2011 Mississippi Curriculum Framework

Postsecondary Brick, Block, and Stone Masonry

(Program CIP: 46.0101 – Mason/Masonry)

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Published by

Office of Career and Technical Education
Mississippi Department of Education
Jackson, MS 39205

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Preface

Brick, Block, and Stone Masonry Research Synopsis

The Brick, Block, and Stone Masonry program is designed to prepare individuals for employment opportunities in masonry. Content of the program includes federal, state, and local codes; and brick and stone laying, math, blueprint reading, and chimney and fireplace construction. There are a variety of occupations in brick, block, and stone masonry, including bricklayers, refractory masons, and stone masons. Education requirements range from on-the-job training to an associate's degree from a postsecondary institution.

Needs of the Future Workforce

Brickmasons, blockmasons, and stonemasons should see as fast as average growth as the construction industry responds to the needs of a growing population in the United States, 16%. Occupation within the masonry field will experience much better than average growth in the state of Mississippi, 26%, highlighting the viability of such a program in Mississippi's community and junior colleges. Job prospects should be better for workers with more thorough training who can work on complex structures.

Brick, Block, and Stone Masonry Employment Projections and Earnings

Region	2010 Jobs	2020 Jobs	Change	% Change	Openings	2010 Median Hourly Earnings
Regional Total	12,241	15,398	3,157	26%	5,231	$9.82
National Total	1,559,726	1,810,790	251,064	16%	528,820	$12.16

Curriculum

The following national standards were referenced in each course of the curriculum:

- CTB/McGraw-Hill LLC *Tests of Adult Basic Education, forms 9 and 10* Academic Standards
- *21st Century Skills*
- *Contren Learning Series Best Practices*

Due to its importance in this curriculum, students are strongly encouraged to attend math tutoring sessions as requested by the instructor.

Industry and instructor comments, along with current research, were considered by the curriculum revision team during the revision process. Changes were made as needed and appropriate. Many of the skills and topics noted in the research were already included in the curriculum framework. Specific changes made to the curriculum at the November 2010 curriculum revision meeting included the following:

- Steps, Arches, and Brick Floors was split into two courses: Steps, Patios, and Brick Floors (BBV 1823); and Arch Construction (BBV 1723).
- Several competencies and objectives were added to Steps, Patios, and Brick Floors (BBV 1823):

- Explain and describe the various types of pavers used in floor, patio, and step construction.
- Explain and apply procedures to lay out and construct a floor section using paving brick with concrete base and mortar beds.
- Explain and apply procedures to lay out and construct a floor section using paving brick with limestone base and sand beds.
- Explain and apply procedures to lay out and construct flagstone walkways.
- Explain and apply procedures to lay out and construct tile floors and/or walls.

Assessment
Students will be assessed using the Brick, Block, and Stone MS-CPAS2 test. The MS-CPAS2 blueprint can be found at http://www.rcu.msstate.edu/. All students will test after year one of their program. A second test covering the second year material will be administered to AAS track students upon completion of their program. If there are questions regarding assessment of this program, please contact the Architecture and Construction Instructional Design Specialist at the Research and Curriculum Unit at 662.325.2510.

No alternate assessments are available at this time.

Professional Learning
It is suggested that instructors participate in professional learning related to the following concepts:

- New topics in curriculum and new standards
- Topics where instructors need help
- How to use the program Blackboard site
- Differentiated instruction – To learn more about differentiated instruction, please go to http://www.paec.org/teacher2teacher/additional_subjects.html, and click on Differentiated Instruction. Work through this online course, and review the additional resources.

Program Exceptions
No program exceptions exist at this time.

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 MS-CPAS2 according to State Board for Community and Junior Colleges (MCCB) guidelines.

Articulated Secondary Course		Articulated Postsecondary Course
[S] Carpentry (CIP: 46.000)	Commercial Residential Maintenance	CRM 1214 – Carpentry
[S] Masonry (CIP: 46.0101		CRM 1313 – Masonry
[S] Electrical (CIP: 46.0302		CRM 1514 – Electrical
[S] Plumbing (CIP: 46.0503)		CRM 1414– Plumbing

[S] Welding (CIP: 48.0508)		CRM 1713 – Welding

Statewide Guidelines on Articulated Credit

Eligibility

- To be eligible for articulated credit, a student must do the following:
  - Complete the articulated Secondary Career Program.
  - Score 80% or higher on the Mississippi Career Planning and Assessment System (MS CPAS) in his or her secondary program of study.
- To be awarded articulated credit, a student must do the following:
  - Complete application for articulated credit at the community or junior college.
  - Enroll in the community or junior college within 18 months of graduation.
  - Successfully complete 12 non-developmental career/technical or academic credit hours in the corresponding articulated postsecondary career-technical program of study.

How MS CPAS will be documented

- The Research and Curriculum Unit of Mississippi State University will provide the SBCJC a list of all secondary CTE students scoring at or above the 80 percentile for the articulated programs.
- The SBCJC will forward the list of students eligible for articulated credit to the colleges.

Transcripting of Articulated Credit

- Students must complete 12 non-developmental career/technical or academic credit hours in the articulated postsecondary career-technical program of study before the articulated credit is transcripted.
- No grade will be given on the transcript for articulated courses; only hours granted will be transcripted (thus resulting in no change in quality points).

Time Limit

- MS CPAS scores will be accepted to demonstrate competencies for up to 18 months after high school graduation.

Cost

- No costs will be assessed on hours earned through articulated credit.

Foreword

As the world economy continues to evolve, businesses and industries must adopt new practices and processes in order to survive. Quality and cost control, work teams and participatory management, and an infusion of technology are transforming the way people work and do business. Employees are now expected to read, write, and communicate effectively; think creatively, solve problems, and make decisions; and interact with each other and the technologies in the workplace. Career–technical programs must also adopt these practices in order to provide graduates who can enter and advance in the changing work world.

The curriculum framework in this document reflects these changes in the workplace and a number of other factors that impact local career–technical programs. Federal and state legislation calls for articulation between high school and community college programs, integration of academic and career skills, and the development of sequential courses of study that provide students with the optimum educational path for achieving successful employment. National skills standards, developed by industry groups and sponsored by the U.S. Department of Education and Labor, provide career and technical educators with the expectations of employers across the United States. All of these factors are reflected in the framework found in this document.

Referenced throughout the courses of the curriculum are the 21st Century Skills, which were developed by the Partnership for 21st Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills learned in school and those needed in communities and the workplace. A portion of the 21st Century Skills addresses learning skills needed in the 21st century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. Another important aspect of learning and working in the 21st century involves technology skills. The International Society for Technology in Education, developer of the National Educational Technology Standards (NETS), was a strategic partner in the Partnership for 21st Century Skills.

Each postsecondary program of instruction consists of a program description and a suggested sequence of courses that focus on the development of occupational competencies. The MS-CPAS2 blueprints are based upon the suggested course sequences to allow for year 1 and year 2 assessments for all exit options. Please refer to the blueprint online. Each career–technical course in this sequence has been written using a common format, which includes the following components:

- Course Name – A common name that will be used by all community and junior 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–technical core – A required career–technical course for all students
    - Area of concentration (AOC) core – A course required in an area of concentration of a cluster of programs
    - Career–technical elective – An elective career–technical course
    - Related academic course – An academic course that provides academic skills and knowledge directly related to the program area

  - Academic core – An academic course that is required as part of the requirements for an associate's degree

- Description – A short narrative that includes the major purpose(s) of the course and the recommended number of hours of lecture and laboratory activities to be conducted each week during a regular semester

- 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

- Competencies and Suggested Objectives – A listing of the competencies (major concepts and performances) and the suggested student objectives 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 district. 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 a minimum 15-semester-credit-hour academic core. Specific courses to be taken within this core are to be determined by the local district. Minimum academic core courses are as follows:
  - 3 semester credit hours (sch) Math/Science Elective
  - 3 semester credit hours Written Communications Elective
  - 3 semester credit hours Oral Communications Elective
  - 3 semester credit hours Humanities/Fine Arts Elective

- 3 semester credit hours Social/Behavioral Science Elective

It is recommended that courses in the academic core be spaced out over the entire length of the program, so that students complete some academic and career–technical courses each semester. Each community or junior college has the discretion to select the actual courses that are required to meet this academic core requirement.

- Career–technical elective courses have been included to allow community colleges and students to customize programs to meet the needs of industries and employers in their area.

In order to provide flexibility within the districts, individual courses within a framework may be customized by doing the following:

- Adding new competencies and suggested objectives
- Revising or extending the suggested objectives for individual competencies
- 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)

In addition, the curriculum framework as a whole may be customized by doing the following:

- Resequencing courses within the suggested course sequence reflecting the new assessment format
- Developing and adding a new course that meets specific needs of industries and other clients in the community or junior college district (with MCCB approval)
- Utilizing the career technical elective options in many of the curricula to customize programs

Table of Contents

Program Description

Brick, Block, and Stone Masonry is an 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 *Best Practices for Contren Learning Series*, National Center for Construction Education and Research.

Suggested Course Sequence*
Brick, Block and Stone Masonry
Career Certificate

5 sch	Brick and Block Laying (BBV 1115)	5 sch	Advanced Block Laying (BBV 1425)
5 sch	Masonry Construction (BBV 1215)	5 sch	Advanced Bricklaying (BBV 1525)
3 sch	Masonry Math, Estimating, and Blueprint Reading (BBV 1223)	6 sch	Career–Technical Electives ***
3 sch	Tools, Equipment, and Safety (BBV 1313)		
16 sch		16 sch	

* Students who lack entry-level skills in math, English, science, and so forth will be provided related studies.

CAREER–TECHNICAL ELECTIVES ***

Chimney and Fireplace Construction (BBV 1623)
Arch Construction (BBV 1723)
Steps, Patios, and Brick Floors (BBV 1823)
Special Problem in Brick, Block, and Stone Masonry [BBV 191(1-3)]
Supervised Work Experience in Brick, Block, and Stone Masonry [BBV 192(1-6)]
Work-Based Learning I, II, III, IV, V and VI [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)]

Other electives approved by instructor

Suggested Course Sequence*
Brick, Block and Stone Masonry
Technical Certificate

FIRST YEAR

3 sch	Tools, Equipment, and Safety (BBV 1313)	5 sch	Advanced Bricklaying (BBV 1525)
5 sch	Brick and Block Laying (BBV 1115)	5 sch	Advanced Block Laying (BBV 1425)
5 sch	Masonry Construction (BBV 1215)	3 sch	Masonry Math, Estimating, and Blueprint Reading (BBV 1223)
3 sch	Blueprint Reading (CAV 1133)	3 sch	Career–Technical Electives †
16 sch		16 sch	

SECOND YEAR

3 sch	Chimney and Fireplace Construction (BBV 1623)	6 sch	Foundations (CAV 1116)
3 sch	Arch Construction (BBV 1723)	3 sch	Steps, Patios, and Brick Floors (BBV 1823)
3 sch	Construction Materials (DDT 1213)	3 sch	Cost Estimating (DDT 2243)
4 sch	Fundamentals of Drafting (DDT 1114)	4 sch	Career–Technical Electives †
3 sch	Career-Technical Elective†	16 sch	
16 sch			

* Students who lack entry-level skills in math, English, science, and so forth will be provided related studies.

† CAREER–TECHNICAL ELECTIVES

3 sch	Construction Materials (DDT 1213)
3 sch	Elementary Surveying (DDT 1413)
3 sch	Welding (CRM 1713)
4 sch	Plumbing (CRM 1414)
4 sch	Electrical (CRM 1514)
4 sch	Carpentry (CRM 1214)
5 sch	Heating, Ventilating, and Air Conditioning (HVAC) (CRM 1615)
3 sch	Fundamentals of Microcomputer Applications (CPT 1113) (or any other suitable computer science course approved by the instructor)
3 sch	Forming Applications (CAV 1123)
3 sch	Electronic Spreadsheet (BOT 1813)
3 sch	Records Management (BOT 1413)
3 sch	Business Accounting (BOT 1433)

	OR Principles of Accounting I (ACC 1213)
3 sch	Keyboard Skillbuilding (BOT 1123)
1-3 sch	Special Problem in Brick, Block, and Stone Masonry [BBV 191(1-3)]
1-6 sch	Supervised Work Experience in Brick, Block, and Stone Masonry [BBV 192(1-6)]
1-3 sch	Work Based Learning VI [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)]

Other electives approved by instructor

Suggested Course Sequence*
Brick, Block and Stone Masonry
Associate of Applied Science Degree

FIRST YEAR

3 sch	Tools, Equipment, and Safety (BBV 1313)	3 sch	Masonry Math, Estimating, and Blueprint Reading (BBV 1223)
5 sch	Brick and Block Laying (BBV 1115)	5 sch	Advanced Bricklaying (BBV 1525)
5 sch	Masonry Construction (BBV 1215)	5 sch	Advanced Block Laying (BBV 1425)
3 sch	Blueprint Reading (CAV 1133)	3 sch	Oral Communications Elective
		3 sch	Career–Technical Electives †
16 sch		19 sch	

SECOND YEAR

3 sch	Written Communications Elective	3 sch	Social/Behavioral Science Elective
3 sch	Humanities/Fine Arts Elective	4 sch	Fundamentals of Drafting (DDT 1114)
3 sch	Chimney and Fireplace Construction (BBV 1623)	3 sch	Steps, Patios, and Brick Floors (BBV 1823)
3 sch	Arch Construction (BBV 1723)	3 sch	Career–Technical Electives †
6 sch	Foundations (CAV 1116)	3 sch	Math/Science Elective
18 sch		16 sch	

* Students who lack entry-level skills in math, English, science, and so forth will be provided related studies.

† CAREER–TECHNICAL ELECTIVES

3 sch	Construction Materials (DDT 1213)
3 sch	Elementary Surveying (DDT 1413)
3 sch	Cost Estimating (DDT 2243)
3 sch	Blueprint Reading (CAV 1133)
3 sch	Welding (CRM 1713)
4 sch	Plumbing (CRM 1414)
4 sch	Electrical (CRM 1514)
4 sch	Carpentry (CRM 1214)
5 sch	Heating, Ventilating, and Air Conditioning (HVAC) (CRM 1615)
3 sch	Fundamentals of Microcomputer Applications (CPT 1113) (or any other suitable computer science course approved by the instructor)

3 sch Forming Applications (CAV 1123)
3 sch Electronic Spreadsheet (BOT 1813)
3 sch Records Management (BOT 1413)
3 sch Business Accounting (BOT 1433)
OR Principles of Accounting I (ACC 1213)
3 sch Keyboard Skillbuilding (BOT 1123)
1-3 sch Special Problem in Brick, Block, and Stone Masonry [BBV 191(1-3)]
1-6 sch Supervised Work Experience in Brick, Block, and Stone Masonry [BBV 192(1-6)]
1-3 sch Work Based Learning VI [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)]

Other electives approved by instructor

Brick, Block, and Stone Masonry Courses

Course Name: Brick and Block Laying

Course Abbreviation: BBV 1115

Classification: Career–Technical Core

Description: This course is designed to give the student experience in laying brick and block. (5 sch: 1-hr lecture, 8-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Describe and apply safety procedures for layout and construction of a brick/block wall. (DOK1, C1, C2)
2. Explore the history of masonry to include materials and techniques. (DOK1, C1)
3. Explain and perform procedures for layout and construction of a brick/block wall. (DOK1, C4, C15, C16) a. Describe and apply procedures to establish, build, and erect corner leads. (DOK1) b. Discuss and perform procedures to establish, build, and erect vertical masonry guides. (DOK1) c. Explain and utilize procedures to set line from corner leads. (DOK1) d. Set a trig correctly. (DOK1) e. Explain and apply procedures to lay brick/block to line. (DOK1) f. Describe and demonstrate procedures to set closures in masonry course. (DOK1) g. Describe and perform procedures to strike mortar joints, both head and bed. (DOK1) h. Specify and practice procedures to perform tuck pointing. (DOK1) i. Outline and relate the cleaning processes for brick/block masonry. (DOK1)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)
M6 Fractions (addition, subtraction, multiplication, division)

M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations
A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

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Course Name: Masonry Construction

Course Abbreviation: BBV 1215

Classification: Career–Technical Core

Description: This course is designed to give the student experience in various types of walls, finishing, and masonry construction techniques. (5 sch: 1-hr lecture, 8-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Explain safety process for masonry construction.((DOK1, C1)
2. Identify brick, block, and stone materials and their applications. (DOK1, C4, C5, C7) a. Name the different types of brick, block, and stone. (DOK1) b. Label parts of a brick, block, and stone. (DOK1) c. Identify the bond positions as they appear in a wall. (DOK1) d. Describe types of stone and their applications. (DOK1) e. Mix mortar to specifications (hand and machine). (DOK1)
3. Plan and construct a concrete foundation. (DOK2, C5, C7) a. Estimate the materials needed for a concrete foundation. (DOK1) b. Prepare footing and construct forms needed for a concrete foundation. (DOK2) c. Install concrete reinforcement. (DOK2) d. Install vapor barrier. (DOK2) e. Pour concrete mixture into foundation forms. (DOK2) f. Finish concrete according to industry specifications. (DOK2)
4. Lay out a brick wall and/or a block wall to specifications. (DOK2, C1, C5, C7) a. Set up the safe and efficient work area. (DOK2) b. Establish the building line. (DOK2) c. Dry bond the first course. (DOK2) d. Mark the bond. (DOK2) e. Lay a brick wall in mortar according to instructor's specifications. (DOK2)
5. Plan and construct a reinforced wall. (DOK2, C5, C7, C8, C9, C15, C16, C19) a. Distinguish between load bearing and non-load bearing walls. (DOK2) b. Select materials for a reinforced wall. (DOK1) c. Construct a reinforced masonry wall to industry specifications. (DOK2) d. Select and install flashing to specifications. (DOK2) e. Install a weep hole and describe its function. (DOK2) f. Install an expansion joint and describe its function. (DOK2)
6. Plan and construct a stone masonry wall. (DOK2, C5, C7, C8, C9, C15, C16, C19) a. Identify bond patterns. (DOK1) b. Identify finishes. (DOK1) c. Prepare mortar for stone masonry. (DOK2) d. Identify tools and procedures used in stone cutting and chipping. (DOK1) e. Perform procedures necessary for installation of stone veneer. (DOK2) f. Perform procedures for laying a stone walk. (DOK2)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)
M6 Fractions (addition, subtraction, multiplication, division)
M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations
A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

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Course Name: Masonry Math, Estimating, and Blueprint Reading

Course Abbreviation: BBV 1223

Classification: Career–Technical Core

Description: This course is designed to give the student experience in calculations, estimating, and blueprint reading. (3 sch: 2-hr lecture, 2-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Demonstrate addition, subtraction, division, and multiplication with whole numbers, fractions, and decimal for the masonry trade. (DOK1, C3) a. Perform addition, subtraction, division, and multiplication with whole numbers, fractions, and decimals for masonry trade. (DOK1) b. Read a standard carpenter's rule to accuracy of 1/16 in. (DOK1) c. Read a brick mason's modular, standard spacing, and oversized spacing rule. (DOK1)
2. Describe the symbols and abbreviations used on blueprints for masonry. (DOK1, C3, C6, C17) a. Read a floor plan. (DOK1) b. Read a foundation plan. (DOK1) c. Determine window and door schedules. (DOK1) d. Read detail, cross-section, and elevation of a blueprint. (DOK1) e. Calculate size according to scale from blueprints. (DOK2)
3. Estimate materials for a masonry job using manual procedures and/or computer equipment with software. (DOK2, C3, C6, C17, C19) a. Estimate masonry materials using the square foot method for brick and block according to instructor's specifications. (DOK2) b. Use the mason's rule of thumb in estimating masonry materials for a specific job. (DOK1) c. Estimate blocks, bricks, mortar, and sand for a specific job. (DOK2) d. Estimate miscellaneous materials for a masonry construction project. (DOK2)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)

M6 Fractions (addition, subtraction, multiplication, division)
M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations
A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

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Course Name: Tools, Equipment, and Safety

Course Abbreviation: BBV 1313

Classification: Career–Technical Core

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.
(3 sch: 2-hr lecture, 2-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Identify and use masonry tools and equipment. (DOK1, C2) a. Match terms associated with hand tools to their correct definitions. (DOK1) b. Identify and describe the correct way to hold a brick trowel. (DOK1) c. Measure, mark, and cut brick and block to specifications. (DOK1) d. List basic rules concerning care of the level. (DOK1) e. Use a framing square to lay out a wall corner to specifications. (DOK1) f. Describe the measuring instruments and guides used to lay out masonry work. (DOK1) g. Demonstrate the use of a laser and/or level. (DOK1)
2. Explain safe work practices for the masonry shop and job site. (DOK1, C2, C12) a. Describe practices associated with chemicals and other hazardous materials according to OSHA and EPA regulations (MSDS). (DOK1) b. Demonstrate safe use of masonry hand tools, power tools, machines, and equipment. (DOK1) c. Describe personal safety clothing and equipment used in masonry trades. (DOK1) d. Demonstrate procedures for safely handling of heavy objects. (DOK1) e. Describe state eye-safety law, including appropriate times for wearing safety glasses. (DOK1) f. Identify causes of electrical hazards. (DOK1)
3. Demonstrate the ability to care for the tools and equipment. (DOK1, C2) a. Describe the accepted methods to care for tools and equipment. (DOK1) b. Clean tools and equipment after use. (DOK1) c. Store tools and equipment in accepted manner. (DOK1)
4. Explain student organizations and how they relate to and support the instructional program. (DOK1, C2) a. Describe the activity programs of career student organizations and how they relate to and support the instructional program. (DOK1)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)
M6 Fractions (addition, subtraction, multiplication, division)
M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations
A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

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Course Name: Advanced Block Laying

Course Abbreviation: BBV 1425

Classification: Career–Technical Core

Description: This course is designed to give the student experience in laying block columns, piers, and various walls. (5 sch: 1-hr lecture, 8-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Demonstrate proper safety procedures for layout and construction of block columns, piers, and various walls. (DOK1, C2)
2. Explain and perform procedures for layout and construction of block columns, piers, and various walls using different widths of block. (DOK2, C4, C9, C10, C11) a. Describe and perform procedures to layout and construct block columns to specifications. (DOK2) b. Explain and apply procedures to lay a hollow block pier to specifications. (DOK2) c. Discuss and practice procedures to construct a block wall with pilasters to specifications. (DOK2) d. Outline and use procedures to construct a block chase wall to specifications. (DOK2) e. Describe and complete procedures to construct a block cavity wall to specifications. (DOK2) f. Describe and demonstrate procedures to install reinforcing wire, rebar, embed plates, and wall ties. (DOK2) g. Set, brace, plumb, and course off a hollow metal door/window frame. (DOK2)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)
M6 Fractions (addition, subtraction, multiplication, division)
M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations

A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

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Course Name: Advanced Bricklaying

Course Abbreviation: BBV 1525

Classification: Career–Technical Core

Description: This course is designed to give the student advanced experience in brick columns, piers, and various walls. (5 sch: 1-hr lecture, 8-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Demonstrate safety procedures for layout and construction of brick columns, piers, and various walls. (DOK1, C1, C2)
2. Explain and perform procedures for layout and construction of brick columns, piers, and various walls using different sizes of brick. (DOK2, C2, C3, C4, C9, C10, C11) a. Describe and apply procedures to lay out and construct brick columns to specifications. (DOK2) b. Explain and perform procedures to lay a hollow brick pier to specifications. (DOK2) c. Discuss and demonstrate procedures to construct a brick wall with pilasters to specifications. (DOK2) d. Describe and practice procedures to construct a chase wall to specifications. (DOK2) e. Outline and utilize procedures to construct a cavity wall to specifications. (DOK2) f. Lay out advanced masonry such as soldiers, rowlocks, corbelling, and headers. (DOK2)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)
M6 Fractions (addition, subtraction, multiplication, division)
M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations
A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)

A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

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Course Name: Chimney and Fireplace Construction

Course Abbreviation: BBV 1623

Classification: Career–Technical Elective

Description: The student will gain advanced experiences in layout and construction of chimneys, fireplaces, and refractory masonry. (3 sch: 1-hr lecture, 4-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Utilize safety procedures to lay out and construct fireplaces and chimneys.(DOK1, C2)
2. Describe and apply procedures to lay out and construct fireplaces and chimneys. (DOK2, C7) a. Describe and perform procedures to construct fireplaces with mantel and hearth to specifications. (DOK2) b. Explain and apply procedures to construct chimneys to specifications. (DOK2) c. Discuss and use procedures to construct a heater flue to specifications. (DOK2)
3. Describe procedures for refractory masonry. (DOK2, C7) a. Lay out and construct a wall of refractory masonry. (DOK2) b. Prepare refractory mortar. (DOK2) c. Demonstrate procedures for layout and using refractory materials. (DOK2)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)
M6 Fractions (addition, subtraction, multiplication, division)
M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations
A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)

A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

SUGGESTED REFERENCES

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Videos

Earth Communications. (2004). *Safety on the job part 1: Standards of personal protection and health care* [Videotape]. (Available from Earth Communications, 2370 Proffit Rd., Charlottesville, VA 22911)

Course Name: Arch Construction

Course Abbreviation: BBV 1723

Classification: Career–Technical Core

Description: Students will gain advanced experiences in layout and construction of arches. (3 sch: 1-hr lecture, 4-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Specify and practice safety procedures to lay out and construct brick and stone arches. (DOK1, C2)
2. Describe and explain the history and development of arches. (DOK1, C1)
3. Describe the different types of arches. (DOK1, C10, C13)
4. Explain the techniques utilized in developing arches to include cutting and shaping of various masonry units. (DOK1, C10, C13)
5. Explain and apply procedures to lay out and construct brick and stone arches. (DOK2, C10, C13) a. Describe and complete procedures to lay out and construct arches to specifications. (DOK2)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)
M6 Fractions (addition, subtraction, multiplication, division)
M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations
A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)

A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
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S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
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Videos

Earth Communications. (2004). *Safety on the job part 1: Standards of personal protection and health care* [Videotape]. (Available from Earth Communications, 2370 Proffit Rd., Charlottesville, VA 22911)

Course Name: Steps, Patios, and Brick Floors

Course Abbreviation: BBV 1823

Classification: Career–Technical Core

Description: Students will gain advanced experiences in layout and construction of steps, patios, and brick floors. (3 sch: 1-hr lecture, 4-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
1. Specify and practice safety procedures to lay out and construct brick floors, patios, and steps.(DOK1, C2)
2. Explain and describe the various types of pavers used in floor, patio, and step construction. (DOK1, C7, C10, C13)
3. Explain and apply procedures to lay out and construct brick floors, patios, and steps. (DOK2, C7, C10, C13) b. Explain and apply procedures to lay out and construct a floor section using paving brick with concrete base and mortar beds. (DOK2) c. Explain and apply procedures to lay out and construct a floor section using paving brick with limestone base and sand beds. (DOK2) d. Describe and use various bond patterns used in constructing brick floors. (DOK2)
4. Explain and apply procedures to lay out and construct flagstone walkways. (DOK1, C7, C10, C13)
5. Explain and apply procedures to lay out and construct tile floors and/or walls. (DOK1, C7, C10, C13)

STANDARDS

Related Academic Standards

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)
M1 Addition of Whole Numbers (no regrouping, regrouping)
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M9 Algebraic Operations
A1 Numeration (ordering, place value, scientific notation)

A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)
L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)
S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy
CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

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Masonry Construction. Hanley-Wood, LLC. Retrieved June 15, 2006, from http://www.masonryconstruction.com/

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Technical Notes on Brick Construction. The Brick Industry Association. Retrieved June 15, 2006, from http://www.gobrick.com/html/frmset_thnt.htm

Videos

Earth Communications. (2004). *Safety on the job part 1: Standards of personal protection and health care* [Videotape]. (Available from Earth Communications, 2370 Proffit Rd., Charlottesville, VA 22911)

Course Name: Special Problem in Brick, Block, and Stone Masonry

Course Abbreviation: BBV 191(1-3)

Classification: Career–Technical Elective

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.
(1-3 sch: 2-6-hr lab)

Prerequisite: None

Competencies and Suggested Objectives
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.

STANDARDS

Specific standards for this course will depend upon the nature of the problem under investigation.

SUGGESTED REFERENCES

Specific references for this course will depend upon the nature of the problem under investigation.

Course Name: Supervised Work Experience in Brick, Block, and Stone Masonry

Course Abbreviation: BBV 292(1-6)

Classification: Career–Technical Elective

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.
(1-6 sch: 3-18-hr externship)

Prerequisite: Consent of instructor

Competencies and Suggested Objectives
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 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.

STANDARDS

Specific standards for this course will depend upon the nature of the problem under investigation.

SUGGESTED REFERENCES

Specific references for this course will depend upon the nature of the problem under investigation.

Course Name: Work-Based Learning I, II, III, IV, V, and VI

Course Abbreviation: 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)

Classification: Free Elective

Description: A structured work-site learning experience in which the student, program area teacher, work-based learning coordinator, and worksite supervisor/mentor develop and implement an educational training agreement. This course is designed to integrate the student's academic and technical skills into a work environment, and may include regular meetings and seminars with school personnel and employers for supplemental instruction and progress reviews.
(1-3 sch: 3-9-hr externship)

Prerequisite: Concurrent enrollment in career–technical program area courses

Competencies and Suggested Objectives
1. Apply technical skills and related academic knowledge needed to be a viable member of the workforce. a. Demonstrate technical skills necessary to complete job requirements. b. Demonstrate academic skills necessary to complete job requirements. c. Perform tasks detailed in an educational training agreement at the work setting.
2. Apply general workplace skills to include positive work habits necessary for successful employment. a. Demonstrate appropriate human relationship skills in the work setting to include conflict resolution, team participation, leadership, negotiation, and customer/client service. b. Utilize time, materials, and resource management skills. c. Use critical thinking skills such as problem solving, decision making, and reasoning. d. Acquire, evaluate, organize, maintain, interpret, and communicate information.

STANDARDS

Specific standards for this course will depend upon the nature of the problem under investigation.

SUGGESTED REFERENCES

Specific references for this course will depend upon the nature of the problem under investigation.

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)

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)

RECOMMENDED INSTRUCTIONAL AIDS

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

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

Assessment

Blueprint

This program is assessed using the MS-CPAS. The following blueprint summary contains the competencies that are measured when assessing this program. Competencies are grouped into *clusters* and a weight is given to each cluster to determine the number of items needed from each cluster. The numbers of C1s and C2s (item difficulty levels) are also indicated on the blueprint.

Please visit http://info.rcu.msstate.edu/services/curriculum.asp to download the blueprint that accompanies this curriculum.

Appendix A: Contren Best Practices for Brick, Block, and Stone Masonry Program[1]

LEVEL ONE

C1 Introduction to Masonry

ITM1 Discuss the history of masonry.
ITM2 Describe modern masonry materials and methods.
ITM3 Explain career ladders and advancement possibilities in masonry work.
ITM4 Describe the skills, attitudes, and abilities needed to work as a mason.
ITM5 State the safety precautions that must be practiced at a work site, including the following:
- Safety practices
- Fall-protection procedures
- Forklift-safety operations

ITM6 Perform the following basic bricklaying procedures:
- Mixing of mortar
- Laying a mortar bed
- Laying bricks

ITM7 Put on eye protection, respiratory protection, and a safety harness.
ITM8 Use the correct procedures for fueling and starting a gasoline-powered tool.

C2 Safety Requirements

SAR1 Identify and name the tools used in performing masonry work.
SAR2 Identify and name the equipment used in performing masonry work.
SAR3 Describe how each tool is used.
SAR4 Describe how the equipment is used.
SAR5 Associate trade terms with the appropriate tools and equipment.
SAR6 Demonstrate the correct procedures for assembling and disassembling scaffolding according to federal safety regulations, under the supervision of a competent person.

C3 Measurements, Drawings, and Specifications

MDS1 Work with denominate numbers.
MDS2 Read a mason's measure.
MDS3 Convert measurements in the U.S. Customary (English) system into their metric equivalents.
MDS4 Recognize, identify, and calculate areas, circumferences, and volumes of basic geometric shapes.
MDS5 Identify the basic parts of a set of drawings.
MDS6 Discuss the different types of specifications used in the building industry and the sections that pertain to masonry.

[1] *Contren learning series.* Retrieved March 1, 2006, from http://.nccer.org/

C4 Mortar

MOR1 Name and describe the primary ingredients in mortar and their properties.
MOR2 Identify the various types of mortar used in masonry work.
MOR3 Describe the common admixtures and their uses.
MOR4 Identify the common problems found in mortar application and their solutions.
MOR5 Properly set up the mortar mixing area.
MOR6 Properly mix mortar by hand.
MOR7 Properly mix mortar with a mechanical mixer.

C5 Masonry Units and Installation Techniques

MIT1 Describe the most common types of masonry units.
MIT2 Describe and demonstrate how to set up a wall.
MIT3 Lay a dry bond.
MIT4 Spread and furrow a bed joint, and butter masonry units.
MIT5 Describe the different types of masonry bonds.
MIT6 Cut brick and block accurately.
MIT7 Lay masonry units in a true course.

LEVEL TWO

C6 Residential Plans and Drawing Interpretation

RPD1 Understand the organization of residential plans and drawings.
RPD2 Interpret dimensions and scales on drawings.
RPD3 Interpret information on residential plans.
RPD4 Estimate materials quantities from plans and drawings.

C7 Residential Masonry

REM1 Understand the requirements for construction of various types of residential foundations.
REM2 Identify and explain the characteristics, uses, and installation techniques for brick pavers.
REM3 Lay out and construct steps, patios, and decks made from masonry units.
REM4 Lay out and construct chimneys and fireplaces.

C8 Grout and Other Reinforcement

GOR1 Name and describe the primary ingredients in grout and their properties.
GOR2 Identify the different types of grout used in masonry work.
GOR3 Describe the common admixtures and their uses.
GOR4 Describe the use of steel bar reinforcement in masonry construction.
GOR5 Use the proper techniques to apply grout in low and high lifts.

C9 Metal Work in Masonry

MWM1 Describe the uses and installation of vertical reinforcement.
MWM2 Describe the uses and installation of different types of horizontal joint reinforcements and ties.
MWM3 Describe the uses and installation of different anchors, fasteners, and embedded items.
MWM4 Describe the installation of hollow metal frames.
MWM5 Describe the functions and installations of sills and lintels.

C10 Advanced Laying Techniques

ALT1 Recognize the structural principles and fundamental uses of basic types of walls.
ALT2 Recognize the requirement for, and function of, control joints and expansion joints.
ALT3 Construct various types of walls using proper reinforcement, jointing, and bonding techniques.
ALT4 Construct specialty structures such as manholes, segmented block walls, and screens.
ALT5 Identify and explain the different types of masonry arches used today.
ALT6 Construct a semicircular and jack arch.

C11 Construction Techniques and Moisture Control

CTM1 Explain and demonstrate techniques for constructing masonry around windows, doors, and other openings.
CTM2 Explain the requirements for wall bracing and demonstrate the techniques used to construct pilasters and other types of bracing.
CTM3 Identify the various types of insulation used in conjunction with masonry construction and explain installation techniques.
CTM4 Identify the need for moisture control in various types of masonry construction and demonstrate the techniques used to eliminate moisture problems.

C12 Elevated Work

ELW1 Describe the appropriate steps necessary for setting up and maintaining elevated workstations.
ELW2 Properly operate material handling and hoisting equipment.
ELW3 Describe the safety requirements and guidelines employed in elevated and high-rise construction.
ELW4 Describe basic activities that can be used on the job to prevent elevated workstation accidents.
ELW5 Understand scaffolding positioning and how it affects laying technique.

C13 Construction Inspection and Quality Control

CIQ1 Discuss industry standards for quality control.
CIQ2 Build masonry sample panels and prisms.

CIQ3 Perform field tests on mortar.
CIQ4 Discuss and perform field inspections.

LEVEL THREE

C14 Masonry in High-Rise Construction

1. Recognize and explain the use of high-rise construction equipment.
2. Understand and apply block and brick construction techniques typically employed in high-rise construction.
3. Understand and apply safety guidelines employed in high-rise construction.
4. Safely work with materials handling equipment in high-rise construction.

C15 Specialized Materials and Techniques

SMT1 Explain the various techniques used to provide adequate protection during hot- or cold-weather masonry construction.
SMT2 Apply a working knowledge of all-weather construction techniques.
SMT3 Apply construction techniques for surface bonding mortar.
SMT4 Understand and apply techniques for construction of stone walls and other stone building surfaces.
SMT5 Understand and apply basic knowledge of various materials such as glass block, acid brick, and refractory brick.

C16 Repair and Restoration

RAR1 Recognize signs of deterioration in masonry structures.
RAR2 Describe the causes of efflorescence, cracking, and faulty mortar joints.
RAR3 Describe the procedures for preventing and correcting efflorescence, cracking, and faulty mortar joints.
RAR4 Describe the procedures for preventing and correcting water damage in basements.
RAR5 Describe the procedures for rebuilding fireplaces.
RAR6 Recognize types of paint failures.
RAR7 Describe the types of paint available for use on masonry.

C17 Commercial Drawings

CDR1 Recognize the difference between commercial and residential construction drawings.
CDR2 Identify the basic keys, abbreviations, and other references contained in a set of commercial drawings.
CDR3 Accurately read a set of commercial drawings.
CDR4 Explain basic construction details and concepts employed in commercial construction.

C18 Estimating

EST1 Understand and apply basic materials estimating procedures for concrete block construction and brick construction.
EST2 Understand and apply basic estimating procedures for reinforcements, ties, and other materials.
EST3 Understand and apply procedures for quantities of mortar and mortar materials.

C19 Project Planning and Supervision

PPS1 Describe the general duties and responsibilities of masonry foremen and supervisors.
PPS2 Describe the basic activities required to organize project resources.
PPS3 Operate and effectively use basic surveying equipment to lay out foundations, walls, and other structural components.
PPS4 Understand and apply inspection procedures normally used on a project.

Appendix B: Related Academic Standards[2]

Reading

R1 Interpret Graphic Information (forms, maps, reference sources)
R2 Words in Context (same and opposite meaning)
R3 Recall Information (details, sequence)
R4 Construct Meaning (main idea, summary/paraphrase, compare–contrast, cause–effect)
R5 Evaluate/Extend Meaning (fact/opinion, predict outcomes, point of view)

Mathematics Computation

M1 Addition of Whole Numbers (no regrouping, regrouping)
M2 Subtraction of Whole Numbers (no regrouping, regrouping)
M3 Multiplication of Whole Numbers (no regrouping, regrouping)
M4 Division of Whole Numbers (no remainder, remainder)
M5 Decimals (addition, subtraction, multiplication, division)
M6 Fractions (addition, subtraction, multiplication, division)
M7 Integers (addition, subtraction, multiplication, division)
M8 Percents
M9 Algebraic Operations

Applied Mathematics

A1 Numeration (ordering, place value, scientific notation)
A2 Number Theory (ratio, proportion)
A3 Data Interpretation (graph, table, chart, diagram)
A4 Pre-Algebra and Algebra (equations, inequality)
A5 Measurement (money, time, temperature, length, area, volume)
A6 Geometry (angles, Pythagorean theory)
A7 Computation in Context (whole numbers, decimals, fractions, algebraic operations)
A8 Estimation (rounding, estimation)

Language

L1 Usage (pronoun, tense, subject–verb agreement, adjective, adverb)
L2 Sentence Formation (fragments, run-on, clarity)
L3 Paragraph Development (topic sentence, supporting sentence, sequence)
L4 Capitalization (proper noun, titles)
L5 Punctuation (comma, semicolon)
L6 Writing Conventions (quotation marks, apostrophe, parts of a letter)

Spelling

S1 Vowel (short, long)
S2 Consonant (variant spelling, silent letter)
S3 Structural Unit (root, suffix)

[2] CTB/McGraw-Hill LLC. (2005). *Tests of adult basic education, forms 7 and 8.* Monterey, CA: Author.

Appendix C: 21st Century Skills[3]

CSS1-21st Century Themes

CS1 Global Awareness

1. Using 21st century skills to understand and address global issues
2. Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue in personal, work and community contexts
3. Understanding other nations and cultures, including the use of non-English languages

CS2 Financial, Economic, Business and Entrepreneurial Literacy

1. Knowing how to make appropriate personal economic choices
2. Understanding the role of the economy in society
3. Using entrepreneurial skills to enhance workplace productivity and career options

CS3 Civic Literacy

1. Participating effectively in civic life through knowing how to stay informed and understanding governmental processes
2. Exercising the rights and obligations of citizenship at local, state, national and global levels
3. Understanding the local and global implications of civic decisions

CS4 Health Literacy

1. Obtaining, interpreting and understanding basic health information and services and using such information and services in ways that enhance health
2. Understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance and stress reduction
3. Using available information to make appropriate health-related decisions
4. Establishing and monitoring personal and family health goals
5. Understanding national and international public health and safety issues

CS5 Environmental Literacy

1. Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water and ecosystems
2. Demonstrate knowledge and understanding of society's impact on the natural world (e.g., population growth, population development, resource consumption rate, etc.)
3. Investigate and analyze environmental issues, and make accurate conclusions about effective solutions
4. Take individual and collective action towards addressing environmental challenges (e.g., participating in global actions, designing solutions that inspire action on environmental issues)

[3] *21st century skills.* (n.d.). Washington, DC: Partnership for 21st Century Skills.

CSS2-Learning and Innovation Skills

- **CS6 Creativity and Innovation**
  1. Think Creatively
  2. Work Creatively with Others
  3. Implement Innovations
- **CS7 Critical Thinking and Problem Solving**
  1. Reason Effectively
  2. Use Systems Thinking
  3. Make Judgments and Decisions
  4. Solve Problems
- **CS8 Communication and Collaboration**
  1. Communicate Clearly
  2. Collaborate with Others

CSS3-Information, Media and Technology Skills

- **CS9 Information Literacy**
  1. Access and Evaluate Information
  2. Use and Manage Information
- **CS10 Media Literacy**
  1. Analyze Media
  2. Create Media Products
- **CS11 ICT Literacy**
  1. Apply Technology Effectively

CSS4-Life and Career Skills

- **CS12 Flexibility and Adaptability**
  1. Adapt to change
  2. Be Flexible
- **CS13 Initiative and Self-Direction**
  1. Manage Goals and Time
  2. Work Independently
  3. Be Self-directed Learners
- **CS14 Social and Cross-Cultural Skills**
  1. Interact Effectively with others
  2. Work Effectively in Diverse Teams
- **CS15 Productivity and Accountability**
  1. Manage Projects
  2. Produce Results
- **CS16 Leadership and Responsibility**
  1. Guide and Lead Others
  2. Be Responsible to Others