

Implementation Date

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PROGRAM CONCENTRATION: Architecture, Construction,
Communication, Transportation
CAREER PATHWAY: Marine Engine Technology
COURSE TITLE: Foundations of Marine Engine
Technology (FME)

This course introduces students to basic principles and skills associated with the field of marine engine service and repair. Students learn and apply basic skills including shop and boat safety, safe and appropriate use of tools and measuring devices, technical writing and shop management skills, and marine engine computer applications. Mastery of these standards through project-based learning and leadership development activities of Skills USA will help prepare students with a competitive edge for the transportation logistics marketplace.

Career Exploration and Ethics

ACCT-FME-1. Students will explore the different careers available in the field of marine engine technology. Students will:

- a. Explore career opportunities in marine engine technology.
- b. Describe the roles and functions of individuals engaged in marine engine technology.
- c. Explore opportunities for employment in marine engine technology.
- d. Explore opportunities for entrepreneurial endeavors.

Academic Standards:

ELA10W3 The student uses research and technology to support writing. The student:

- a. *Formulates clear research questions and utilizes appropriate research venues (e.g. library, electric media, personal interview, survey) to locate and incorporate evidence from primary and secondary sources.*
- b. *Uses supporting evidence from multiple sources to develop the main ideas within the body of a research essay, a composition, or a technical document.*
- c. *Synthesizes information from multiple sources and identifies complexities and discrepancies in the information and the different perspectives found in each medium (e.g. almanacs, microfiche, news sources, in-depth field studies, speeches, journals, and technical documents).*
- d. *Integrates quotations and citations into a written text while maintaining the flow of ideas.*
- e. *Uses appropriate conventions for documentation in the text, notes, and bibliographies by adhering to an appropriate style.*

MM1-4P4 Students will make connections among mathematical ideals and to other disciplines. Students will:

- c. *Recognize and apply mathematics and context outside of mathematics*

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Marine Engine Technology Safety Procedures

ACCT-FME-2. Students will understand basic concepts and practices necessary for effective marine shop operation. Students will:

- a. Demonstrate basic shop safety skills.
- b. Identify and demonstrate US Coast Guard and US Boating safety rules and regulations.
- c. Operate hand tools safely and properly.
- d. Operate tools and precision instruments for observing, measuring, and manipulating equipment and materials.
- e. Set up, use, and maintain power tools safely and properly.
- f. Identify all applicable federal, state and local laws, OSHA and EPA regulations in the operation of a marine shop.

Academic Standards:

MM1-4P1 Students will solve problems using appropriate technology. Students will:

- b. Solve problems that arise in mathematics and in other contexts.*
- c. Apply and adapt a variety of appropriate strategies to solve problems.*

MM1-4P3 Students will communicate mathematically. Students will:

- d. Use the language of mathematics to express mathematical ideals precisely*

SCSh2 Students will use standard safety practices for all classroom laboratories and field investigations.

- a. Follow correct procedures for use of scientific apparatus.*
- b. Demonstrate appropriate techniques in all laboratory situations.*
- c. Follow correct protocol for identifying and reporting safety problems and violations.*

Fasteners

ACCT-FME-3. Students will learn about various fasteners and their applications. Students will:

- a. Identify and use different grades and types of fasteners.
- b. Measure the torque of various fasteners used in the marine engine industry.
- c. Identify the properties and apply various sealants appropriately.

Academic Standards:

MM1-4P3 Students will communicate mathematically. Students will:

- d. Use the language of mathematics to express mathematical ideals precisely.*

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SCSh4 Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

- a. Develop and use systematic procedures for recording and organizing information.*
- b. Use technology to produce tables and graphs.*
- c. Use technology to develop, test, and revise experimental or mathematical models.*

SC7 Students will characterize the properties that describe solutions and the nature of acids and bases. Students will:

- a. Explain the process of dissolving in terms of solute/solvent interactions.*
 - Observe factors that effect the rate at which a solute dissolves in a specific solvent.*

SC5 Students will understand that the rate at which a chemical reaction occurs can be affected by changing concentration, temperature, or pressure, and the addition of a catalyst.

- a. Demonstrate the effects of changing concentration, temperature, and pressure on chemical reactions.*

SPS6 Students will investigate the properties of solutions.

- a. Describe solutions in terms of solute/solvent, conductivity, concentration.*

Shop Management

ACCT-FME-4 Students will describe shop management systems and procedures. Students will:

- a. Describe inventory management procedures.*
- b. Operate personal computers and software to access inventory databases.*
- c. Demonstrate customer service skills.*
- d. Write customer service orders.*

Academic Standards:

ELA10C1 Students will demonstrate understanding and control of the rules of the English language, realizing that usage involves the appropriate application of conventions and grammar in both written and spoken formats. The student:

- a. Demonstrates an understanding of proper English usage and control of grammar, sentence and paragraph structure, diction, and syntax.*

Parts and Service Literature

ACCT-FME-5 Students will use and interpret information from various industry literature sources. Students will:

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- a. Select and apply service manuals for all types of marine engines.
- b. Interpret and use service bulletins.
- c. Interpret and apply service bulletins for all brands and types of marine engines.
- d. Select appropriate online parts information for model engine undergoing service.

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Academic Standards:

ELA10RL5 Students will understand and acquire new vocabulary and use it correctly in reading and writing. The student:

- c Uses general dictionaries, specialized dictionaries, thesauruses, or related references as needed to increase learning.*

ELA10C2 Students will demonstrate understanding of manuscript form, realizing that different forms of writing require different formats.

- a. Identifies messages and themes from books in all subject areas.*
- b. Responds to a variety of texts in multiple modes of discourse.*
- c. Relates messages and themes from one subject area to those in another area.*

Reading Across the Curriculum

Reading Standard Comment

After the elementary years, students engage in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas in context.

Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

Students will enhance reading in all curriculum areas by:

- a. Reading in all curriculum areas
 - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.

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- Read both informational and fictional texts in a variety of genres and modes of discourse.
- Read technical texts related to various subject areas.
- b. Discussing books
 - Discuss messages and themes from books in all subject areas.
 - Respond to a variety of texts in multiple modes of discourse.
 - Relate messages and themes from one subject area to messages and themes in another area.
 - Evaluate the merit of texts in every subject discipline.
 - Examine author's purpose in writing.
 - Recognize the features of disciplinary texts.
- c. Building vocabulary knowledge
 - Demonstrate an understanding of contextual vocabulary in various subjects.
 - Use content vocabulary in writing and speaking.
 - Explore understanding of new words found in subject area texts.
- d. Establishing context
 - Explore life experiences related to subject area content.
 - Discuss in both writing and speaking how certain words are subject area related.
 - Determine strategies for finding content and contextual meaning for unknown words.

CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

CTAE-FS-1 Technical Skills: Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

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CTAE-FS-2 Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-3 Communications: Learners use various communication skills in expressing and interpreting information.

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

CTAE-FS-5 Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-6 Systems: Learners understand a variety of organizational structures and functions.

CTAE-FS-7 Safety, Health and Environment: Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

CTAE-FS-8 Leadership and Teamwork: Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

CTAE-FS-9 Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

CTAE-FS-10 Career Development: Learners plan and manage academic-career plans and employment relations.

CTAE-FS-11 Entrepreneurship: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.