

Masonry

Mississippi Curriculum Framework

Program CIP: 46.0101 – Brick, Block, and Stone Masonry

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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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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 assessment 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/masonry> .

INDUSTRY JOB PROJECTION DATA

The Brick, Block and Stone Masonry occupations require an education level of short-term on-the-job training or work experience in a related field. There is expected to be a 10.87% increase in occupational demand at the regional level and 10.77% increase at the state level. Median annual income for this occupation is \$27,145.63 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
First-Line Supervisors/ Managers of Construction Trade and Extraction Workers	Work Experience in Related Field
Brick Masons and Block Masons	long-term on-the-job training
Stone Masons	long-term on-the-job training
Tile and Marble setters	long-term on-the-job training

Table 2: Occupational Overview

	Region	State	United States
2010 Occupational Jobs	4482	5519	584730
2020 Occupational Jobs	5450	6550	682805
Total Change	968	1031	98075
Total % Change	21.60%	18.68%	16.77%
2010 Median Hourly Earnings	\$18.16	\$20.43	\$24.11
2010 Median Annual Earnings	\$37,762.40	\$42,493.06	\$50,155.53
Annual Openings	96	103	9807

Table 3: Occupational Breakdown

Description	2010 Jobs	2020 Jobs	Annual Openings	2010 Hourly Earnings	2010 Annual Earnings 2,080 Work Hours
First-Line Supervisors/Managers of Construction Trades and Extraction Workers	4058	4976	91	\$23.50	\$48,880.00
Brick Masons and Block Masons	302	338	3	\$19.20	\$39,936.00
Stone Masons	34	37	0	\$16.09	\$33,467.20
Tile and Marble Setters	88	99	1	\$13.83	\$28,766.40
TOTAL	4482	5450	96	\$18.16	\$37,762.40

Table 4: Occupational Change

Description	Regional Change	Regional % Change	State % Change	National % Change
First-Line Supervisors/Managers of Construction Trades and Extraction Workers	918	22.62%	19.04%	17.22%
Brick Masons and Block Masons	36	11.92%	14.44%	13.95%
Stone Masons	3	8.82%	17.24%	14.77%
Tile and Marble Setters	11	12.50%	17.74%	16.87%

ARTICULATION

Articulation credit from Secondary Construction: Carpentry to Postsecondary Commercial Residential Maintenance will be awarded upon implementation of this curriculum by the college. The course to be articulated is Carpentry (CRM 1214) with the stipulation of passing the MSCPAS2 according to Mississippi Community College Board guidelines.

SEC Program	PS Program	PS Courses
[S] Carpentry (CIP: 46.000)	Commercial Residential Maintenance	CRM 1214 – Carpentry
		CRM 1313 – Masonry
[S] Masonry (CIP: 46.0101)		
[S] Electrical (CIP: 46.0302)		CRM 1514 – Electrical
[S] Plumbing (CIP: 46.0503)		CRM 1414– Plumbing
[S] Welding (CIP: 48.0508)		CRM 1713 Welding

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. To use the approved Alternate Assessment for the following programs of study, colleges should provide a Letter of Notification to the Director of Career Technical Education at the MS Community College Board. Please see the following link for further instructions: <http://www.mccb.edu/wkfEdu/CTDefault.aspx>.

CIP Code	Program of Study	
46.0101	Mason/ Masonry	
Level	Standard Assessment	Alternate Assessment
Career	MS-CPAS-2 Postsecondary Brick, Block, and Stone Masonry	NCCER Masonry Core NCCER Masonry Level I
Level	Standard Assessment	Alternate Assessment
Technical/AAS	MS-CPAS-2 Postsecondary Brick, Block, and Stone Masonry	NCCER Masonry Level II, Level III

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

Instructional strategies for faculty members implementing the curriculum can be found through the Office of Curriculum and Instruction's professional development.

ASSESSMENT STRATEGIES

The Office of Curriculum and Instruction's professional development offer assessment strategies to faculty members implementing the curriculum. Additionally, standards were included in course content when appropriate.

RESEARCH ABSTRACT

In the fall of 2016, the Office of Curriculum and Instruction (OCI) met with the different industry members who made up the advisory committees for the Brick, Block Stone and Masonry 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 the college 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 how to communicate with the customers, basic math skills, troubleshooting with customer concerns, and understanding the importance of confidentiality.

A curriculum writing meeting was convened in November 2016 and attended by faculty, administrators, and industry members. During the writing meeting, the curriculum was aligned to the 30/45/60 model allowing for a stackable credentials model whereby students can earn a career certificate, technical certificate, and an Associate of Applied Science degree in Masonry. NCCER standards for NCCER Core, and NCCER Masonry Levels I, II, and III were mapped to the curriculum.

Also during the writing meeting, the course prefix was updated from BBV to BBT and three new courses were added to the curriculum document that include: BBT 1123 Forming Applications, BBT 2112 Repair and Restoration, and BBT 2123 Leadership Preparation.

REVISION HISTORY:

2011 Revised, Research and Curriculum Unit, Mississippi State University
2017 Mississippi Community College Board

PROGRAM DESCRIPTION

The Brick, Block, Stone and Masonry program is instructional program that prepares individuals to lay brick, block, and/or stone. Included is instruction in laying out and/or spacing bonds; determining vertical and horizontal alignment of courses using gauges, plumb-bobs, and levels; and cutting, notching, and shaping blocks, bricks, and stone to construct or repair walls, partitions, arches, and fireplaces.

Industry standards referenced are from the National Center for Construction Education and Research (NCCER).

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
BBT 1115	Brick and Block Laying	5						NCCER CORE
BBT 1215	Masonry Construction	5						
BBT 1313	Tools, Equipment, and Safety	3						
	Instructor Approved Elective	2						
	Total	15						

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
BBT 1115	Brick and Block Laying	5						NCCER CORE NCCER MASONRY Level I
BBT1215	Masonry Construction	5						
BBT 1223	Masonry Math, Estimating, and Blueprint Reading	3						
BBT 1313	Tools, Equipment, and Safety	3						
BBT 1425	Advanced Block laying	5						
BBT 1525	Advanced Brick laying	5						
BBT 2112	Repair and Restoration	2						
	Instructor Approved Elective	2						
	TOTAL	30						

Technical 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
BBT 1623	Chimney, Fireplace, Refractory Construction	3						NCCER MASONRY Level II and Level III
BBT 1723	Arch Construction	3						
BBT 1823	Steps, Patios, and Brick Floors	3						
BBT 2123	Leadership Preparedness	3						
	Technical electives per instructor approval	3						
	TOTAL	15						

General Education Core Courses – Brick, Block and Stone Masonry

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.

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						
	Math/Science	3						
	Academic electives	6						
	TOTAL	15						

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>

Electives listing

			SCH Breakdown				Contact Hour Breakdown		
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Externship	Total Contact Hours	Lecture	Lab	Externship
BBT 191 (1-3)	Special Problem in Brick, Block and Stone Masonry	1-3							
BBT 292 (1-6)	Supervised Work Experience in Brick, Stone Masonry								
BBT 1123	Forming Application	3							
BAD 2413	Legal Environment of Business	3							
BOT 1273	Introduction to Microsoft® Office®	3							
WBL 191 (1-3), WBL 192 (1-3), WBL 193 (1-3), WBL 291 (1-3). WBL 292 (1-3), and WBL 293 (1-3)	Work-Based Learning I, II,III, IV,V and VI								
CRM 1713	Welding	3							
CRM 1414	Plumbing	4							
CRM 1514	Electrical	4							
CRM 1214	Carpentry	4							
CRM 1615	Heating, Ventilating, and Air Conditioning (HVAC)	5							
DDT 1213	Construction Standards and Material	3							
DDT 1413	Elementary Surveying	3							
	All other electives approved by instructor per local community college policy								

BRICK AND MASONRY COURSES

Course Number and Name: **BBT 1115** **Brick and Block Laying**

Description: This course is designed to give the student experience in laying brick and block.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
5	1	8	135
5	2	6	120

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Describe and apply safety procedures for layout and construction of a brick/block wall.
2. Explore the history of masonry to include materials and techniques.
3. Explain and perform procedures for layout and construction of a brick/block wall.
 - a. Describe and apply procedures to establish, build, and erect corner leads.
 - b. Discuss and perform procedures to establish, build, and erect vertical masonry guides.
 - c. Explain and utilize procedures to set line from corner leads.
 - d. Set a trig correctly.
 - e. Explain and apply procedures to lay brick/block to line.
 - f. Describe and demonstrate procedures to set closures in masonry course.
 - g. Describe and perform procedures to strike mortar joints, both head and bed.
 - h. Specify and practice procedures to perform tuck pointing.
 - i. Outline and relate the cleaning processes for brick/block masonry.

NCCER CORE: 00107-09

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.

NCCER CORE: 00108-09

1. Explain the role of 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.

NCCER CORE: 00109-09

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.

NCCER Module: 28105-13

1. Describe how to install concrete masonry units.
2. Describe how to install brick.

Course Number and Name: **BBT 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	1	4	75
3	2	2	60

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Discuss and apply forming application 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.

Course Number and Name: **BBT 1215** **Masonry Construction**

Description: This course is designed to give the student experience in various types of walls, finishing, and masonry construction techniques

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
5	1	8	135
5	2	6	120

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Explain safety procedures for masonry construction.
2. Identify brick, block, and stone materials and their applications.
 - a. Name the different types of brick, block, and stone.
 - b. Label parts of a brick, block, and stone.
 - c. Identify the bond positions as they appear in a wall.
 - d. Describe types of stone and their applications.
 - e. Mix mortar to specifications (hand and machine).
3. Plan and construct a concrete foundation.
 - a. Estimate the materials needed for a concrete foundation.
 - b. Prepare footing and construct forms needed for a concrete foundation.)
 - c. Install concrete reinforcement.
 - d. Install vapor barrier.
 - e. Pour concrete mixture into foundation forms.
 - f. Finish concrete according to industry specifications.
4. Lay out a brick wall and/or a block wall to specifications.
 - a. Set up the safe and efficient work area.
 - b. Establish the building line.
 - c. Dry bond the first course.
 - d. Mark the bond.
 - e. Lay a brick wall in mortar according to instructor's specifications.
5. Plan and construct a reinforced wall.
 - a. Distinguish between load bearing and non-load bearing walls.
 - b. Select materials for a reinforced wall.
 - c. Construct a reinforced masonry wall to industry specifications.
 - d. Select and install flashing to specifications.
 - e. Install a weep hole and describe its function.
 - f. Install an expansion joint and describe its function.
6. Plan and construct a stone masonry wall.
 - a. Identify bond patterns.
 - b. Identify finishes.
 - c. Prepare mortar for stone masonry.
 - d. Identify tools and procedures used in stone cutting and chipping.
 - e. Perform procedures necessary for installation of stone veneer.
 - f. Perform procedures for laying a stone walk.

NCCER Module: 28103-13

1. Recognize the mathematical concepts used in masonry.

NCCER Module: 28104-13

1. Name and describe the ingredients and types of mortar.
2. Describe properties of plastic and hardened mortar.
3. Identify the common problems found in mortar application and their solutions.
4. Explain how to properly set up, maintain, and dispose of mortar and use the mortar mixing area.

NCCER Module: 28105-13

3. Describe how to cut concrete masonry units and brick.
4. Describe how to install masonry reinforcement and accessories.

NCCER Module: 28106-13

5. Explain how to handle materials properly.

NCCER Module: 28302-05

1. Explain the various techniques used to provide adequate protection during hot –and cold- weather masonry construction
2. Describe all-weather construction techniques.
4. Demonstrate techniques for construction of stone walls and other stone building surfaces.

NCCER Module: 28103-13

2. Identify the basic parts of a set of drawings and list the information found on each type.
3. Identify the purpose of specifications, standards, and codes used in the building industry and the section that pertain to masonry.

NCCER Module: 28201-14

1. Describe the basic parts of a set of residential drawings and list the information found on each type of drawing.
2. Explain how to estimate material quantities from residential drawings.

NCCER Module: 28304-05

1. Recognize the difference between commercial and residential construction drawings.
2. Identify the basic key, abbreviations, and other references contained in a set of commercial drawings.
3. Accurately read a set of commercial drawings.
4. Explain basic construction details and concepts employed in commercial construction.

NCCER Module: 28305-05

1. Explain and apply basic materials estimating procedures for concrete block and brick construction.
2. Explain and apply basic estimating procedures for reinforcements, ties, and other materials.
3. Explain and apply procedures for estimating quantities of mortar and mortar materials.

NCCER Module: 28306-05

1. Describe the major responsibilities of the mason relative to site layout.
2. Convert measurements stated in feet and inches to equivalent measurements stated in decimal feet, and vice versa.
3. Use and properly maintain tools and equipment associated with taping.
4. Use taping and /or chaining equipment and procedures to make distance measurements and perform site layout task.
5. Determine approximate distances by pacing.
6. Recognize, use, and properly care for tools and equipment associated with differential leveling.
7. Use a builder's level or transit and differential leveling procedures to determine site and building elevations.
8. Record site layout data and information in field notes using accepted practices.
9. Check and/or establish 90 degree angles using the 3-4-5 rule.

Course Number and Name: **BBT 1313** **Tools, Equipment, and Safety**

Description: This course is designed to give the student experience in the use and care of tools and equipment along with the safety procedures used in the masonry trade.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60
3	3	0	45

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Identify and use masonry tools and equipment.
 - a. Match terms associated with hand tools to their correct definitions.
 - b. Identify and describe the correct way to hold a brick trowel.
 - c. Measure, mark, and cut brick and block to specifications.
 - d. List basic rules concerning care of the level.
 - e. Use a framing square to lay out a wall corner to specifications.
 - f. Describe the measuring instruments and guides used to lay out masonry work.
 - g. Demonstrate the use of a laser and/or level.
2. Explain safe work practices for the masonry shop and job site.
 - a. Describe practices associated with chemicals and other hazardous materials according to OSHA and EPA regulations
 - b. Demonstrate safe use of masonry hand tools, power tools, machines, and equipment.
 - c. Describe personal safety clothing and equipment used in masonry trades.
 - d. Demonstrate procedures for safely handling of heavy objects.
 - e. Describe state eye-safety law, including appropriate times for wearing safety glasses.
 - f. Identify causes of electrical hazards.
3. Demonstrate the ability to care for the tools and equipment.
 - a. Describe the accepted methods to care for tools and equipment.
 - b. Clean tools and equipment after use.
 - c. Store tools and equipment in accepted manner.
4. Explain student organizations and how they relate to and support the instructional program.
 - a. Describe the activity programs of career student organizations and how they relate to and support the instructional program.

NCCER CORE Module: 00101-09

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.

NCCER CORE Module: 00103-09

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.

NCCER CORE Module: 00104-09

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

NCCER CORE Module: 00106-09

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 Society of Mechanical Engineers (ASME) hand signals.

NCCER Module: 28102-13

1. Identify hand tools used in masonry.
2. Identify measures and measuring tools used in masonry.
3. Identify mortar equipment used in masonry.
4. Identify power tools used in masonry.
5. Identify power equipment used in masonry.
6. Identify lifting equipment used in masonry.
7. Recognize scaffolds used in masonry.

NCCER Module: 28106-13

1. Understand the importance of safety on a job site.
2. Recognize the proper use of personal protective equipment in masonry.
3. Explain how to work safely from elevated surfaces.
4. Describe how to use tools and equipment safely.

NCCER Module: 28301-05

3. State the safety procedures in high-rise construction.
4. Safely work with materials handling equipment in high-rise construction.
5. Properly put on a safety harness, lanyard, and lifeline.
6. Demonstrate the hand signals used for lifting materials.

Course Number and Name: **BBT 1425** **Advanced Block Laying**

Description: This course is designed to give the student experience in laying block columns, piers, and various walls.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
5	1	8	135
5	2	6	120

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Demonstrate proper safety procedures for layout and construction of block columns, piers, and various walls.
2. Explain and perform procedures for layout and construction of block columns, piers, and various walls using different widths of block.
 - a. Describe and perform procedures to layout and construct block columns to specifications.
 - b. Explain and apply procedures to lay a hollow block pier to specifications.
 - c. Discuss and practice procedures to construct a block wall with pilasters to specifications.
 - d. Outline and use procedures to construct a block chase wall to specifications.
 - e. Describe and complete procedures to construct a block cavity wall to specifications.
 - f. Describe and demonstrate procedures to install reinforcing wire, rebar, embed plates, and wall ties.
 - g. Set, brace, plumb, and course off a hollow metal door/window frame.

NCCER Module: 28202-13

1. Explain the requirements for construction of various types of residential foundations.

NCCER Module 28203-13

1. Name and describe the primary ingredients in grout and their properties.
2. Identify the different types of grout used in masonry work.
3. Describe the common admixtures and their uses.

NCCER Module: 28205-13

1. Identify the structural principles and fundamental uses of basic types of walls.
2. Identify the requirement for and function of control joints and expansion joints.

NCCER Module: 28206-13

3. Explain the various techniques used to provide adequate protection during hot- and cold-weather masonry construction.

NCCER Module: 28207-13

1. Describe how standards and specifications are used to ensure quality control throughout the masonry industry.
2. Describe how masonry sample panels and prisms are built and tested to ensure quality control on a project.

NCCER Module: 28301-05

1. Recognize and explain the use of high-rise construction equipment.
2. Identify construction sequence in high-rise construction.

NCCER Module: 28302-05

3. Describe techniques for surface-bonding mortar.
4. Demonstrate techniques for construction of stone walls and other stone building surfaces.
5. Demonstrate basic knowledge of various building materials such as glass block and refractory brick.

Course Number and Name: **BBT 1525** **Advanced Bricklaying**

Description: This course is designed to give the student advanced experience in brick columns, piers, and various walls.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
5	2	6	120
5	1	8	135

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Demonstrate safety procedures for layout and construction of brick columns, piers, and various walls.
2. Explain and perform procedures for layout and construction of brick columns, piers, and various walls using different sizes of brick.
 - a. Describe and apply procedures to lay out and construct brick columns to specifications.
 - b. Explain and perform procedures to lay a hollow brick pier to specifications.
 - c. Discuss and demonstrate procedures to construct a brick wall with pilasters to specifications.
 - d. Describe and practice procedures to construct a chase wall to specifications.
 - e. Outline and utilize procedures to construct a cavity wall to specifications.
 - f. Lay out advanced masonry such as soldiers, rowlocks, corbelling, and headers.

NCCER Module: 28204-14

1. Describe the methods and materials used to install masonry openings.
2. Describe the methods and materials used to tie a single masonry wythe together.
3. Describe the methods and materials used to tie two masonry wythes together.
4. Describe the methods and materials used to tie a masonry wythe to structural elements.

NCCER Module 28205-13

3. Build various types of walls using proper reinforcement, jointing, and bonding techniques.

NCCER Module: 28206-14

1. Identify the various types of insulation used in conjunction with masonry construction, and explain installation techniques.
2. Identify the need for moisture control in various types of masonry construction, and describe the techniques used to eliminate moisture problems.

NCCER Module: 28207-14

3. Describe how mortar is tested to ensure quality control on a project.
4. Describe how field inspections and observations are used to ensure quality control on a project.

Course Number and Name: **BBT 1723** **Arch Construction**

Description: Students will gain advanced experiences in layout and construction of arches.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	1	4	75
3	2	2	60

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Specify and practice safety procedures to lay out and construct brick and stone arches.
2. Describe and explain the history and development of arches.
3. Describe the different types of arches.
4. Explain the techniques utilized in developing arches to include cutting and shaping of various masonry units.
5. Explain and apply procedures to lay out and construct brick and stone arches.
 - a. Describe and complete procedures to lay out and construct arches to specifications.

Course Number and Name: **BBT 1823** **Steps, Patios, and Brick Floors**

Description: Students will gain advanced experiences in layout and construction of steps, patios, and brick floors.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	1	4	75
3	2	2	60

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Specify and practice safety procedures to lay out and construct brick floors, patios, and steps.
2. Explain and describe the various types of pavers used in floor, patio, and step construction.
3. Explain and apply procedures to lay out and construct brick floors, patios, and steps.
4. Explain and apply procedures to lay out and construct a floor section using paving brick with concrete base and mortar beds.
5. Explain and apply procedures to lay out and construct a floor section using paving brick with limestone base and sand beds.
6. Describe and use various bond patterns used in constructing brick floors.
7. Explain and apply procedures to lay out and construct flagstone walkways.
8. Explain and apply procedures to lay out and construct tile floors and/or walls.

NCCER Module 28202-14

2. Identify and explain the characteristics, uses, and installation techniques for clay brick and concrete pavers.
3. Lay out and build steps, patios, and decks made from masonry units.

Course Number and Name: **BBT 191(1-3) Special Problems in Brick, Block, and Stone Masonry**

Description: A course to provide students with an opportunity to utilize skills and knowledge gained in other Brick, Block, and Stone Masonry 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
1-3		2-6	15-90

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Prepare a written agreement.
 - a. Compile a written training agreement in cooperation with the instructor and student that details work schedule and specific tasks/skills to be mastered in the program.
2. Prepare a written report of activities.
 - a. Compile a daily log of activities and tasks.
 - b. Submit weekly reports to the instructor summarizing activities and tasks completed.
 - c. Submit a final report of activities and experiences.
3. Follow written guidelines for special problems.
 - a. Complete all required activities in the training agreement.
 - b. Adhere to all written and oral instructions for the special problem.

Course Number and Name: **BBT 2112** **Repair and Restoration**

Description: The student will gain experience in the repair and restoration of brick and masonry structures.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
2	0	4	60
2	1	2	45

Prerequisite: Instructor approved

NCCER Module 28303-05

1. Recognize signs of deterioration in masonry structures.
2. Describe the causes of efflorescence, cracking, and faulty mortar joints.
3. Describe the procedures for preventing and correcting efflorescence, cracking, and faulty mortar joints.
4. Describe the procedures for preventing and correcting water damage in basements.
5. Describe the procedures for rebuilding fireplaces.
6. Replace a damaged brick in a wall.
7. Repair mortar joints.

Course Number and Name: **BBT 2123 Leadership Preparedness**

Description: The student will gain experience in job skills, leadership, safety, and project control from a management perspective.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	1	4	75
3	2	2	60

Prerequisite: Instructor approved

Student Learning Outcomes:

NCCER Module: 28307-05

Chapter One: Orientation to the Job

1. Discuss the history, trends, and economic conditions of the construction industry.
2. Describe how workers' values have changed over the years.
3. Explain the importance of training for construction industry personnel.
4. List the new technologies available, and discuss how they are helpful to the construction industry.
5. Identify the gender and minority issues associated with a changing workforce.
6. Describe what employers can do to prevent discrimination.
7. Describe the four major categories of construction projects.
8. Differentiate between formal and informal organizations.
9. Describe the difference between authority and responsibility.
10. Explain the purpose of job descriptions and what they should include.
11. Distinguish between company policies and procedures.

Chapter Two: Leadership Skills

1. Explain the role of a crew leader.
2. List the characteristics of effective leaders.
3. Be able to discuss the importance of ethics in a supervisor's role.
4. Identify the three styles of leadership.
5. Describe the forms of communication.
6. Explain the four parts of verbal communication.
7. Demonstrate the importance of active listening.
8. Illustrate how to overcome the barriers to communication.
9. List some ways that supervisors can motivate their employees.
10. Explain the importance of delegating and implementing policies and procedures.
11. Differentiate between problem solving and decision making.

Chapter Three: Safety

1. Demonstrate an understanding of the importance of safety.
2. Give examples of direct and indirect costs of workplace accidents.
3. Identify safety hazards of the construction industry.
4. Explain the purpose of the Occupation Safety and Health Act (OSHA).
5. Discuss OSHA inspection programs.
6. Identify the key points of a safety program.
7. List the steps to train employees on how to perform new tasks safely.

8. Identify a supervisor's safety responsibilities.
9. Explain the importance of having employees trained in first aid and Cardio-Pulmonary Resuscitation (CPR) on the job site.
10. Describe the signals of substance abuse.
11. List the essential parts of an accident investigation.
12. Describe the ways to maintain employee interest in safety.

Chapter Four: Project Control

1. Describe the three phases of a construction project.
2. Define the three types of project delivery systems.
3. Define planning and describe what it involves.
4. Explain why it is important to plan.
5. Describe the two major stages of planning.
6. Explain the importance of documenting one's work.
7. Describe the estimating process.
8. Explain how schedules are developed and used.
9. Identify the two most common schedules.
10. Explain short-interval production scheduling (SIPS).
11. Describe the different costs associated with building a job.
12. Explain the supervisor's role in controlling costs.
13. Illustrate how to control the main resources of a job: materials, tools, equipment, and labor.
14. Define the terms production and productivity and explain why they are important.

Course Number and Name: **BBT 292(1-6)** **Supervised Work Experience in Masonry**

Description: A course that is a cooperative program between industry and education and is designed to integrate the student's technical studies with industrial experience. Variable credit is awarded on the basis of one semester hour per 45 industrial contact hours.

Hour Breakdown:

Semester Credit Hours	Lecture	Externship	Contact Hours
1-6		3-18	45-270

Prerequisite: Consent of Instructor

Student Learning Outcomes:

1. Apply technical skills needed to be a viable member of the workforce.
 - a. Prepare a description of technical skills to be developed in the supervised work experience.
 - b. Develop technical skills needed to be a viable member of the workforce.
2. Apply skills developed in other program area courses.
 - a. Perform skills developed in other program area courses.
3. Apply human relationship skills.
 - a. Use proactive human relationship skills in the supervised work experience.
4. Apply and practice positive work habits and responsibilities.
 - a. Perform assignments to develop work habits and responsibilities.
5. Work with instructor and employer to develop written occupational objectives to be accomplished.
 - a. Perform written occupational objectives in the supervised work experience.
6. Assess accomplishment of objectives.
 - a. Prepare daily written assessment of accomplishment of objectives.
 - b. Present weekly written reports to instructor in activities performed and objectives to be accomplished.
7. Utilize a set of written guidelines for the supervised work experience.
 - a. Develop and follow a set of written guidelines for the supervised work experience.

RECOMMENDED TOOLS AND EQUIPMENT

CAPITALIZED ITEMS

1. Compressor, air (1)
2. Mixer, mortar (gas or electric powered) (1)
3. Portable saw, masonry (14 in. diameter with extra blades) (1)
4. Stationary saw, masonry (20 in. diameter with extra blades) (1)
5. Portable chop saw (1)
6. Portable tile saw (10 in.) (1)
7. Precast aluminum molds (12)
8. Pressure washer (3,000 psi) (1)
9. Frame scaffold with safety and leveling accessories (14 sets)
10. Veneer scaffolding (14 sets)
11. Pallet jack (1)
12. exhaust system (1)

NON-CAPITALIZED ITEMS

1. Boltcutter (14 in.) (20)
2. Brickset (16)
3. Brush, masonry (20)
4. Chalkline (20)
5. Chisels, stone sets (5)
6. Dolly, brick/block (2)
7. Eye protection and sterilization chest (with 20 pairs of safety glasses) (1)
8. Grinder, pedestal (6 in.) (1)
9. Hammer, brick (20)
10. Hammer, carpenter (20)
11. Hammer, mashing (5)
12. Hammer, stone mason's (5)
13. Hoe, mortar (5)
14. Hose, air (50 ft) (2)
15. Jointer, sled runner (V-type) (20)
16. Jointer, sled runner (concave) (20)
17. Jointer, rake (20)
18. Jointer, concave (S-type) (20)
19. Level, masonry (48 in.) (20)
20. Level, masonry (24 in.) (20)
21. Line, braided mason's (250 ft) (20)
22. Mortar stands (20)
23. Mortar boards (20)
24. Pointing trowel (20)
25. Rule, brick mason's oversized brick spacing (20)
26. Rule, folding (6 ft modular) (20)
27. Rule, folding (6 ft spacing) (20)
28. Safety kit (OSHA approved) (2)
29. Shovel, round point (12)
30. Shovel, square point (12)
31. Square, framing with rafter chart (20)
32. Tape, steel (100 ft) (1)
33. Tape, steel (50 ft) (1)
34. Tong, brick (20)
35. Tool, brick bander (1)

- 36. Toolbox/bag (16)
- 37. Tool, pneumatic (2-in. drive with sockets) (1)
- 38. Trowel, tuck pointer (20)
- 39. Trowel, bricklaying (20)
- 40. Wheelbarrow, 6 cu. ft. (10)
- 41. Wheelbarrow, brick (4)
- 42. Portable drill set (1)
- 43. Portable impact driver (1)
- 44. Level tripod and rod (1)
- 45. Laser level and tripod (1)

RECOMMENDED INSTRUCTIONAL AIDS

- 1. DVD player and data projector
- 2. Computer with internet connection
- 3. Printer
- 4. Digital camera with movie capability

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:
 - Adding new student learning outcomes to complement the existing competencies and suggested objectives in the program framework
 - Revising or extending the student learning outcomes
 - 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)

COURSE CROSSWALK

Course Crosswalk Masonry CIP 46.0101 – Brick, Block, and Stone Masonry					
<i>Note: Courses that have been added or changed in the 2017 curriculum are highlighted.</i>					
Existing			Revised		
2010 MS Curriculum Framework			2017 MS Curriculum Framework		
Course Number	Course Title	Hours	Course Number	Course Title	Hours
BBV 1115	Brick and Block Laying	5	BBT 1115	Brick and Block Laying	5
			BBT 1123	Forming Applications	3
BBV 1215	Masonry Construction	5	BBT 1215	Masonry Construction	5
BBV 1223	Masonry Math, Estimating, and Blueprint Reading	3	BBT 1223	Masonry Math, Estimating, and Blueprint Reading	3
BBV 1313	Tools, Equipment, and Safety	3	BBT 1313	Tools, Equipment, and Safety	3
BBV 1425	Advanced Block laying	5	BBT 1425	Advanced Block laying	5
BBV 1525	Advanced Brick laying	5	BBT 1525	Advanced Brick laying	5
BBV 1623	Chimney and Fireplace Construction	3	BBT 1623	Chimney, Fireplace, Refractory Construction	3
BBV 1723	Arch Construction	3	BBT 1723	Arch Construction	3
BBV 1823	Steps, Patios, and Brick Floors	3	BBT 1823	Steps, Patios, and Brick Floors	3
			BBT 2112	Restoration and Repair	2
			BBT 2123	Leadership Preparedness	3
BBV 191	Special Problem in Brick, Block, and Stone Masonry	1-3	BBT 191(1-3)	Special Problem in Brick, Block, and Stone Masonry	1-3
BBV 292	Supervised Work Experience in Brick, Block, and Stone Masonry	1-6	BBT 292(1-6)	Supervised Work Experience in Brick, Block, and Stone Masonry	1-6