Maryland CTE Programs of Study

Marine Maintenance and Repair II (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 maintenance 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 Marine Maintenance and Repair program is a comprehensive four course sequence that prepares students for careers in marine service and boat building. Through hands-on experience with industry-standard tools and equipment, students develop essential skills in boat construction, electrical systems installation, engine and propulsion system service, and advanced marine system repair. The program integrates fundamental construction techniques with complex systems integration, teaching students to build, maintain, and repair modern vessels aligned to American Boat and Yacht Council standards. Students learn to work with diverse materials including composites, marine-grade woods, and metals while mastering electrical system design, engine installation, and advanced diagnostics. Upon completion, graduates are prepared for entry-level positions in marine service, boat building, or yacht repair facilities, and are equipped with the knowledge needed to successfully complete the ABYC Marine Service Technician Certification examination. 2.C

D Students in the Marine Maintenance and Repair II course combine boat construction techniques with marine electrical systems installation. Students earn basic electrical theory while developing hands-on skills in marine wiring, circuit testing, and system integration. Construction skills include advanced

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composite layup, marine woodworking, and basic metal fabrication. Students apply these integrated skills to plan and execute electrical system installations during the construction process, with emphasis on marine standards compliance and quality control procedures. 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 and following OSHA guidelines. 3.A.6
7. Exhibit an understanding of legal and ethical responsibilities in the automotive 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 Marine Maintenance and Repair 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 technician or in the Marine Maintenance and Repair 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 Marine Maintenance and Repair field. 3.B.3

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C **The student identifies the issues associated with Marine Maintenance and Repair 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 Marine Maintenance and Repair 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 Marine Maintenance and Repair 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. Solve algebraic equations using Ohm's Law, calculate power requirements and voltage drops, and apply mathematical principles to determine wire sizing and circuit loads. 3.D.2
3. Understand principles of electrical current flow, analyze electromagnetic principles, comprehend galvanic corrosion processes, and apply concepts of thermal conductivity in electrical systems. 3.D.3

E **The student understands marine electrical theory and safety. The student is expected to:** 3.E

1. Explain basic electrical principles in marine applications by demonstrating understanding of voltage, current, and resistance relationships through calculations and practical demonstrations. 3.E.1
2. Calculate basic electrical values using Ohm's law by solving circuit problems, measuring actual values with meters, and comparing calculated vs. measured results. 3.E.2
3. Demonstrate proper electrical safety procedures by using appropriate PPE, following lockout/tagout procedures, and maintaining safe working conditions around electrical systems. 3.E.3
4. Identify marine-specific electrical hazards by conducting risk assessments, explaining galvanic corrosion principles, and implementing appropriate safety measures. 3.E.4

F **The student demonstrates proficiency in marine electrical systems. The student is expected to:** 3.F

1. Install basic DC electrical circuits by selecting proper wire sizes, following ABYC color codes, and making correct connections with marine-grade components. 3.F.1

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2 Test electrical circuits using appropriate equipment by selecting proper meter settings, taking accurate readings, and interpreting results correctly. 3.F.2

3 Interpret marine electrical diagrams by identifying standard symbols, tracing circuits correctly, and explaining system operation to others. 3.F.3

4 Demonstrate proper wire selection and routing by using ABYC tables, calculating voltage drops, and securing wires appropriately. 3.F.4

5 Apply marine electrical standards and codes by referencing appropriate documentation, following installation requirements, and documenting compliance. 3.F.5

G The student executes marine construction techniques. The student is expected to: 3.G

1 Perform advanced composite layup procedures by calculating material quantities, preparing complex molds, and achieving proper fiber-to-resin ratios. 3.G.1

2 Execute marine-grade woodworking techniques by selecting appropriate materials, using proper tools, and achieving professional-quality results. 3.G.2

3 Demonstrate basic metal fabrication skills by cutting, shaping, and joining metals using appropriate tools and techniques while maintaining accuracy. 3.G.3

4 Apply proper bonding and sealing methods by preparing surfaces correctly, selecting appropriate materials, and ensuring watertight integrity. 3.G.4

5 Perform quality control procedures by conducting appropriate tests, documenting results, and making necessary corrections. 3.G.5

H The student integrates electrical systems during construction. The student is expected to: 3.H

1 Plan electrical system layouts by creating detailed wiring diagrams, determining component locations, and developing installation sequences that accommodate construction phases. 3.H.1

2 Install electrical components during construction by coordinating with other trades, protecting components from construction hazards, and ensuring proper access for future maintenance. 3.H.2

3 Perform system integration procedures by connecting multiple electrical systems, implementing proper grounding methods, and ensuring compatibility between components. 3.H.3

4 Execute proper testing and documentation by conducting voltage checks, performing continuity tests, and creating detailed as-built documentation including panel schedules and wire routes. 3.H.4

5 Demonstrate compliance with marine standards by following ABYC guidelines, maintaining proper wire support and chafe protection, and completing required inspection forms. 3.H.5