Maryland CTE Programs of Study

Painting and Refinishing (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 Supply Chain & Transportation Career Cluster encompasses the transfer, coordination, and management of goods from production to consumption, ensuring efficient movement across various modes of transportation including air, ground, and water, as well as Collision Repair and Refinishing of the respective transport modes. This Cluster integrates logistics and distribution networks to facilitate the seamless flow of materials and products, playing a crucial role in global commerce, economic development, and community health. 2.B

C The Automotive Collision and Repair program prepares students for careers in the automotive collision industry through a four-course sequence combining hands-on skills with technical knowledge. Students progress from foundational safety and repair principles through advanced structural analysis and modern vehicle systems. Throughout the program, students master essential skills including metal straightening, welding, refinishing techniques, and structural repairs while gaining experience with industry-standard tools and equipment. Students learn to analyze damage, write estimates, repair panels, apply primers and paints, and work with advanced driver assistance systems (ADAS). The program aligns with ASE Education Foundation Entry-Level certifications: Non-structural Analysis & Damage Repair, Painting & Refinishing, and Structural Analysis & Damage Repair. Additionally, systems who use the I-CAR PDP-EE Curriculum may also earn ICAR Platinum ProLevel 1 credentials. These certifications position students for immediate employment in collision centers, dealerships, or custom shops, or continued education in advanced automotive programs. 2.C

D This specialized course prepares students for the ASE Entry-Level Certification in Painting & Refinishing by providing comprehensive training in automotive refinishing procedures. Students master surface preparation, paint mixing, color

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matching, and application techniques while learning to operate industry-standard spray equipment. The course covers the complete refinishing process from initial surface preparation through final detailing, including masking procedures, primer application, and clear coat finishing. Students learn to identify and correct paint defects, perform color blending, and execute quality control procedures. Emphasis is placed on understanding paint chemistry, proper application techniques, and environmental compliance while developing the skills needed for professional-quality refinishing work. 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, Collision Repair and Refinishing 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, Collision Repair and Refinishing 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 Automotive Collision Repair and Refinishing 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 Automotive Collision Repair and Refinishing field. The student is expected to:** 3.B

1. Develop a career plan that includes the necessary education, certifications, job skills, experience, and progression steps for specific roles as a technician or in the Automotive Collision Repair and Refinishing field. 3.B.1

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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 Automotive Collision Repair and Refinishing field. 3.B.3

C The student identifies the issues associated with Automotive Collision Repair and Refinishing hazards found on a jobsite. The student is expected to: 3.C

1 Demonstrate safe working procedures in a lab/shop 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 Automotive Collision Repair and Refinishing related workplace hazards and how to avoid or minimize them. 3.C.3

4 Explain safety issues concerning lockout and tagout procedures, personal protection using assured grounding and isolation programs, automotive lift safety, and other equipment related safety protocols. 3.C.4

D The student integrates core academic skills into Automotive Collision Repair and Refinishing 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 Calculate mixing ratios, volumetric calculations, and surface area determinations. Students apply geometric formulas for complex surface areas, utilize ratio and proportion in paint mixing formulas, and perform viscosity calculations. Environmental calculations include relative humidity, temperature conversions, and dew point determinations. The course incorporates advanced measurement systems for film build calculations, mixing ratios for multi-stage finishes, and coverage rate determinations. Statistical analysis is applied to color matching and quality control procedures. 3.D.2

3 Understand chemistry of coatings technology, including polymer chemistry, cross-linking reactions, and solvent evaporation principles. Students explore advanced concepts in fluid dynamics through spray atomization physics, surface tension principles, and viscosity relationships. Light theory and color physics become essential in understanding spectrophotometry, metameric effects, and color matching principles. Environmental science concepts include psychrometrics, vapor pressure relationships, and VOC emissions chemistry. Students examine reaction kinetics in paint curing, adhesion theory in coating applications, and surface chemistry in substrate preparation. 3.D.3

E The student masters surface preparation techniques. The student is expected to: 3.E

1 Perform proper chemical cleaning procedures. [PR-B2-4] 3.E.1

2 Execute appropriate sanding techniques. [PR-B6-8] 3.E.2

- Demonstrate masking procedures for various applications. [PR-B9-10] 3.E.3
- Apply primer according to manufacturer specifications. [PR-B11-14] 3.E.4

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5 Evaluate surface quality before refinishing. [PR-B15-17] 3.E.5

F The student demonstrates proficiency in paint application. The student is expected to: 3.F

1 Operate spray equipment according to manufacturer specifications. [PR-C1-3] 3.F.1

2 Mix paint materials following proper procedures. [PR-D1-3] 3.F.2

3 Perform color matching techniques. [PR-D12-15] 3.F.3

4 Execute blending procedures. [PR-D6-7] 3.F.4

5 Apply clear coat according to manufacturer specifications. [PR-D8-9] 3.F.5

G The student identifies and corrects paint problems. The student is expected to: 3.G

1 Diagnose common paint defects. [PR-E1-5] 3.G.1

2 Implement appropriate correction techniques. [PR-E6-10] 3.G.2

3 Develop strategies for preventing paint problems. [PR-E11-15] 3.G.3

4 Perform paint material tests. [PR-E16-20] 3.G.4

5 Evaluate final finish quality. [PR-E21-26] 3.G.5

H The student performs final detailing procedures. The student is expected to: 3.H

1 Execute buffing and polishing techniques. [PR-F2-3] 3.H.1

2 Conduct final quality inspections. [PR-F7] 3.H.2

3 Prepare vehicles for customer delivery. [PR-F4-5] 3.H.3

4 Document final quality control measures. [PR-F8] 3.H.4

5 Demonstrate proper care and maintenance procedures. [PR-F6,9] 3.H.5