

Carpentry Technology Mississippi Curriculum Framework

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The Office of Curriculum and Instruction (OCI) was founded in 2013 under the Division of Workforce, Career, and Technical Education at the Mississippi Community College Board (MCCB). The office is funded through a partnership with The Mississippi Department of Education (MDE), who serves as Mississippi's fiscal agent for state and federal Career and Technical Education (CTE) Funds. The OCI is tasked with developing statewide CTE curriculum, programming, and professional development designed to meet the local and statewide economic demand.

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RESEARCH ABSTRACT

In the spring of 2015, the Office of Curriculum and Instruction (OCI) met with different industry members who made up the advisory committees for the Residential Carpentry program. An industry questionnaire was used to gather feedback concerning the trends and needs, both current and future, of their field. Program faculty, administrators, and industry members were consulted regarding industry workforce needs and trends.

Industry advisory team members from colleges involved with this program were asked to give input related to changes to be made to the curriculum framework. Specific comments related to soft skills needed in this program include having a positive attitude, being at work every day and on time, and having reading and writing skills to complete work orders and other forms. Occupation-specific skills stated include knowing basic math skills, blueprint reading, awareness of safety guidelines, cost estimation, and troubleshooting. Safety practices emphasized include practicing all safety rules and wearing the proper safety equipment. Industry members also discussed the need for more courses to include commercial building skills. Industry members stated there is a great need for carpenters skilled in commercial building, and that if carpenters could work in commercial building, then residential carpentry would be covered.

Instructors from colleges throughout the state were also asked to give input on changes to be made to the curriculum framework. Industry felt the need to adopt the National Center for Construction Education and Research (NCCER) standards. The industry members and instructors also chose to rename the program from Residential Carpentry Technology to just Carpentry Technology in order to include more commercial carpentry skills within the course descriptions and student learning outcomes.

Revision History:

2006, Revised, Research and Curriculum Unit, Mississippi State University

2010, Revised, Research and Curriculum Unit, Mississippi State University

2015, Revised, Office of Curriculum and Instruction, Mississippi Community College Board

ADOPTION OF NATIONAL CERTIFICATION STANDARDS

The **National Center for Construction Education and Research (NCCER)** is a not-for-profit 501(c)(3) Education foundation created in 1996. It was developed with the support of more than 125 construction CEOs and various association and academic leaders who united to revolutionize training for the construction industry. Sharing the common goal of developing a safe and productive workforce, these companies created a standardized training and credentialing program for the industry. This progressive program has evolved into curricula for more than 70 craft areas and a complete series of more than 70 assessments offered in over 4,000 NCCER-accredited training and assessment locations across the United States.

NCCER develops standardized construction and maintenance curricula and assessments with portable credentials. These credentials are tracked through NCCER's National Registry which allows organizations and companies to track the qualifications of their craft professionals and/or check the qualifications of possible new hires. The National Registry also assists craft professionals by maintaining their records in a secure database.

NCCER's process of accreditation, instructor certification, standardized curriculum, national registry, assessment, and certification is a key component in the industry's workforce development efforts. NCCER also drives multiple initiatives to enhance career development and recruitment efforts for the industry. NCCER is headquartered in Alachua, FL, and is affiliated with the University of Florida's M.E. Rinker, Sr. School of Building Construction.

As the accrediting body for the industry, NCCER establishes the benchmark for quality training and assessments. By partnering with industry and academia, NCCER has developed a system for program accreditation that is similar to those found in institutions of higher learning. This process fosters national unity among the construction industry while providing a defined career path with industry-recognized credentials.

NCCER's accreditation process assures that students and craft professionals receive quality training based on uniform standards and criteria. These standards are outlined in the NCCER Accreditation Guidelines and must be adhered to by all NCCER Accredited Training Sponsors and Accredited Assessment Centers.

For more information related to implementing NCCER at your local campus, please visit:

<http://www.nccer.org/carpentry>.

INDUSTRY JOB PROJECTION DATA

Carpenters' occupations require an Education level of long-term on-the-job training. There is expected to be a 16.39% increase in occupational demand at the regional level and a 14.52% increase at the state level. Median annual income for carpenters is \$30,139.20 at the state level. A summary of occupational data from the State Workforce Investment Board Data Center is displayed below:

Table 1: Education Level

Program Occupations	Education Level
Carpenters	Long-term on-the-job training

Table 2: Occupational Overview

	Region	State	United States
2010 Occupational Jobs	3885	4676	620070
2020 Occupational Jobs	4541	5355	704814
Total Change	656	679	84744
Total % Change	16.89%	14.52%	13.67%
2010 Median Hourly Earnings	\$14.49	\$14.49	\$19.00
2010 Median Annual Earnings	\$30,139.20	\$30,139.20	\$39,520.00
Annual Openings	65	67	8474

Table 3: Occupational Breakdown

Description	2010 Jobs	2020 Jobs	Annual Openings	2010 Hourly Earnings	2010 Annual Earnings 2,080 Work Hours
Carpenters	3885	4541	65	\$14.49	\$30,139.20
TOTAL	3885	4541	65	\$14.49	\$30,139.20

Table 4: Occupational Change

Description	Regional Change	Regional % Change	State % Change	National % Change
Carpenters	656	16.89%	14.52%	13.67%

ARTICULATION

Due to the complexity of courses offered at postsecondary level, no articulation is offered at this time.

TECHNICAL SKILLS ASSESSMENT

Colleges should report the following for students who complete the program with a career Certificate, technical Certificate, or an Associate of Applied Science Degrees for technical skills attainment:

For year one:

NCCER Core Assessment (\$45.00)

NCCER Carpentry Level 1 (\$50.00)

OR

MS-CPAS2 *Carpentry Technology* test for career Certificate

For year two:

NCCER Carpentry Level Two (\$50.00)

OR

MS-CPAS2 *Carpentry Technology* test for technical Certificate

Make sure to check the MCCB site for the latest approved alternate assessments.

ONLINE AND BLENDED LEARNING OPPORTUNITIES

Course content includes lecture and laboratory semester credit hours. Faculty members are encouraged to present lecture related content to students in an online or blended learning environment. Training related to online and blended learning will be available to faculty members through the MS Community College Board.

INSTRUCTIONAL STRATEGIES

The NCCER standards were adopted and provide instructional strategies to faculty members implementing the curriculum.

ASSESSMENT STRATEGIES

The NCCER standards were adopted and provide assessment strategies to faculty member implementing the curriculum. Additionally, performance tasks were included in course content when appropriate.

PROGRAM DESCRIPTION

Carpentry Technology is an instructional program designed to prepare students for entry level into the carpentry trade. The carpentry program offers learning experiences in blueprint reading, estimating, building, installing, and repairing structural units.

Certification by the National Center for Construction Education (NCCER):

This curriculum has been aligned to modules in the Contren program as endorsed by the National Center for Construction Education and Research (NCCER). Students who study this curriculum using the Contren materials under the supervision of an instructor who has been certified by the NCCER are eligible to be tested on each module. Students who successfully pass these tests may be certified to the NCCER by the instructor and will receive documentation from NCCER. Secondary-level programs of Carpentry and Building Trades cover the NCCER Core and Level I. Postsecondary 1-year Certificate programs cover subjects in the Core and Level I, and 2-year Certificate programs cover Level 2 topics.

Industry standards are based on the Contren Best Practices for Carpentry Technology Programs.

This curriculum offers an accelerated transition pathway at 15 hours and a career Certificate at 30 hours in Carpentry Technology. Students completing this program are prepared for entry-level positions at any construction facility. They will have acquired the basic technical skills in using equipment and building and have a broadened vocabulary to make the job-specific learning less difficult. They will also possess team-building skills, safety awareness, environmental awareness, communication skills, and computer skills that are critical in the workplace. The Associate of Applied Science (AAS) degree in Carpentry Technology may be awarded to a student who successfully completes the 2 years or 60 semester credit hours of required courses. Included in the requirements are 15 semester credit hours of academic courses.

SUGGESTED COURSE SEQUENCE

Accelerated Integrated Career Pathway

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
CCT 1116	Foundations	6	2	8	150	30	120	NCCER Core
CCT 1236	Floor and Wall Framing	6	2	8	150	30	120	
	Electives	3						
	Total	15	4	16	300	60	240	

Career Certificate Required Courses

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
CCT 1116	Foundations	6	2	8	150	30	120	NCCER Core
CCT 1236	Floor and Wall Framing	6	2	8	150	30	120	NCCER Level 1
CCT 1133	Blueprint Reading	3	2	2	60	30	30	
CCT 1245	Ceiling and Roof Framing	5	1	8	135	15	120	
CCT 1163	Construction Mathematics	3	1	4	75	15	60	
CCT 1315	Interior/Exterior Finishing and Cabinet Installation	5	2	6	120	30	90	
	Instructor Approved Electives	2						
	TOTAL	30	10	36	690	150	540	

Technical Certificate

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
CCT 2133	Millwork	3	1	4	75	15	60	NCCER Level 2
CCT 1113	Fundamentals of Drafting	3	2	2	60	30	30	
CCT 2113	Principles of Multi-Family and Light Commercial Construction	3	2	2	60	30	30	
CCT 2243	Cost Estimating	3	2	2	60	30	30	
	Instructor Approved Electives	3						
	Total	15	7	10	255	105	150	

General Education Core Courses

To receive the Associate of Applied Science Degree, a student must complete all of the required coursework found in the Career Certificate option, Technical Certificate option and a minimum of 15 semester hours of General Education Core. The courses in the General Education Core may be spaced out over the entire length of the program so that students complete some academic and Career Technical courses each semester or provided primarily within the last semester. Each community college will specify the actual courses that are required to meet the General Education Core Requirements for the Associate of Applied Science Degree at their college. The Southern Association of Colleges and Schools (SACS) Commission on Colleges Standard 2.7.3 from the Principles of Accreditation: Foundations for Quality Enhancement¹ describes the general Education core.

Section 2.7.3 In each undergraduate degree program, the institution requires the successful completion of a general Education component at the collegiate level that (1) is substantial component of each undergraduate degree, (2) ensures breadth of knowledge, and (3) is based on a coherent rationale. For degree completion in associate programs, the component constitutes a minimum of 15 semester hours or the equivalent. These credit hours are to be drawn from and include at least one course from the following areas: humanities/fine arts, social/behavioral sciences, and natural science/mathematics. The courses do not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession.

1

Southern Association of Colleges and Schools Commission on Colleges. (2012). *The principles of accreditation: Foundations for quality enhancement*. Retrieved from <http://www.sacscoc.org/pdf/2012PrinciplesOfAccreditation.pdf>

General Education Courses

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
	Humanities/Fine Arts	3						
	Social/Behavioral Sciences	3						
	Natural science/mathematics	3						
	Any other instructor approved academic courses per local college requirement.	6						
	TOTAL	15						

Technical Electives

			SCH Breakdown				Contact Hour Breakdown		
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Externship	Total Contact Hours	Lecture	Lab	Externship
ATE 1113	Science and Technology	3	3			45	45		
CCT 1113	Fundamentals of Drafting	3	2	2		60	30	30	
CCT 1123	Forming Applications	3	2	2		60	30	30	
CCT 1213	Construction Materials	3	2	2		60	30	30	
CCT 1413	Roofing	3	1	4		75	15	30	
CCT 1213	Construction Materials	3	2	2		60	30	30	
CCT 2133	Millwork	3	2	2		60	30	30	
CCT 2243	Cost Estimating	3	2	2		60	30	30	
CCT 2313	Advanced Interior Finishing	3	2	2		60	30	30	
CCT 291(1-3)	Special Problem in Carpentry Technology	1-3		2-6		30-90		30-90	
CCT 292(1-6)	Supervised Work Experience	1-6			3-18	45-270			45-270
CCT 1911	Seminar	1	1			15	15		
CCT1921	Seminar II	1	1			15	15		
CCT 1931	Seminar III	1	1			15	15		
CCT 1941	Seminar IV	1	1			15	15		
CPT 1113	Fundamentals of Microcomputer Applications	3							
DDT 1313	Principles of CAD	3							
IMM 1935	Skills Manufacture Basic	3							
WBL 191(1-3) WBL 192(1-3) WBL 193(1-3) WBL 291(1-3) WBL 292(1-3) WBL 293(1-3)	Work-Based Learning	1-3			3-9	45-135			45-135
	All other electives approved by instructor per local community college policy								

CARPENTRY TECHNOLOGY COURSES

Course Number and Name: **CCT 1113** **Fundamentals of Drafting**

Description: Fundamentals and principles of drafting to provide the basic background needed for all other drafting courses.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

National Assessment: None

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Discuss classroom procedures and drafting occupations.
 - a. Describe proper classroom/lab procedures.
 - b. Describe the various occupations in drafting and their requirements.
2. Explain and apply safety rules and regulations.
 - a. Describe safety rules for drafting occupations.
 - b. List and discuss hazardous materials found in the drafting area.
3. Apply proper techniques in technical drawings.
 - a. Demonstrate the ability to scale drawings.
 - b. Construct various angles.
 - c. Recognize and construct the alphabet of lines.
4. Sketch and develop views of basic shapes.
 - a. Develop a pictorial view from three principal views.
 - b. Develop three principal views from a pictorial view.
 - c. Complete three principal views when lines are missing.
5. Use geometric constructions.
 - a. Construct tangent arcs and lines.
 - b. Divide lines or arcs into equal and/or proportional parts.
 - c. Develop geometric shapes.
6. Construct orthographic projections.
 - a. Construct a top view, with front and right side views given.
 - b. Construct a front view, with top and right side views given.
 - c. Construct a right side view, with top and front views given.
 - d. Develop a drawing consisting of three principal views.
7. Dimension objects.
 - a. Recognize lines, symbols, features, and conventions used in dimensioning.
 - b. Recognize and use size and location dimensions.
 - c. Recognize and use general and local notes.
 - d. Dimension a drawing using contour, chain, and baseline dimensioning.
8. Construct sectional views.
 - a. Construct full and half sectional views.
 - b. Recognize and construct removed, revolved, offset, and aligned sectional views.

Course Number and Name: **CCT 1116** **Foundations**

Description: This course includes site selection site preparation site layout building forms and construction of foundations.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
6	2	8	150

National Assessment: National Center for Construction Education and Research (NCCER) Core Assessment and Components of NCCER Level One

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe and apply foundation safety procedures.
2. Explain procedures for building foundations.
 - a. Define terms associated with foundations.
 - b. Identify types of foundations and foundation materials.
 - c. Locate buildings on building site from plot plan according to local building codes.
 - d. Calculate types amounts and costs of materials needed for various foundations.
 - e. Locate doors walls and windows from a floor plan.
 - f. Accurately Locate and demonstrate proper spacing for anchor bolts from a blueprint.
 - g. Discuss rough-in of electrical plumbing and heating ventilation and air-conditioning systems.
 - h. Describe soil treatment for termite control.
3. Prepare for and build a foundation.
 - a. Locate building on-site; determine elevation using builder's leveling devices.
 - b. Set batter boards.
 - c. Build and set forms for a monolithic slab.
 - d. Excavate and/or fill in preparation for pouring slab including installation of wire mesh rebar vapor barrier and screeds.
 - e. Construct and/or observe a concrete slab foundation being poured.
 - f. Construct and/or observe construction of the footing for a stem wall.

NCCER Standards

Core

Module 00101-09--Basic Safety

1. Explain the idea of a safety culture and its importance in the construction crafts.
2. Identify causes of accidents and the impact of accident costs.
3. Explain the role of OSHA in job-site safety.
4. Explain OSHA's General Duty Clause and 1926 CFR Subpart C.
5. Recognize hazard recognition and risk assessment techniques.
6. Explain fall protection, ladder, stair, and scaffold procedures and requirements.
7. Identify struck-by hazards and demonstrate safe working procedures and requirements.
8. Identify caught-in-between hazards and demonstrate safe working procedures and requirements.
9. Define safe work procedures to use around electrical hazards.
10. Demonstrate the use and care of appropriate personal protective equipment (PPE).
11. Explain the importance of hazard communications (HazCom) and material safety data sheets (MSDSs).
12. Identify other construction hazards on your job site, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.

Module 00102-09--Introduction to Construction Math

1. Add, subtract, multiply, and divide whole numbers, with and without a calculator.
2. Use a standard ruler, a metric ruler, and a measuring tape to measure.
3. Add, subtract, multiply, and divide fractions.
4. Add, subtract, multiply, and divide decimals, with and without a calculator.
5. Convert decimals to percentages and percentages to decimals.
6. Convert fractions to decimals and decimals to fractions.
7. Explain what the metric system is and how it is important in the construction trade.
8. Recognize and use metric units of length, weight, volume, and temperature.
9. Recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them.

Module 00103-09--Introduction to Hand Tools

1. Recognize and identify some of the basic hand tools and their proper uses in the construction trade.
2. Visually inspect hand tools to determine if they are safe to use.
3. Safely use hand tools.

Module 00104-09--Introduction to Power Tools

1. Identify power tools commonly used in the construction trades.
2. Use power tools safely.
3. Explain how to maintain power tools properly.

Module 00105-09--Introduction to Construction Drawings

1. Recognize and identify basic construction drawing terms, components, and symbols.
2. Relate information on construction drawings to actual locations on the print.
3. Recognize different classifications of construction drawings.
4. Interpret and use drawing dimensions.

Module 00106-09--Basic Rigging

1. Identify and describe the use of slings and common rigging hardware.
2. Describe basic inspection techniques and rejection criteria used for slings and hardware.
3. Describe basic hitch configurations and their proper connections.
4. Describe basic load-handling safety practices.
5. Demonstrate proper use of American National Standards Institute (ANSI) hand signals.

Module 00107-09--Basic Communication Skills

1. Interpret information and instructions presented in both verbal and written form.
2. Communicate effectively in on-the-job situations using verbal and written skills.
3. Communicate effectively on the job using electronic communication devices.

Module 00108-09--Basic Employability Skills

1. Explain your role as an employee in the construction industry.
2. Demonstrate critical thinking skills and the ability to solve problems using those skills.
3. Demonstrate knowledge of computer systems and explain common uses for computers in the construction industry.
4. Define effective relationship skills.
5. Recognize workplace issues such as sexual harassment, stress, and substance abuse.

Module 00109-09--Introduction to Materials Handling

1. Define a load.
2. Establish a pre-task plan prior to moving a load.
3. Use proper materials-handling techniques.

4. Choose appropriate materials-handling equipment for the task.
5. Recognize hazards and follow safety procedures required for materials handling.

Level One Standards

Module 27101-06 Orientation to the Trade

1. Describe the history of the carpentry trade.
2. Identify the aptitudes, behaviors, and skills needed to be a successful carpenter.
3. Identify the training opportunities within the carpentry trade.
4. Identify the career and entrepreneurial opportunities within the carpentry trade.
5. Identify the responsibilities of a person working in the construction industry.
6. State the personal characteristics of a professional.
7. Explain the importance of safety in the construction industry.

Module 27102-06 Building Materials, Fasteners, and Adhesives

1. Identify various types of building materials and their uses.
2. State the uses of various types of hardwoods and softwoods.
3. Identify the different grades and markings of wood building materials.
4. Identify the safety precautions associated with building materials.
5. Describe the proper method of storing and handling building materials.
6. State the uses of various types of engineered lumber.
7. Calculate the quantities of lumber and wood products using industry-standard methods.
8. Describe the fasteners, anchors, and adhesives used in construction work and explain their uses.

Module 27103-06 Hand and Power Tools

1. Identify the hand tools commonly used by carpenters and describe their uses.
2. Use hand tools in a safe and appropriate manner.
3. State the general safety rules for operating all power tools, regardless of type.
4. State the general rules for properly maintaining all power tools, regardless of type.
5. Identify the portable power tools commonly used by carpenters and describe their uses.
6. Use portable power tools in a safe and appropriate manner.

Course Number and Name: **CCT 1123 Forming Applications**

Description: This course includes forming Applications for foundations flatwork reinforcing concrete patented forms and tilt-up wall systems.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

National Assessment: None

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Discuss and apply forming Applications safety processes.
2. Examine methods of forming Applications.
 - a. Describe safety as it applies to forming Applications.
 - b. Define terms associated with forming Applications.
 - c. Identify types of forming Applications and materials used in them.
 - d. Calculate types amounts and costs of materials needed for various forming Applications.
 - e. Accurately Locate and demonstrate proper spacing for reinforcing steel and wire mesh from a blueprint.
3. Construct various forms.
 - a. Demonstrate layout of forming Applications using builder's leveling devices.
 - b. Build and set forms for a monolithic slab, concrete stairs or other forming Applications according to local building codes.
 - c. Excavate and/or fill in preparation for pouring slab including installation of wire mesh rebar vapor barrier and screeds.
 - d. Construct and/or observe a concrete slab foundation being poured.
 - e. Construct and/or observe construction of the footing for a stem wall.
 - f. Construct a forming Application to scale.

NCCER Standards Core

Module 27108-06 Introduction to Concrete, Reinforcing Materials, and Forms

1. Identify the properties of cement.
2. Describe the composition of concrete.
3. Perform volume estimates for concrete quantity requirements.
4. Identify types of concrete reinforcement materials and describe their uses.
5. Identify various types of footings and explain their uses.
6. Identify the parts of various types of forms.
7. Explain the safety procedures associated with the construction and use of concrete forms.
8. Erect, plumb, and brace a simple concrete form with reinforcement.

Course Number and Name: **CCT 1133** **Blueprint Reading**

Description: This course includes the elements of residential plans and how to prepare a bill of materials from a set of plans.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

National Assessment: Components of the NCCER Level One examination

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Explain the elements of construction documents.
 - a. Identify the elements commonly included in a set of documents.
 - b. Demonstrate the use of scale in architectural drawings.
 - c. Recognize architectural symbols.
 - d. Explain the use of building specifications.
 - e. Summarize the concept of modular construction.
 - f. Describe the Application of building codes standards and permits.
2. Prepare a bill of materials from a set of plans.
 - a. Estimate a bill of materials and cost from plans for a foundation floor and wall framing ceiling and roof framing and roof decking exterior finishes and interior finishes.
 - b. Introduce basic drafting tools and computer programs.

NCCER Standards Level One

Module 27104-06 Reading Plans and Elevations

1. Describe the types of drawings usually included in a set of plans and list the information found on each type.
2. Identify the different types of lines used on construction drawings.
3. Identify selected architectural symbols commonly used to represent materials on plans.
4. Identify selected electrical, mechanical, and plumbing symbols commonly used on plans.
5. Identify selected abbreviations commonly used on plans.
6. Read and interpret plans, elevations, schedules, sections, and details contained in basic construction drawings.
7. State the purpose of written specifications.
8. Identify and describe the parts of a specification.
9. Demonstrate or describe how to perform a quantity takeoff for materials.

Course Number and Name: **CCT 1163** **Construction Mathematics**

Description: This course includes the fundamental principles of practical problems in mathematics that carpenters may encounter in the workforce.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	1	4	75

National Assessment: Components of NCCER Level One examination

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Understand the use of whole numbers.
 - a. Add whole numbers.
 - b. Subtract whole numbers.
 - c. Multiply whole numbers.
 - d. Divide whole numbers.
 - e. Combine operations with whole numbers.
2. Understand the use of common fractions.
 - a. Add common fractions.
 - b. Subtract common fractions.
 - c. Multiply common fractions.
 - d. Divide common fractions.
 - e. Combine operations with common fractions.
3. Understand the use of decimal fractions.
 - a. Add decimal fractions.
 - b. Subtract decimal fractions.
 - c. Multiply decimal fractions.
 - d. Divide decimal fractions.
 - e. Combine operations with decimal fractions.
4. Understand the use of percent and percentage.
 - a. Calculate simple percent and percentage.
 - b. Calculate interest.
 - c. Determine discounts.
5. Understand the use of direct and computed measurements.
 - a. Determine linear measures.
 - b. Determine and convert inches to feet.
 - c. Determine square measures.
 - d. Determine surface measurements-triangles.
 - e. Understand the framing square.
 - f. Determine surface measurements-irregular figures.
 - g. Determine surface measurements-circles.
 - h. Determine volume measurements-cubes and rectangular solids.
 - i. Determine board measures.
 - j. Determine volume measurements-cylinders.
 - k. Determine weight measures.

6. Understand the use of powers and roots.
 - a. Demonstrate the Application of exponents in formulas.
 - b. Use square roots to find sides of right triangles.
7. Understand the principles of slopes and pitches.
 - a. Identify positive, negative, zero and undefined slopes.
 - b. Use standard form, point-slope, slope-intercept forms.
 - c. Identify how to find slope (y/x , rise and run).
8. Understand the use of combined operations applied to building construction using the following: girders, sills, and floor joists; wall plates; studding and Fire Stops or Draft Stops; common rafters; hip rafters; sheathing and subflooring; trim; roofing; doors and windows; siding; and stairs.

Course Number and Name: **CCT 1213 Construction Material**

Description: Physical properties of the materials generally used in the erection of a structure, with a brief description of their manufacture.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

National Assessment: None

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Utilize the MasterFormat divisions of the Construction Specifications Institute
2. Describe the uses of wood components.
 - a. Identify and describe diseases and lumber defects.
 - b. Calculate board feet of lumber.
 - c. Identify the different types of lumber used in construction and their design factors.
3. Describe concrete characteristics.
 - a. Describe the use of common and special types of concrete.
 - b. Classify aggregates.
 - c. Explain how the design and control of concrete are maintained.
 - d. Describe the psi rating system for concrete.
 - e. Identify and describe common concrete and brick masonry units.
 - f. Explain purposes of concrete additives.
4. Describe the use of bricks in construction.
 - a. Describe different types of bricks.
 - b. Describe the different types of brick bonds.
 - c. Identify and describe the brick pattern bonds.
 - d. Identify and describe the different mortar joints.
5. Describe various cover materials used in construction.
 - a. Identify and describe the different types of exterior wall materials and their specific purposes.
 - b. Identify and describe different types of insulating materials and their special purposes.
 - c. Identify and describe the different types of floor coverings and their special uses.
 - d. Identify and describe the different types of roofing materials.
 - e. Identify and describe the different types of finishing materials and their special uses.
 - f. Identify and describe different types of protective and decorative coatings and their special uses.
6. Discuss the various types and Applications of metals in construction.

Course Number and Name: **CCT 1236** **Floor and Wall Framing**

Description: This course is designed to give the student experience in floor and wall framing.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	6	2	8	150

National Assessment: Components of the NCCER Level One examination

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe and apply safety procedures for floor and wall framing.
2. Relate terms and materials associated with floor and wall framing.
 - a. Identify terms associated with floor and wall framing.
 - b. Identify types of materials and estimate amounts and costs associated with floor and wall framing.
 - c. Identify methods of alternative fastening including strapping according to local codes.
 - d. Describe assemblies and sequencing necessary for proper installation of floor and wall framing.
3. Build a floor and wall frame.
 - a. Install various parts of a floor and wall frame.
 - b. Plumb and align walls and install exterior sheathing.
4. Calculate the materials and lay out of stair risers.

NCCER Standards Level One

Module 27105-06 Floor Systems

1. Identify the different types of framing systems.
2. Read and interpret drawings and specifications to determine floor system requirements.
3. Identify floor and sill framing and support members.
4. Name the methods used to fasten sills to the foundation.
5. Given specific floor load and span data, select the proper girder/beam size from a list of available girders/beams.
6. List and recognize different types of floor joists.
7. Given specific floor load and span data, select the proper joist size from a list of available joists.
8. List and recognize different types of bridging.
9. List and recognize different types of flooring materials.
10. Explain the purposes of subflooring and underlayment.
11. Match selected fasteners used in floor framing to their correct uses.
12. Estimate the amount of material needed to frame a floor assembly.
13. Demonstrate the ability to:
 - a. Lay out and construct a floor assembly
 - b. Install bridging
 - c. Install joists for a cantilever floor
 - d. Install a subfloor using butt-joint plywood/OSB panels
 - e. Install a single floor system using tongue-and-groove plywood/OSB panels

Module 27106-06 Wall and Ceiling Framing

1. Identify the components of a wall and ceiling layout.

2. Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and firestops.
3. Describe the correct procedure for assembling and erecting an exterior wall.
4. Identify the common materials and methods used for installing sheathing on walls.
5. Lay out, assemble, erect, and brace exterior walls for a frame building.
6. Describe wall framing techniques used in masonry construction.
7. Explain the use of metal studs in wall framing.
8. Describe the correct procedure for laying out ceiling joists.
9. Cut and install ceiling joists on a wood frame building.
10. Estimate the materials required to frame walls and ceilings.

Module 27110-06 Basic Stair Layout

1. Identify the various types of stairs.
2. Identify the various parts of stairs.
3. Identify the materials used in the construction of stairs.
4. Interpret construction drawings of stairs.
5. Calculate the total rise, number and size of risers, and number and size of treads required for a stairway.
6. Lay out and cut stringers, risers, and treads.
7. Build a small stair unit with a temporary handrail.

Course Number and Name: **CCT 1245** **Ceiling and Roof Framing**

Description: This course will apply the techniques of cutting and assembly of framing materials based on predetermined specifications.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	5	1	8	135

National Assessment: Components of the NCCER Level One examination

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Explain and use safety processes for ceiling and roof framing.
 - a. Describe safety requirements associated with carpentry ceiling and roof framing.
2. Relate procedures for ceiling joists and roof construction.
 - a. Identify ceiling and roof framing members and their use in house framing.
 - b. Compare different types of roof framing systems and their Applications.
 - c. Discuss special fasteners and bracing as required by local codes.
 - d. Identify methods for laying out rafters and ceiling joists including use of the framing square.
 - e. Identify and calculate the length and cuts for different types of roof framing members ceiling joists and decking.
3. Fabricate ceiling joists and roof framing components.
 - a. Lay out cut and install ceiling joists according to specifications.
 - b. Lay out cut and install roof framing members according to specifications.
 - c. Cut and install decking and building paper according to specifications.

NCCER Standards Level One

Module 27106-06 Wall and Ceiling Framing

1. Identify the components of a wall and ceiling layout.
2. Describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition Ts, bracing, and firestops.
3. Describe the correct procedure for assembling and erecting an exterior wall.
4. Identify the common materials and methods used for installing sheathing on walls.
5. Lay out, assemble, erect, and brace exterior walls for a frame building.
6. Describe wall framing techniques used in masonry construction.
7. Explain the use of metal studs in wall framing.
8. Describe the correct procedure for laying out ceiling joists.
9. Cut and install ceiling joists on a wood frame building.
10. Estimate the materials required to frame walls and ceilings.

Module 27107-06 Roof Framing

1. Understand the terms associated with roof framing.
2. Identify the roof framing members used in gable and hip roofs.
3. Identify the methods used to calculate the length of a rafter.
4. Identify the various types of trusses used in roof framing.
5. Use a rafter framing square, speed square, and calculator in laying out a roof.
6. Identify various types of sheathing used in roof construction.
7. Frame a gable roof with vent openings.

8. Frame a roof opening.
9. Erect a gable roof using trusses.
10. Estimate the materials used in framing and sheathing a roof.

NCCER Standards Level Two

Module 27202.07 – Roofing Applications

1. Identify the materials and methods used in roofing.
2. Explain the safety requirements for roof jobs.
3. Install fiberglass shingles on gable and hip roofs.
4. Close up a valley using fiberglass shingles.
5. Explain how to make various roof projections watertight when using fiberglass shingles.
6. Complete the proper cuts and install the main and hip ridge caps using fiberglass shingles.
7. Lay out, cut, and install a cricket or saddle.
8. Install wood shingles and shakes on roofs.
9. Describe how to close up a valley using wood shingles and shakes.
10. Explain how to make roof projections watertight when using wood shakes and shingles.
11. Complete the cuts and install the main and hip ridge caps using wood shakes/shingles.
12. Demonstrate the techniques for installing other selected types of roofing materials.

Module 27209-07 Suspended Ceilings

1. Establish a level line.
2. Explain the common terms related to sound waves and acoustical ceiling materials.
3. Identify the different types of suspended ceilings.
4. Interpret plans related to ceiling layout.
5. Sketch the ceiling layout for a basic suspended ceiling.
6. Perform a material takeoff for a suspended ceiling.
7. Install selected suspended ceilings.

Course Number and Name: **CCT 1315** **Interior/Exterior Finishing and Cabinet Installation**

Description: This course includes thermal and sound protection types of interior ceilings wall coverings floor coverings, trim work and cabinet installation. It also includes the installation and finishing of wall coverings, cornices and exterior trim.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	5	2	6	120

National Assessment: Components of the NCCER Level One examination

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Determine and utilize safety procedures for interior finishing and cabinet making.
2. Explain terms materials and installation techniques associated with interior finishing and cabinet making.
 - a. Compare types and installation of thermal and sound protection.
 - b. Describe materials and Applications of ceiling wall and floor coverings.
 - c. Discuss terms and installation of doors trim and hardware.
 - d. Examine parts and compare construction techniques and installation procedures associated with cabinet making.
 - e. Estimate materials and cost for a specific job.
3. Apply procedures for installing thermal and sound protection interior finishing cabinets and floor covering.
 - a. Install insulation and sound protection.
 - b. Install ceiling wall and floor coverings.
 - c. Install interior commercial and residential doors trim and hardware.
 - d. Construct and install cabinets and countertops to specifications.
4. Specify and utilize safety procedures for exterior finishing.
5. Examine materials used in the installation of exterior wall coverings cornices and trim.
 - a. Describe necessary preparation and layout for various exterior finishes.
 - b. Describe various types and installation of exterior wall coverings, cornices, and trim.
 - c. Estimate amounts and cost of materials needed for specific jobs.
6. Install an exterior wall covering cornices and exterior trim.
 - a. Prepare a layout for exterior finishes.
 - b. Install commonly used exterior wall coverings cornice materials and trim.

NCCER Standards Level One

Module 27108-06 Introduction to Concrete, Reinforcing Materials, and Forms

1. Identify the properties of cement.
2. Describe the composition of concrete.
3. Perform volume estimates for concrete quantity requirements.
4. Identify types of concrete reinforcement materials and describe their uses.
5. Identify various types of footings and explain their uses.
6. Identify the parts of various types of forms.

7. Explain the safety procedures associated with the construction and use of concrete forms.
8. Erect, plumb, and brace a simple concrete form with reinforcement.

Module 27109-06 Windows and Exterior Doors

1. Identify various types of fixed, sliding, and swinging windows.
2. Identify the parts of a window installation.
3. State the requirements for a proper window installation.
4. Install a pre-hung window.
5. Identify the common types of exterior doors and explain how they are constructed.
6. Identify the parts of a door installation.
7. Identify the types of thresholds used with exterior doors.
8. Install a pre-hung exterior door.
9. Identify the various types of locksets used on exterior doors and explain how they are installed.
10. Install a lockset.

NCCER Standards Level Two

Module 27203.07 – Thermal and Moisture Protection

1. Describe the requirements for insulation.
2. Describe the characteristics of various types of insulation material.
3. Calculate the required amounts of insulation for a structure.
4. Install selected insulation materials.
5. Describe the requirements for moisture control and ventilation.
6. Install selected vapor barriers.
7. Describe various methods of waterproofing.
8. Describe air infiltration control requirements.
9. Install selected building wraps.

Module 27204.07 – Exterior Finishing

1. Describe the purpose of wall insulation and flashing.
2. Install selected common cornices.
3. Demonstrate lap and panel siding estimating methods.
4. Describe the types and Applications of common wood siding.
5. Describe fiber-cement siding and its uses.
6. Describe the types and styles of vinyl and metal siding.
7. Describe the types and Applications of stucco and masonry veneer finishes.
8. Describe the types and Applications of special exterior finish systems.
9. Install three types of siding commonly used in your area.

Module 27206-07 – Drywall Installation

1. Identify the different types of drywall and their uses.
2. Select the type and thickness of drywall required for specific installations.
3. Select fasteners for drywall installation.
4. Explain the fastener schedules for different types of drywall installations.
5. Perform single-layer and multi-layer drywall installations using different types of fastening systems, Including:
 - Nails
 - Drywall screws
 - Adhesives
6. Install gypsum drywall on steel studs.
7. Explain how soundproofing is achieved in drywall installations.
8. Estimate material quantities for a drywall installation.

Module 27207-07 Drywall Finishing

1. State the differences among the six levels of finish established by industry standards and distinguish a finish level by observation.
2. Identify the hand tools used in drywall finishing and demonstrate the ability to use these tools.
3. Identify the automatic tools used in drywall finishing.
4. Identify the materials used in drywall finishing and state the purpose and use of each type of material, including:
 - Compounds
 - Joint reinforcing tapes
 - Trim material
 - Textures and coatings
5. Properly finish drywall using hand tools.
6. Recognize various types of problems that occur in drywall finishes; identify the causes and correct methods for solving each type of problem.
7. Patch damaged drywall.

Module 27208-07 Doors and Door Hardware

1. Identify various types of door jambs and frames and demonstrate the installation procedures for placing selected door jambs and frames in different types of interior partitions.
2. Identify different types of interior doors.
3. Identify different types of interior door hardware and demonstrate the installation procedures for selected types.
4. Demonstrate the correct and safe use of the hand and power tools described in this module.
5. List and identify specific items included on a typical door schedule.
6. Demonstrate the procedure for placing and hanging a selected door.

Module 27209-07 Suspended Ceilings

1. Establish a level line.
2. Explain the common terms related to sound waves and acoustical ceiling materials.
3. Identify the different types of suspended ceilings.
4. Interpret plans related to ceiling layout.
5. Sketch the ceiling layout for a basic suspended ceiling.
6. Perform a material takeoff for a suspended ceiling.
7. Install selected suspended ceilings.

Module 27210-07 Window, Door, Floor, and Ceiling Trim

1. Identify the different types of standard moldings and describe their uses.
2. Make square and miter cuts using a miter box or power miter saw.
3. Make coped joint cuts using a coping saw.
4. Select and properly use fasteners to install trim.
5. Install interior trim, including:
 - Door trim
 - Window trim
 - Base trim
 - Ceiling trim
6. Estimate the quantities of different trim materials required for selected rooms.

Module 27211-07 Cabinet Installation

1. State the classes and sizes of typical base and wall kitchen cabinets.
2. Identify the cabinet components and hardware and describe their purposes.
3. Lay out factory-made cabinets, countertops, and backsplashes.
4. Explain the installation of an island base.

Course Number and Name: **CCT 1413** **Roofing**

Description: This course covers types of roofs types of roofing materials and their Application. Also covered are basic roofing techniques including material selection roof styles cost estimation and installation procedures.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	1	4	75

National Assessment: None

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Specify and utilize safety procedures for roofing.
2. Identify materials and Applications in roofing.
 - a. Describe types of roofing materials and installation methods.
 - b. Differentiate between and analyze roof ventilation systems.
 - c. Examine flashing requirements and Applications.
 - d. Estimate materials and cost for a specific job.
 - e. Describe re-roofing and repair of existing roofing structure.
3. Install a roof.
 - a. Lay out and prepare for installation of a roof.
 - b. Install various types of roofing and components.

NCCER Standards Level One

Module 27107-06 Roof Framing

1. Understand the terms associated with roof framing.
2. Identify the roof framing members used in gable and hip roofs.
3. Identify the methods used to calculate the length of a rafter.
4. Identify the various types of trusses used in roof framing.
5. Use a rafter framing square, speed square, and calculator in laying out a roof.
6. Identify various types of sheathing used in roof construction.
7. Frame a gable roof with vent openings.
8. Frame a roof opening.
9. Erect a gable roof using trusses.
10. Estimate the materials used in framing and sheathing a roof.

NCCER Standards Level Two

Module 27202.07 – Roofing Applications

1. Identify the materials and methods used in roofing.
2. Explain the safety requirements for roof jobs.
3. Install fiberglass shingles on gable and hip roofs.
4. Close up a valley using fiberglass shingles.
5. Explain how to make various roof projections watertight when using fiberglass shingles.
6. Complete the proper cuts and install the main and hip ridge caps using fiberglass shingles.
7. Lay out, cut, and install a cricket or saddle.
8. Install wood shingles and shakes on roofs.
9. Describe how to close up a valley using wood shingles and shakes.
10. Explain how to make roof projections watertight when using wood shakes and shingles.

11. Complete the cuts and install the main and hip ridge caps using wood shakes/shingles.
12. Demonstrate the techniques for installing other selected types of roofing materials.

Course Number and Name: **CCT 1911 Carpentry Seminar I**

Description: This course is designed for students to participate in activities of various professional organizations such as the SkillsUSA and other student activities. Leadership skills, an understanding of group dynamics, Educational enrichment, stimulation of enthusiasm and interest, community service and rapport among health Education professionals are outcomes of this course. One hour per week with additional activities to meet organizational goals.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
1	1		15

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Discuss interaction and cooperation in the modern workplace
 - a. Demonstrate communication skills by actively participating in program and campus activities.
 - b. Evaluate new materials added to the classroom.
2. Discuss and implement community participation
 - a. Actively participate in a class organized community service project.

Course Number and Name: **CCT 1921** **Carpentry Seminar II**

Description:

This course is designed for students to participate in activities of various professional organizations such as the SkillsUSA and other student activities. Leadership skills, an understanding of group dynamics, Educational enrichment, stimulation of enthusiasm and interest, community service and rapport among health Education professionals are outcomes of this course. One hour per week with additional activities to meet organizational goals.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
1	1		15

Prerequisite:

Instructor Approved

Student Learning Outcomes:

1. Discuss interaction and cooperation in the modern workplace
 - a. Demonstrate communication skills by actively participating in program and campus activities.
 - b. Evaluate new materials added to the classroom.
2. Community participation
 - a. Actively participate in a class organized community service project.

Course Number and Name: **CCT 1931 Carpentry Seminar III**

Description: This course is designed for students to participate in activities of various professional organizations such as the SkillsUSA and other student activities. Leadership skills, an understanding of group dynamics, Educational enrichment, stimulation of enthusiasm and interest, community service and rapport among health Education professionals are outcomes of this course. One hour per week with additional activities to meet organizational goals.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
1	1		15

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Interaction and cooperation in the modern workplace
 - a. Demonstrate communication skills by actively participating in program and campus activities.
 - b. Evaluate new materials added to the classroom.
2. Community participation
 - a. Actively participate in a class organized community service project.

Course Number and Name: **CCT 1941 Carpentry Seminar IV**

Description: This course is designed for students to participate in activities of various professional organizations such as the SkillsUSA and other student activities. Leadership skills, an understanding of group dynamics, Educational enrichment, stimulation of enthusiasm and interest, community service and rapport among health Education professionals are outcomes of this course. One hour per week with additional activities to meet organizational goals.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
1	1		15

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Interaction and cooperation in the modern workplace
 - a. Demonstrate communication skills by actively participating in program and campus activities.
 - b. Evaluate new materials added to the classroom.
2. Community participation
 - a. Actively participate in a class organized community service project.

Description: This course examines the fundamentals of multi-family and light commercial construction.

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

1. Specify and utilize safety procedures for multi-family and light commercial construction.
 - a. Summarize special safety procedures as relating to multi-family and light commercial construction.
 - b. Discuss OSHA standards required for multi-family or light commercial construction.
2. Employ procedures used in multi-family and light commercial construction.
 - a. Describe Applications of local building codes and standards in multi-family and light commercial construction.
 - b. Lay out a building site for multi-family or light construction.
 - c. Establish a finished floor level for split-level construction.
 - d. Observe various excavation techniques.
 - e. Analyze alternative foundation construction.
 - f. Discuss steel floor wall and roof framing for multi-level or light commercial construction.
 - g. Compare special framing and forming procedures to include concrete and/or steel columns beams posts girders and so forth.
 - h. Outline the sequence of events of multi-family or light commercial construction.
 - i. Illustrate various types of special roof framing for light commercial construction.
 - j. Calculate a stair layout for multi-family and light commercial construction.

Module 27201.07 – Commercial Drawings

1. Recognize the difference between commercial and residential construction drawings.
2. Identify the basic keys, abbreviations, and other references contained in a set of commercial drawings.
3. Accurately read a set of commercial drawings.
4. Identify and document specific items from a door and window schedule.
5. Explain basic construction details and concepts employed in commercial construction.
6. Calculate the floor area of each room in a floor plan.

1. Identify the materials and methods used in roofing.
2. Explain the safety requirements for roof jobs.
3. Install fiberglass shingles on gable and hip roofs.
4. Close up a valley using fiberglass shingles.
5. Explain how to make various roof projections watertight when using fiberglass shingles.
6. Complete the proper cuts and install the main and hip ridge caps using fiberglass shingles.
7. Lay out, cut, and install a cricket or saddle.

8. Install wood shingles and shakes on roofs.
9. Describe how to close up a valley using wood shingles and shakes.
10. Explain how to make roof projections watertight when using wood shakes and shingles.
11. Complete the cuts and install the main and hip ridge caps using wood shakes/shingles.
12. Demonstrate the techniques for installing other selected types of roofing materials.

Module 27203.07 – Thermal and Moisture Protection

1. Describe the requirements for insulation.
2. Describe the characteristics of various types of insulation material.
3. Calculate the required amounts of insulation for a structure.
4. Install selected insulation materials.
5. Describe the requirements for moisture control and ventilation.
6. Install selected vapor barriers.
7. Describe various methods of waterproofing.
8. Describe air infiltration control requirements.
9. Install selected building wraps.

Module 27204.07 – Exterior Finishing

1. Describe the purpose of wall insulation and flashing.
2. Install selected common cornices.
3. Demonstrate lap and panel siding estimating methods.
4. Describe the types and Applications of common wood siding.
5. Describe fiber-cement siding and its uses.
6. Describe the types and styles of vinyl and metal siding.
7. Describe the types and Applications of stucco and masonry veneer finishes.
8. Describe the types and Applications of special exterior finish systems.
9. Install three types of siding commonly used in your area.

Module 27205.07 – Cold-Formed Steel Framing

1. Identify the components of a steel framing system.
2. Identify and select the tools and fasteners used in a steel framing system.
3. Identify Applications for steel framing systems.
4. Demonstrate the ability to build back-to-back, box, and L-headers.
5. Lay out and install a steel stud structural wall with openings to include bracing and blocking.
6. Lay out and install a steel stud non-structural wall with openings to include blocking and bracing.

Module 27206.07 – Drywall Installation

1. Identify the different types of drywall and their uses.
2. Select the type and thickness of drywall required for specific installations.
3. Select fasteners for drywall installation.
4. Explain the fastener schedules for different types of drywall installations.
5. Perform single-layer and multi-layer drywall installations using different types of fastening systems, Including:
 - Nails
 - Drywall screws
 - Adhesives
6. Install gypsum drywall on steel studs.
7. Explain how soundproofing is achieved in drywall installations.
8. Estimate material quantities for a drywall installation.

Module 27207.07 Drywall Finishing

1. State the differences among the six levels of finish established by industry standards and distinguish a finish level by observation.
2. Identify the hand tools used in drywall finishing and demonstrate the ability to use these tools.
3. Identify the automatic tools used in drywall finishing.
4. Identify the materials used in drywall finishing and state the purpose and use of each type of material, including:
 - Compounds
 - Joint reinforcing tapes
 - Trim material
 - Textures and coatings
5. Properly finish drywall using hand tools.
6. Recognize various types of problems that occur in drywall finishes; identify the causes and correct methods for solving each type of problem.
7. Patch damaged drywall.

Module 27208-07 Doors and Door Hardware

1. Identify various types of door jambs and frames and demonstrate the installation procedures for placing selected door jambs and frames in different types of interior partitions.
2. Identify different types of interior doors.
3. Identify different types of interior door hardware and demonstrate the installation procedures for selected types.
4. Demonstrate the correct and safe use of the hand and power tools described in this module.
5. List and identify specific items included on a typical door schedule.
6. Demonstrate the procedure for placing and hanging a selected door.

Module 27209-07 Suspended Ceilings

1. Establish a level line.
2. Explain the common terms related to sound waves and acoustical ceiling materials.
3. Identify the different types of suspended ceilings.
4. Interpret plans related to ceiling layout.
5. Sketch the ceiling layout for a basic suspended ceiling.
6. Perform a material takeoff for a suspended ceiling.
7. Install selected suspended ceilings.

Module 27210-07 Window, Door, Floor, and Ceiling Trim

1. Identify the different types of standard moldings and describe their uses.
2. Make square and miter cuts using a miter box or power miter saw.
3. Make coped joint cuts using a coping saw.
4. Select and properly use fasteners to install trim.
5. Install interior trim, including:
 - Door trim
 - Window trim
 - Base trim
 - Ceiling trim
6. Estimate the quantities of different trim materials required for selected rooms.

Module 27211-07 Cabinet Installation

1. State the classes and sizes of typical base and wall kitchen cabinets.
2. Identify the cabinet components and hardware and describe their purposes.
3. Lay out factory-made cabinets, countertops, and backsplashes.
4. Explain the installation of an island base.

Course Number and Name: **CCT 2133 Millwork**

Description: This course includes principles of building and installation of cabinet drawers and shelves.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	1	4	75

National Assessment: Components of the NCCER Level Two examination

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Review and apply safety procedures for cabinet making.
2. Integrate the principles of advanced cabinet making.
 - a. Compare the common alternative procedures for building cabinets on the job.
 - b. Lay out and frame a cabinet from drawings.
 - c. Describe the three types of drawer guides (side guide center guides and center top guides).
 - d. Describe the material choices for cabinet shelves and doors.
 - e. Select prefabricated cabinets for a specific floor plan.
3. Build and install cabinets and shelves.
 - a. Perform the steps in cutting and assembling drawers.
 - b. Install a plastic laminate surface.
 - c. Install prefabricated base and wall cabinets.
 - d. Fabricate various types of doors.

NCCER Standards Level Two

Module 27211-07 Cabinet Installation

1. State the classes and sizes of typical base and wall kitchen cabinets.
2. Identify the cabinet components and hardware and describe their purposes.
3. Lay out factory-made cabinets, countertops, and backsplashes.
4. Explain the installation of an island base.

Course Number and Name: **CCT 2243 Cost Estimating**

Description: Preparation of material and labor quantity surveys from actual working drawings and specifications.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

National Assessment: Components of the NCCER Level Two exam

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Prepare a cost estimate of an assigned building.
 - a. Define the different types of estimates and specific purposes of each.
 - b. Prepare estimates of various kinds of foundations.
 - c. Estimate wall, ceiling, and roof frames.
 - d. Estimate exterior and interior finishes.
 - e. Estimate sub-contract items.
2. Discuss the best construction methods based on project requirements.
 - a. List the different types of construction in residential and commercial buildings.
 - b. Discuss the best method of construction in residential and commercial buildings.
3. Discuss principles of contracts for construction.
 - a. Identify and describe the essential elements of a contract.
 - b. Describe how contracts are terminated.
 - c. Describe different types of construction contracts and their specific purpose.
 - d. List bidding procedures.
4. Complete a materials list for a structure.
 - a. Describe the procedures of doing a materials list.
 - b. Explain the purposes for a materials list.
 - c. Complete a materials form for a construction project.

Course Number and Name: **CCT 2313 Advanced Interior Finishing**

Description: This course includes procedures for advanced ceiling and wall interior finishing and for stair calculation and construction.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

National Assessment: Components of the NCCER Level One examination

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Review and apply safety procedures for interior finishing.
2. Examine and demonstrate procedures for stair calculation and construction.
 - a. Describe types of stairs and their construction.
 - b. Estimate materials and costs for stair construction.
 - c. Calculate amount of materials needed for stringers treads and risers according to specifications.
 - d. Construct a staircase according to specifications.
3. Explain procedures for advanced ceiling and wall interior finishing.
 - a. Discuss and report on specialized ceilings and ceiling systems.
 - b. Identify materials and compare costs for specialized ceilings (exposed beams vaulted cathedral sky lights etc.).
 - c. Identify types of wall finishes to include wainscot raised panel chair-rail vinyl covering and exposed wood.
 - d. Calculate materials and cost for different types of wall finishes according to specifications.

NCCER Standards Level One

Module 27110-06 Basic Stair Layout

1. Identify the various types of stairs.
2. Identify the various parts of stairs.
3. Identify the materials used in the construction of stairs.
4. Interpret construction drawings of stairs.
5. Calculate the total rise, number and size of risers, and number and size of treads required for a stairway.
6. Lay out and cut stringers, risers, and treads.
7. Build a small stair unit with a temporary handrail.

Course Number and Name: **CCT 291(1-3) Special Problem in Carpentry Technology**

Description: This course is designed to provide students with an opportunity to utilize skills and knowledge gained in other courses. The instructor and student work closely together to select a topic and establish criteria for completion of the project.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
1		2	30
2		4	60
3		6	90

National Assessment:

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Develop a written plan that details the activities and projects to be completed.
 - a. Use a written plan that details the activities and projects to be completed.
 - b. Perform written occupational objectives in the special problem.
2. Assess accomplishment of objectives.
 - a. Prepare daily written assessment of accomplishment of objectives.
 - b. Present weekly written reports of activities performed and objectives accomplished to the instructor.
3. Use and follow a set of written guidelines for the special problem.
 - a. Develop and follow a set of written guidelines for the special problem.

Course Number and Name: **CCT 292(1-3) Supervised Work Experience in Carpentry Technology**

Description: This course, which is a cooperative program between industry and Education, is designed to integrate the student's technical studies with industrial experience. Variable credit is awarded on the basis of 1 semester hour per 45 industrial contact hours.

Hour Breakdown:

Semester Credit Hours	Lecture	Externship	Contact Hours
1		3	45
2		6	90
3		9	135
4		12	180
5		15	225
6		18	270

National Assessment:

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Follow safety procedures associated with practical industrial construction work.
2. Follow a set of instructor-written guidelines for the supervised work experience program.
3. Apply skills needed to be a viable member of the workforce.
 - a. Prepare a description of skills to be developed in the supervised work experience program.
 - b. Practice skills needed to be a viable member of the workforce.
4. Practice human relationship skills in the supervised work experience program.
5. Practice positive work habits responsibilities and ethics.
6. Develop written occupational objectives in the supervised work experience program.
7. Assess performance of occupational skills.
 - a. Prepare daily written assessments of work performance as specified in the occupational objectives.
 - b. Present weekly written reports of activities performed and objectives accomplished to the instructor.

RECOMMENDED TOOLS AND EQUIPMENT

CAPITALIZED ITEMS

1. Air compressor stationary (1)
2. Cabinet metal vented for flammable materials (1)
3. Computer networkable with Internet access (1 per 2 students)
4. Concrete portable mixer (1)
5. Concrete power trowel (1)
6. Concrete vibrator (1)
7. Drill press (14-in. with vise) (1)
8. Drill rotary hammer (1)
9. Dust collection system for laboratory (1)
10. Grinder pedestal (1)
11. Level laser with tripod and leveling rod (1)
12. Masonry saw with carborundum and diamond blades (1)
13. Masonry mortar mixer (2)
14. Planer stationary (18-in.) (1)
15. Plotter (1)
16. Printer laser printer for networked lab
17. Sander drum (22-in.) (1)
18. Sander stationary (with disk and 6-in.-by-48-in. belt) (1)
19. Band saw (12-in.) (1)
20. Saw slide compound miter (12-in.) (1)
21. Saw radial arm (1)
22. Saw stationary table (with accessories) (12-in.) (2)
23. Saw portable table (with accessories) (10-in.) (1)
24. Interior Scaffold (2 endframes 2 braces 2 walkboards) (4)
25. Shaper with accessories and bits (1)
26. Table workbench (4)
27. Teacher computer networkable with Internet access and color inkjet printer
28. Vinyl siding break (1)
29. Plumb laser (1)

NON-CAPITALIZED ITEMS

1. Awl scratch (2)
2. Bar ripping (2)
3. Bit expansion (2)
4. Bit set auger (1/4-in. to 1-in.) (2)
5. Bit set forstner (1/4-in. to 3-in.) (2)
6. Bit set brad points (1/8-in. to 1/2-in.) (1)
7. Bit set spade (1/4-in. to 1 1/2-in.) (1)
8. Bit set twist (1/16-in. to 1/2-in.) (1)
9. C-clamp assorted sizes (8)
10. C-clamp vise grip (4)
11. Clamp bar (48-in.) (6)
12. Clamp bar (72-in.) (6)
13. Clamp hand screw (12-in.) (4)
14. Clamp quick acting (24-in.) (6)
15. Clamp spring (6)
16. Chalkline (4)

17. Chisel ripping (1)
18. Chisel set wood (1/4-in. to 1 1/2-in.) (2)
19. Concrete finishing hand tool set (2)
20. Concrete bull float with extension handles (1)
21. Cutter bolt (1)
22. Dividers wing (2)
23. Drill cordless (4)
24. Drill hammer (1/2-in.) (1)
25. Drill portable (1/2-in.) (1)
26. Drill portable (3/8-in.) (2)
27. Drill portable screw gun (3)
28. Extension cord (25-ft 12/3 conductor) (6)
29. Extinguisher fire (ABC) (2)
30. Eye protection and sterilization chest (with 2 pairs safety glasses) (1)
31. File metal double-cut (3)
32. File wood (flat assorted sizes) (6)
33. File wood rasp (half-round) (6)
34. Grinder portable angle (1)
35. Gun ramset (1)
36. Hacksaw (1)
37. Half hatchet (1)
38. Hatchet shingle hammer (2)
39. Hammer straight claw (6)
40. Hammer sledge (3)
41. Hammer curved claw (16 oz) (2)
42. Hammer curved claw (2 oz) (12)
43. Handsaw rip (1)
44. Handsaw crosscut (8)
45. Hose air (50-ft) (2)
46. Jointer (1)
47. Knife 5-in-1 (2)
48. Knives drywall (5 to 12 in.) (1)
49. Knife putty (2-in.) (2)
50. Knife utility (4)
51. Ladder extension type 1-A fiberglass (24-ft) (1)
52. Ladder extension types 1-A fiberglass (16-ft) (1)
53. Ladder step type 1-A fiberglass (6-ft) (2)
54. Ladder step type 1-A fiberglass (8-ft) (2)
55. Laminate band cutter (1)
56. Level builder with tripod and leveling rod (2)
57. Level transit with tripod and leveling rod (1)
58. Level carpenter's aluminum (or wood) (48-in.) (2)
59. Level carpenter's aluminum (or wood) (24-in.) (2)
60. Mallet rubber/wood (1)
61. Masonry kit (2)
62. Mixer paddle (2)
63. Nailer pneumatic finish (4)
64. Nailer pneumatic framer (2)
65. Nailer pneumatic crown stapler (1)
66. Nailer pneumatic brad (1)
67. Nailer gas-powered trim (1)
68. Pans drywall (6)
69. Plane block (2)

70. Plane portable power (1)
71. Plane jack (2)
72. Planer thickness (12-in.) (1)
73. Plate joiner (2)
74. Pliers channel lock (12-in.) (2)
75. Pliers diagonal (2)
76. Pliers lineman's (side cutters) (1)
77. Pliers needle-nose (2)
78. Pliers slip joint (2)
79. Pliers vise grip (2)
80. Plumb bob (2)
81. Router with bits (2)
82. Router plunge (3 hp) (1)
83. Router laminate kit (1)
84. Rule folding (6-ft) (6)
85. Safety kit (first aid) (OSHA approved) (1)
86. Sander belt (2)
87. Sander finish 1/4 sheet (1)
88. Sander finish 1/2 sheet (1)
89. Sander portable dual action finishing (3)
90. Saw back (2)
91. Saw portable circular (7 1/4-in.) (4)
92. Saw portable circular left hand (7 1/4-in.) (1)
93. Saw portable worm drive circular (7 1/4-in.) (1)
94. Saw portable circular cordless (1)
95. Saw coping (4)
96. Saw hand (1)
97. Saw hole set (1-in. to 2 1/2-in. with arbor) (1)
98. Saw keyhole (2)
99. Saw motorized compound miter (2)
100. Saw reciprocating (1)
101. Saw reciprocating cordless (1)
102. Saw saber (3)
103. Saw tile set with diamond blade (1)
104. Scaffold (set of 4 wheels) (1)
105. Scaffold interior adjustable set (2)
106. Screwdriver (Phillips assorted sizes) (1)
107. Screwdriver set (spiral with bits) (2)
108. Screwdriver (flat blade assorted sizes) (1)
109. Set nail (assorted sizes) (6)
110. Shield safety (4)
111. Shovel round point (2)
112. Shovel square point (2)
113. Snips aviation (straight) (2)
114. Snips aviation (left) (2)
115. Snips aviation (right) (2)
116. Snips tin (12-in.) (2)
117. Square dry wall (2)
118. Square framing with rafter chart (12)
119. Square combination (12)
120. Square speed (6)
121. Square try (2)
122. T-bevel (6)

- 123. Tape fiberglass/steel (1-ft) (2)
- 124. Tape steel (25-ft) (12)
- 125. Vise metalworking (1)
- 126. Vise woodworking (5-in.) (8)
- 127. Wheelbarrow (6 cu ft) (2)
- 128. Wrench set combination (SAE) (1)
- 129. Wrench adjustable (12-in.) (1)
- 130. Wrench adjustable (1-in.) (1)
- 131. Wrench adjustable (8-in.) (1)
- 132. Wrench set combination (metric) (1)
- 133. Wrench set sockets with ratchets and pullhandles (SAE 3/8-in. drive) (1)
- 134. Wrench set sockets with ratchets and pullhandles (Metric 3/8-in. drive) (1)
- 135. Pocket cutter (1)
- 136. Hand saw (1)
- 137. Pan saw (1)

RECOMMENDED INSTRUCTIONAL AIDS

It is recommended that instructors have access to the following items:

1. VCR/DVD/Blu Ray player (1 per program)
2. Smart TV/TV, color monitor, 52-in. diameter (1 per program)
3. Access to copier
4. Data projector (1 per program)
5. Document Camera
6. Promethean Board

CURRICULUM DEFINITIONS AND TERMS

- Course Name – A common name that will be used by all community colleges in reporting students
- Course Abbreviation – A common abbreviation that will be used by all community and junior colleges in reporting students
- Classification – Courses may be classified as the following:
 - Career Certificate Required Course – A required course for all students completing a career Certificate.
 - Technical Certificate Required Course – A required course for all students completing a technical Certificate.
 - Technical Elective – Elective courses that are available for colleges to offer to students.
- Description – A short narrative that includes the major purpose(s) of the course
- Prerequisites – A listing of any courses that must be taken prior to or on enrollment in the course
- Corequisites – A listing of courses that may be taken while enrolled in the course
- Student Learning Outcomes – A listing of the student outcomes (major concepts and performances) that will enable students to demonstrate mastery of these competencies

The following guidelines were used in developing the program(s) in this document and should be considered in compiling and revising course syllabi and daily lesson plans at the local level:

- The content of the courses in this document reflects approximately 75% of the time allocated to each course. The remaining 25% of each course should be developed at the local district level and may reflect the following:
 - Additional competencies and objectives within the course related to topics not found in the state framework, including activities related to specific needs of industries in the community college district
 - Activities that develop a higher level of mastery on the existing competencies and suggested objectives
 - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed or revised
 - Activities that include integration of academic and career–technical skills and course work, school-to-work transition activities, and articulation of secondary and postsecondary career–technical programs
 - Individualized learning activities, including work-site learning activities, to better prepare individuals in the courses for their chosen occupational areas
- Sequencing of the course within a program is left to the discretion of the local college. Naturally, foundation courses related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other courses related to specific skill areas and related academics, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors. Programs that offer an Associate of Applied Science Degree must include all of the required Career Certificate courses, Technical Certificate courses **AND** a minimum of 15 semester hours of General Education Core Courses. The courses in the General Education Core may be spaced out over the entire length of the program so that students complete some academic and Career Technical courses each semester. Each community college specifies the actual courses that are required to meet the General Education Core Requirements for the Associate of Applied Science Degree at their college.

- In order to provide flexibility within the districts, individual courses within a framework may be customized by doing the following:
 - o Adding new student learning outcomes to complement the existing competencies and suggested objectives in the program framework
 - o Revising or extending the student learning outcomes
 - o Adjusting the semester credit hours of a course to be up 1 hour or down 1 hour (after informing the Mississippi Community College Board [MCCB] of the change)