
18. Explain how to obtain first aid certification.
19. Demonstrate hazardous communication procedures.
20. Describe and demonstrate universal precaution procedures.

### **Connections**

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 160
- WCA Industrial Standards



# Wood Product Manufacturing

Valid Course Code: 480740

**Course Description:** Fundamentals of wood processing and an overview of the secondary wood processing industry are covered in this course. The nature of wood, material selection, terminology, safe setup, and operation of common woodworking equipment will be discussed. Students will fabricate a wood product while being introduced to custom woodworking techniques as well as mass production concepts related to product engineering.

## Content/Process

### Students will:

1. Practice and perform safe shop procedures at all times.
2. Apply the technical math required for employment opportunities.
3. Perform all duties with emphasis on integrity, responsibility, quality, discipline and teamwork.
4. Discuss the characteristics of wood as a building material.
5. Specify and order lumber, veneer, plywood, particleboard, fiberboard, laminates, composite materials, hardware, and related materials and supplies.
6. Identify common species of hardwoods and softwoods.
7. Observe all safety rules and regulations when using hand tools, portable electric tools, and stationary machines.
8. Practice safe setup and operation of woodworking equipment.
9. Master basic jig and fixture design and development concepts.
10. Develop common production planning materials, route sheets, subassembly sheets and final assembly sheets.
11. Evaluate and specify appropriate joinery when assembling two or more components.
12. Describe the properties of common thermosetting and thermoplastic adhesives and the most appropriate application techniques for each.
13. Select and utilize common abrasive materials for surface preparation of the wood.
14. Apply work site and lab safety procedures.
15. Apply personal safety rules and procedures.
16. Apply fire prevention rules and procedures.
17. Apply first aid procedures.
18. Explain how to obtain first aid certification.
19. Demonstrate hazardous communications procedures.
20. Describe and demonstrate universal precaution procedures.
21. Set up and solve ratios and proportions.
22. Convert between various units of measure.
23. Solve problems involving significant digits and accuracy and precision of measurements.
24. Perform mathematical operations with standard and metric measurement systems.

## Connections

- Common Core Standards
- Common Core Technical Standards
- CTSO - SkillsUSA
- KOSSA
- New Generation Science Standards
- KCTCS Course: WMT 120
- WCA Industrial Standards