



## Approved Innovative Course

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*Course: Principles of Maritime Science*

*PEIMS Code: N1304661*

*Abbreviation: PRMSCI*

*Grade Level(s): 9-12*

*Number of Credits: 1.0*

### *Course description:*

The Principles of Maritime Science course is designed to instruct students in the principles of maritime science as outlined by the Code of Federal Regulations (CFR) directly related to the National Maritime Center and the Merchant Mariner Credentialing Program. Students enrolled in this course will identify career opportunities, skills, abilities, tools, certifications, and safety measures for sea based maritime careers. Students will also understand components, systems, equipment, production and safety regulations associated with maritime industries. A baseline understanding of ships and maritime systems is developed to support assessment of the impact, benefit, and risk of decisions involving the design, acquisition, operation, regulation, law enforcement, damage control, maintenance, and salvage of ships and maritime systems. This course will also inform students on the most effective and efficient manners to assure a safe, economically efficient, and environmentally sound maritime system with the intent to lead to advanced coursework in maritime studies in later grades. This course aligns with Chapter 130, Subchapter P: Transportation, Distribution, and Logistics.

### *Essential knowledge and skills:*

- (a) General requirements. This course is recommended for students in Grades 9-12. Students shall be awarded one credit for successful completion of this course.
- (b) Introduction.
  - (1) Career and technical education 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) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as



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transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.

- (3) Students enrolled in Principles of Maritime Science will identify specific career opportunities, skills, abilities, tools, certifications, and safety measures associated with maritime careers. Students will understand components, systems, equipment, production, and safety regulations associated with the maritime industry.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.
  - (5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.
- (c) Knowledge and Skills.
- (1) The student demonstrates the employability characteristics that lead to success in the maritime industry. The student is expected to:
    - (A) identify the credential and certification requirements for entry into careers in the maritime industry;
    - (B) determine how to make effective decisions, use career information, and manage personal career plans;
    - (C) demonstrate the ability to use technological resources in diverse and changing personal, community, and workplace environments;
    - (D) create alternative solutions by using critical- and creative-thinking skills;
    - (E) research and compile health and safety policies, procedures, regulations, and practices of the maritime industry;
    - (F) research and discuss professional, ethical, and legal behavior consistent with applicable laws, regulations, and organizational norms; and
    - (G) demonstrate effective communication skills and leadership styles.
  - (2) The student understands the historical significance and development of maritime enterprises. The student is expected to:
    - (A) describe the history of maritime enterprises in the United States and the Texas Gulf Coast Region;



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- (B) appraise historical vessel construction leading to new construction technologies and techniques;
  - (C) discuss examples of tools and techniques used for construction and shipbuilding advances by mariners of the past such as the early Greeks, and the Vikings; and
  - (D) analyze and evaluate past and present commercial maritime shipping routes.
- (3) The student understands aspects of the components, systems, equipment, production and safety regulations associated with maritime enterprises. The student is expected to:
- (A) identify the major systems and equipment used for cargo handling;
  - (B) demonstrate efficiency in movement and stowage of cargo;
  - (C) differentiate between among the various categories of hazardous cargo;
  - (D) identify, explain, and demonstrate techniques for shipboard damage control;
  - (E) describe the equipment and activities associated with shipboard deck safety; and
  - (F) demonstrate proficient seamanship skills with regard to common industry knot-tying, line-handling, and care and maintenance of equipment.
- (4) The student explores the academic skills necessary to be successful in maritime enterprises. The student is expected to:
- (A) demonstrate competency in basic office software in order to access the National Oceanic and Atmospheric Administration (NOAA) for mariner databases and electronic charting data systems;
  - (B) interpret information from documents related to the maritime industry such as nautical charts, land-based maps, preventative maintenance procedure cards, diagrams, maps, parts catalogs, and service-repair manuals;
  - (C) simulate the creation of industry-specific documentation such as bills of lading, work orders, invoices, quotes, notice to mariners, chart up dates, shipboard logs, and reports; and
  - (D) perform precision measurements to diagnose system components such as fire suppression systems based on maritime industry specifications.



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- (5) The student explores concepts related to cultural diversity in the workplace. The student is expected to:
- (A) identify significant similarities and differences in international culture;
  - (B) identify and explain the diverse maritime workforce cultures; and
  - (C) describe maritime challenges and practices that impact other cultures.
- (6) The student develops leadership experience as it relates to maritime industries. The student is expected to:
- (A) plan, propose, conduct, and evaluate maritime industry-based occupational experiences;
  - (B) apply proper record-keeping skills as they relate to maritime industry-based occupational experiences;
  - (C) demonstrate a customized pollution prevention plan for a ship;
  - (D) discuss youth leadership opportunities to create a well-rounded maritime industry-based occupational experience; and
  - (E) develop a watch quarter and station bill.
- (7) The student understands the importance of fire prevention, response and first aid on ships. The student is expected to:
- (A) compare and contrast marine and land-based firefighting;
  - (B) explain the principles, chemistry, and tetrahedron of fire;
  - (C) identify and describe fire prevention best practices;
  - (D) identify shipboard fire detection systems;
  - (E) create a shipboard firefighting organization plan;
  - (F) explain and demonstrate basic first aid such as Cardiopulmonary Resuscitation (CPR) and American Red Cross first responder skills.

*Description of specific student needs this course is designed to meet:*

Preparing students for careers in the maritime industry is important for meeting workforce needs of the Gulf Coast economy. Fifty percent of the maritime workforce is 50 years of age or older and will be retiring in the near future. There is a lack of qualified workers in the expectant labor pool. Introducing maritime enterprises and possible career pathways at the high school level will create exposure and interest in the maritime field. Skills taught in these courses have been



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assessed from industry partners such as the Port of Houston Authority. After completion of a maritime career pathway, students will be able to graduate work ready with the necessary skills and qualifications for employment in the maritime industry. The purpose of the Principles of Maritime Science, Maritime Science I, and Maritime Science II courses is to provide opportunities for students to develop foundational knowledge and skills necessary for a maritime career.

### Major resources and materials:

The National Marine Educators Association- <http://www.marine-ed.org/>

National Maritime Center and Merchant Mariner Credentialing Program- <http://www.uscg.mil/nmc/>

American Association of Port Authorities- <http://www.aapa-ports.org/industry/content.cfm?ItemNumber=1076>

The Port of Houston Authority- <http://www.portofhouston.com/community-outreach/educational-commitment/>

The National Oceanic and Atmospheric Administration- <http://www.oesd.noaa.gov/>

Maritime Administration (MARAD)- [www.marad.dot.gov](http://www.marad.dot.gov)

Textbooks: Eaton, Jonathan. Chapman Piloting, Seamanship and Small Boat Handling. 67th ed. New York: Hearst, 2013. Print. Ford, Nathaniel B. The American Practical Navigator. III ed. Arcata: Paradise Cay Publications, 2014. Print.

Additional Resource: Navigation Rules and Regulations Handbook by Department of Homeland Security and United States Coast Guard  
<http://www.navcen.uscg.gov/?pageName=navRuleChangescommended> course activities:



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### *Recommended course activities:*

### *Suggested methods for evaluating student outcomes:*

Student outcomes will be evaluated through classroom/homework assignments, independent and group projects, and teacher-made tests and bridge-simulation/performance-based assessments. Additionally, students will create and maintain portfolios of their work.

### *Teacher qualifications:*

An assignment for Principle of Maritime Science is allowed with on the of the following certificates:

- Trade and Industrial Education: Grades 6-12. This assignment requires appropriate work approval.
- Trade and Industrial Education: Grades 8-12. This assignment requires appropriate work approval.
- Vocational Trades and Industry. This assignment requires appropriate work approval.

### *Additional information:*