Maryland CTE Programs of Study

Masonry II (2025)

GENERAL REQUIREMENTS. This course is recommended for students in Grades 11-12. 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 One, and NCCER Masonry Level Two 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 Masonry II builds upon foundational masonry skills. This advanced course focuses on complex residential and commercial masonry applications. Students master sophisticated techniques in constructing reinforced masonry, building fireplaces and chimneys, and installing specialized masonry features such as arches and detailed brickwork patterns. The course emphasizes critical quality control procedures, advanced blueprint reading, and proper installation of masonry openings and metalwork. Students learn to properly install insulation, moisture control systems, and various types of masonry reinforcement while adhering to building codes and industry standards. Through hands-on projects, students

Skip to main content

develop expertise in constructing different wall systems including cavity, composite, and veneer walls. 2.D

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/hand tools 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

Skip to main content

3 Identify Masonry hazards and how to avoid or minimize them in the workplace. 3.C.3

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 Apply calculations required for specialized masonry structures. Students apply advanced geometry and algebra to calculate dimensions and layouts for arches, fireplaces, and chimneys. Mathematical concepts include advanced estimating for large projects, calculating structural loads and reinforcement requirements, and determining precise measurements for specialized architectural features. These advanced mathematical skills enable students to plan and execute complex masonry projects while maintaining structural integrity and aesthetic requirements. 3.D.2

3 Use scientific principles that focus on structural behavior and material interaction in complex systems. Students study the physics of load distribution in reinforced masonry, thermal expansion and contraction in different wall systems, and the chemistry of specialized grouts and mortars. Environmental science concepts include advanced understanding of moisture movement through different wall systems, thermal efficiency of various masonry configurations, and the effects of climate on complex masonry structures. Understanding these advanced scientific principles allows students to properly design and construct complex masonry systems that meet both structural and environmental performance requirements. 3.D.3

E The student interprets residential construction drawings and plans. The student is expected to: 3.E

1 Identify and interpret various types of residential construction drawings. 3.E.1

2 Analyze keys, legends, symbols, and architectural terms used in residential drawings. 3.E.2

3 Calculate measurements and dimensions from scaled drawings. 3.E.3

4 Estimate material quantities using construction drawings. 3.E.4

5 Explain the relationship between specifications, standards, and codes in residential construction. 3.E.5

6 Utilize interactive software to develop construction drawings, including but not limited to various CAD programs. 3.E.6

F The student demonstrates knowledge of residential masonry techniques. The tudent is expected to: 3.F

Skip to main content

Describe and construct various types of residential foundations. 3.F.1

2 Install clay brick and concrete pavers according to specifications. 3.F.2

3 Layout and construct masonry steps, patios, and decks. 3.F.3

4 Design and construct fireplaces and chimneys following building codes. 3.F.4

5 Execute proper planning and construction of masonry openings. 3.F.5

G The student applies reinforced masonry techniques. The student is expected to: 3.G

1 Explain the characteristics and preparation of grout mixtures. 3.G.1

2 Demonstrate proper placement techniques for low-lift and high-lift grouting. 3.G.2

3 Install reinforcement in masonry walls according to specifications. 3.G.3

4 Construct reinforced walls and masonry elements. 3.G.4

5 Install bond beams, lintels, piers, pilasters, and columns correctly. 3.G.5

H The student utilizes proper techniques for masonry openings and metalwork. The student is expected to: 3.H

1 Install door and window frames in masonry openings. 3.H.1

2 Construct and install windowsills and steel lintels. 3.H.2

3 Create chases and recesses in masonry construction. 3.H.3

4 Install various types of anchors and ties in masonry construction. 3.H.4

5 Apply proper techniques for connecting masonry to structural elements. 3.H.5

I The student implements advanced laying techniques. The student is expected to: 3.I

1 Identify and construct various types of walls including solid, hollow, cavity, composite, and veneer. 3.I.1

2 Install and maintain control joints and expansion joints. 3.I.2

3 Layout and construct various corners and wall intersections. 3.I.3

4 Execute proper toothing and corbeling techniques. 3.I.4

5 Apply appropriate insulation and moisture control methods. 3.I.5

J The student performs construction inspection and quality control procedures. The student is expected to: 3.J

1 Apply standards and specifications for quality control in masonry construction. 3.J.1

2 Build and test masonry sample panels and prisms according to specifications. 3.J.2

3 Conduct mortar testing procedures following industry standards. 3.J.3

4 Perform field inspections and observations of masonry construction. 3.J.4

5 Monitor and verify construction tolerances meet specifications. 3.J.5