Maryland CTE Programs of Study

Marine Maintenance and Repair I (2025)

GENERAL REQUIREMENTS. This course is recommended for students in Grades 9-12. 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 The Marine Maintenance and Repair I course introduces students to the marine industry while developing essential boat building and service skills. Students learn to safely operate shop equipment, interpret basic boat plans, and work with various marine materials including wood, composites, and metals. Through

Skip to main content

hands-on projects, students develop basic lofting techniques, learn proper material handling, and gain understanding of fundamental boat systems. The course emphasizes shop safety, proper documentation procedures, and quality workmanship while providing an overview of marine industry career pathways. 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 Marine Maintenance and Repair 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

Skip to main content

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. Apply geometric principles to calculate hull dimensions and displacement, utilize scale measurements and conversions, and perform basic construction calculations including material quantities and angles. 3.D.2
3. Understand principles of buoyancy and displacement, analyze material properties including tensile strength and flexibility, and apply concepts of chemical reactions in composite materials and adhesives. 3.D.3

E **The student understands marine industry fundamentals and safety practices. The student is expected to:** 3.E

1. Identify career pathways and opportunities within the marine service industry by researching job roles, creating career progression maps, and analyzing local market demands. 3.E.1
2. Demonstrate proper use of marine-specific personal protective equipment by selecting appropriate gear for tasks, inspecting equipment condition, and wearing PPE correctly during all shop activities. 3.E.2
3. Apply shop safety procedures specific to marine environments by conducting safety inspections, using ventilation systems properly, and maintaining clean workspaces with proper chemical storage. 3.E.3
4. Execute proper documentation and record-keeping procedures by completing work orders, maintaining material logs, and documenting safety inspections using industry- standard forms. 3.E.4

F **The student analyzes basic boat design and construction principles. The student is expected to:** 3.F

1. Interpret basic boat plans and design documents by identifying standard symbols, taking measurements from scaled drawings, and explaining design features to others. 3.F.1

Skip to main content

2 Explain the principles and characteristics of hull forms by identifying common designs, describing their purposes, and comparing performance characteristics. 3.F.2

3 Calculate basic boat dimensions and measurements by using appropriate measuring tools, applying marine measurement standards, and converting between measurement systems. 3.F.3

4 Demonstrate understanding of boat terminology and nomenclature by correctly identifying boat parts, using proper terms in documentation, and communicating effectively with peers using industry terminology. 3.F.4

G The student demonstrates proficiency with marine materials. The student is expected to: 3.G

1 Differentiate between various marine construction materials by identifying specific properties, explaining appropriate applications, and selecting materials for specific tasks. 3.G.1

2 Demonstrate proper material handling and storage procedures by organizing materials correctly, maintaining proper environmental conditions, and following safety data sheets. 3.G.2

3 Execute basic techniques for working with marine woods by selecting appropriate types, cutting with proper tools, and applying marine-grade finishes. 3.G.3

4 Perform fundamental composite layup procedures by preparing surfaces, mixing resins with proper ratios, and applying materials in correct sequence. 3.G.4

5 Identify various marine metals and their properties by conducting basic tests, explaining corrosion factors, and selecting appropriate metals for specific applications. 3.G.5

H The student develops fundamental boat building skills. The student is expected to: 3.H

1 Perform basic lofting techniques by creating full-size drawings of boat components, using proper tools to develop curves, and transferring measurements accurately to materials. 3.H.1

2 Execute precise material layout and cutting procedures by using appropriate marking tools, measuring twice before cutting, and maintaining accuracy within 1/16 inch tolerance. 3.H.2

3 Demonstrate proper marine joinery methods by selecting appropriate joints for specific applications, cutting joints to proper fit, and assembling with marine-grade adhesives. 3.H.3

4 Apply marine-grade fastening techniques by selecting appropriate fasteners, preparing materials properly, and installing fasteners using correct methods and sequences. 3.H.4

5 Perform quality control inspections by using industry-standard checklists, documenting findings accurately, and identifying areas needing correction. 3.H.5

Skip to main content

he student comprehends basic boat systems. The student is expected to: 3.I

1. Identify major boat systems and their components by creating system diagrams, explaining component functions, and describing system relationships. 3.I.1
2. Explain basic system integration principles by mapping system interconnections, identifying potential conflicts, and describing proper installation sequences. 3.I.2
3. Demonstrate understanding of system installation requirements by interpreting manufacturer specifications, following ABYC standards, and maintaining proper clearances. 3.I.3
4. Perform basic system inspections and tests by using appropriate testing equipment, following manufacturer procedures, and documenting results properly. 3.I.4