Maryland CTE Programs of Study

Carpentry 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 Carpentry program prepares students for careers in residential, commercial, and industrial Carpentry systems. Through a comprehensive curriculum aligned with industry standards, students develop foundational construction skills and specialized Carpentry knowledge while earning industry-recognized certifications. The program emphasizes hands-on learning, safety protocols, and real-world applications, preparing graduates for immediate entry into the Carpentry or related trades.** 2.C

D **Carpentry I introduces foundational carpentry skills and knowledge, building upon skills similar to the NCCER Core and Carpentry Level 1 (or similar approved IRC). Students will explore essential carpentry concepts such as construction safety, blueprint reading, and materials handling. Hands-on training will focus on the proper use of hand and power tools, as well as basic wood-framing techniques for floors, walls, and ceilings. Key skills include constructing simple structures, understanding basic construction math, and adhering to OSHA safety standards. Students will develop a solid understanding of residential construction systems, preparing them for more advanced carpentry tasks.** 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

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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 Carpentry 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 Carpenter or in the Carpentry 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 Carpentry field. 3.B.3

C **The student identifies the issues associated with Carpentry 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 Carpentry 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 Carpentry 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 mathematical concepts including the application of the Pythagorean theorem for verifying square corners in construction, ratio and proportion calculations for stair design (such as rise-to-run ratios), area and volume calculations for material estimation (like board feet and concrete volumes), and angular measurements for roof layout. Students must master both precise measurement techniques and estimation skills to meet industry standards for construction accuracy and material efficiency. 3.D.2

3 Use scientific principles include understanding material properties (such as wood grades, treatment processes, and engineered products), physical forces (like load distribution in floor systems and wind loads on structures), and building science principles (including moisture movement, thermal transfer, and air infiltration in building envelopes). Students learn how these scientific principles inform construction decisions, from selecting appropriate materials to implementing proper installation techniques that ensure building durability and efficiency. 3.D.3

E The student gains knowledge about building materials used in the construction industry. The student is expected to: 3.E

1 Identify various types of building materials and their uses;. 3.E.1

2 Identify and state the uses of various types of hardwoods and softwoods 3.E.2

3 Identify the different grades and markings of wood building materials. 3.E.3

4 Describe the proper method of storing and handling building materials. 3.E.4

5 State the uses of various types of engineered lumber 3.E.5

6 Calculate the quantities of lumber and wood products using industry-standard methods. 3.E.6

7 Describe the fasteners, anchors, and adhesives used in construction work and explain their uses. 3.E.7

F The student interprets architectural and engineering working drawings and specifications. The student is expected to: 3.F

1 Describe the types of drawings usually included in a set of plans and list the information found on each type. 3.F.1

2 Identify the different types of lines used on construction drawings. 3.F.2

3 Identify selected architectural symbols commonly used to represent materials on plans. 3.F.3

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4 Identify selected electrical, mechanical, and plumbing symbols commonly used on plans. 3.F.4

5 Identify selected abbreviations commonly used on plans. 3.F.5

6 Read and interpret plans, elevations, schedules, sections, dimensions/measurements and other details contained in basic construction drawings. 3.F.6

7 State the purpose of written specifications. 3.F.7

8 Identify and describe the parts of a specification. 3.F.8

9 Demonstrate and/or describe how to create a materials list based on drawings/ specifications. 3.F.9

G The student masters wall system construction. The student is expected to: 3.G

1 Identify all components of a wall system. 3.G.1

2 Calculate material quantities needed for wall framing. 3.G.2

3 Execute the layout process for wall construction. 3.G.3

4 Demonstrate proper wall framing techniques. 3.G.4

5 Construct wall systems including assembly and erection. 3.G.5

6 Install structural components for wall systems. 3.G.6

7 Understand and follow required safety practices common to an active work site. 3.G.7

H The student applies roof framing principles. The student is expected to: 3.H

1 Install ceiling frame components according to specifications. 3.H.1

2 Analyze different residential roof types and their components. 3.H.2

3 Apply methods for laying out and cutting common rafters. 3.H.3

4 Construct and sheath a gable roof. 3.H.4

5 Install roof trusses according to specifications. 3.H.5

6 Calculate roof slopes and dimensions accurately. 3.H.6

I The student demonstrates stair construction techniques. The student is expected to: 3.I

1 Identify all stairway components and code requirements. 3.I.1

2 Calculate total rise, number and size of risers. 3.I.2

3 Determine number and size of treads needed for a stairway. 3.I.3

4 Layout and construct basic stair systems. 3.I.4

5 Apply appropriate safety measures for stair construction. 3.I.5

6 Install stair components according to specifications. 3.I.6

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J **The student understands building envelope/enclosure systems. The student is expected to:** 3.J

1. Analyze the purpose and components of building envelope/enclosure systems. 3.J.1
2. Identify and install various types of windows according to specifications. 3.J.2
3. Identify and install different door types based on application requirements. 3.J.3
4. Apply proper flashing and weatherization techniques. 3.J.4
5. Implement energy efficiency measures in envelope system installation. 3.J.5
6. Verify proper installation of envelope (environmental elements) system components. 3.J.6

K **The student develops advanced carpentry skills through integration. The student is expected to:** 3.K

1. Coordinate multiple carpentry systems in complex projects. 3.K.1
2. Apply appropriate safety measures for advanced construction tasks. 3.K.2
3. Evaluate the quality of completed carpentry work. 3.K.3
4. Troubleshoot common carpentry installation issues. 3.K.4
5. Implement sustainable construction practices. 3.K.5
6. Demonstrate leadership in carpentry project execution. 3.K.6