Maryland CTE Programs of Study

# Masonry I (2025)

**GENERAL REQUIREMENTS. This course is recommended for students in Grades 10-12.** 1

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**INTRODUCTION** 2

**A** **Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.** 2.A

**B** **The Construction Career Cluster prepares students for careers in designing, planning, and building sustainable infrastructure. This field includes architects, engineers, construction managers, and skilled trades professionals.** 2.B

**C** **The Masonry Program of Study is a comprehensive three-course sequence that prepares students for careers in residential and commercial masonry construction. Beginning with construction fundamentals and OSHA 30 safety training, students progress through fundamental masonry techniques to advanced applications, combining classroom instruction with extensive hands-on laboratory experience. Through this program, students develop the knowledge and skills needed to earn industry-recognized certifications including OSHA 30 Construction and become prepared to test for NCCER Core, NCCER Masonry Level 1, and NCCER Masonry Level 2 credentials. Students master essential skills from workplace safety and basic tool usage to advanced techniques such as reinforced masonry, fireplace construction, and specialized architectural features. This sequential program aligns with industry standards and provides graduates with the technical knowledge and practical skills needed for immediate employment as apprentice masons or continued education in construction management programs, meeting current workforce demands in the construction industry.** 2.C

**D** **In the Masonry I course, students will be introduced to the fundamental principles and techniques of masonry construction. Students develop essential skills in mixing and applying mortar, laying masonry units, and following proper safety protocols. Through hands-on practice, students learn to identify and properly use masonry tools and equipment, interpret construction drawings and specifications, and understand basic mathematical concepts used in masonry work. The course covers multiple types of masonry construction including brick, block, and stone work, while emphasizing the importance of proper measurements and quality control.** 2.D

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**E** **Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, which might include informational interviews or job shadowing relevant to the program of study.** 2.E

**F** **Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland.** 2.F

## KNOWLEDGE AND SKILLS 3

**A** **The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:** 3.A

1. Identify and demonstrate positive work behaviors that enhance employability and job advancement, such as regular attendance, promptness, proper attire, maintenance of a clean and safe work environment, and pride in work. 3.A.1
2. Demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, active listening, and a willingness to learn. 3.A.2
3. Employ effective reading, writing, and technical documentation skills. 3.A.3
4. Solve problems using critical thinking techniques and structured troubleshooting methodologies. 3.A.4
5. Demonstrate leadership skills and collaborate effectively as a team member. 3.A.5
6. Implement safety procedures, including proper handling of hardware and following OSHA guidelines. 3.A.6
7. Exhibit an understanding of legal and ethical responsibilities in the construction field, following applicable laws and best practices for safety. 3.A.7
8. Demonstrate time-management skills and the ability to prioritize tasks in a technical setting. 3.A.8

**B** **The student identifies various career pathways in the Masonry field. The student is expected to:** 3.B

1. Develop a career plan that includes the necessary education, certifications, job skills, and experience for specific roles as a Mason or in the Masonry field. 3.B.1
2. Create a professional resume and portfolio that reflects skills, projects, certifications, and recommendations. 3.B.2
3. Demonstrate effective interview skills for roles in the Masonry field. 3.B.3

**C** **The student identifies the issues associated with Masonry hazards found on a jobsite. The student is expected to:** 3.C

1. Demonstrate safe working procedures in a construction environment. 3.C.1
2. Explain the purpose of the Occupational Safety and Health Administration (OSHA) and how it promotes safety on the job. 3.C.2
3. Identify Masonry related hazards and how to avoid or minimize them in the workplace. 3.C.3

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4 Explain safety issues concerning lockout and tagout procedures, personal protection using assured grounding and isolation programs, confined space entry, respiratory protection, and fall protection. 3.C.4

**D The student integrates core academic skills into Masonry construction practices. The student is expected to:** 3.D

1 Demonstrate the use of clear communication techniques, both written and verbal, that are consistent with industry standards. 3.D.1

2 Use precise measurements and calculations specific to basic masonry applications. Students apply geometric and algebraic concepts to wall layout, including calculating bond patterns, spacing, and material quantities. Mathematical skills are developed through mortar mix ratio calculations, coursing calculations for brick and block, and basic estimating for simple masonry projects. Understanding elevations, dimensions, and scaled drawings builds students' ability to translate mathematical concepts into practical masonry applications, ensuring accurate layout and construction of basic masonry structures. 3.D.2

3 Understand the properties and behavior of masonry materials and mortar. Students learn the chemistry behind mortar mixing and curing, including how different environmental conditions affect the curing process. Physical properties of various masonry units, including strength, water absorption, and thermal properties, are explored. Students study how temperature and moisture impact masonry construction, particularly in mortar application and curing. These scientific foundations help students understand why specific techniques and procedures are essential for successful basic masonry construction. 3.D.3

**E The student understands fundamental masonry concepts and safety practices. The student is expected to:** 3.E

1 Describe modern masonry materials and their applications in construction. 3.E.1

2 Identify proper uses of concrete masonry units, clay units, and stone in construction. 3.E.2

3 Demonstrate proper safety practices when working with masonry materials. 3.E.3

4 Apply proper techniques for mixing mortar by hand. 3.E.4

5 Demonstrate proper procedures for laying masonry units. 3.E.5

6 Explain the career pathways and professional development opportunities in masonry. 3.E.6

**F The student demonstrates mastery of masonry safety protocols and procedures. The student is expected to:** 3.F

1 Analyze common causes of accidents and hazards in masonry work. 3.F.1

2 Demonstrate proper use of personal protective equipment. 3.F.2

3 Apply safe working procedures when operating from elevated surfaces. 3.F.3

Evaluate proper procedures for tool and equipment safety. 3.F.4

Demonstrate safe material handling techniques. 3.F.5

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6 Execute proper scaffold assembly and disassembly procedures. 3.F.6

**G The student utilizes appropriate tools and equipment in masonry work. The student is expected to:** 3.G

1 Demonstrate proper use of hand tools in masonry applications. 3.G.1

2 Apply measuring techniques using various masonry measuring tools. 3.G.2

3 Operate mortar mixing equipment safely and effectively. 3.G.3

4 Demonstrate proper use of power tools in masonry applications. 3.G.4

5 Utilize appropriate lifting equipment for masonry materials. 3.G.5

6 Assemble and disassemble scaffolding according to safety guidelines. 3.G.6

**H The student applies mathematical concepts and construction drawings in masonry work. The student is expected to:** 3.H

1 Calculate measurements and dimensions for masonry projects. 3.H.1

2 Interpret construction drawings and specifications. 3.H.2

3 Apply mathematical concepts to determine material requirements. 3.H.3

4 Analyze specifications and standards in masonry projects. 3.H.4

5 Evaluate construction drawings to determine project requirements. 3.H.5

**I The student demonstrates knowledge of mortar properties and applications. The student is expected to:** 3.I

1 Analyze different types of mortar and their applications. 3.I.1

2 Evaluate properties of plastic and hardened mortar. 3.I.2

3 Diagnose common problems in mortar application. 3.I.3

4 Demonstrate proper mortar mixing procedures. 3.I.4

5 Apply proper techniques for mortar application and cleanup. 3.I.5

**J The student masters masonry unit installation techniques. The student is expected to:** 3.J

1 Demonstrate proper installation of concrete masonry units. 3.J.1

2 Execute proper brick laying techniques. 3.J.2

3 Perform accurate cutting of masonry units using various tools. 3.J.3

4 Install masonry reinforcement and accessories correctly. 3.J.4

5 Apply proper cleaning techniques for masonry work. 3.J.5

6 Evaluate finished masonry work for quality and accuracy. 3.J.6