



Approved Innovative Course

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Course: Maritime Science II
PEIMS Code: N1304663
Abbreviation: MSC12
Grade Level(s): 9-12
Number of Credits: 1.0

Course description:

After successful completion of Principles of Maritime Science and Maritime Science I, students may participate in the course, Maritime Science II. Students will develop new skills such as advanced navigation coordination; collision avoidance; briefing the command; electronic navigation theory; basic, routine, and emergency ship handling procedures; external communications; and other relevant knowledge, skills, and techniques. Upon successful completion of this course, students will be able to plan and execute safe vessel navigation. Students will exhibit knowledge of all bridge navigation (TRANSAS, ECDIS, and Paper Charts) equipment and procedures. Using case studies and real world simulations, students will identify the contributing factors involved in maritime accidents.

This course falls within Chapter 130, Subchapter P: Transportation, Distribution, and Logistics.

Essential knowledge and skills:

- (a) General requirements. This course is recommended for students in Grades 11-12. Recommended prerequisite: Principles of Maritime Science. Prerequisite: Maritime Science I. 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



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

- (3) The Maritime Science II course will prepare students to plan and execute safe vessel navigation. Students will develop new skills such as advanced navigation coordination, collision avoidance, briefing the command, electronic navigation theory, basic, routine and emergency shiphandling procedures, external communications, and other relevant knowledge, skills, and techniques.
 - (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 credentials 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 use of navigation equipment in voyage-planning decision making. The student is expected to:
 - (A) distinguish among watch conditions;
 - (B) execute a voyage plan;
 - (C) evaluate the process of integrating a pilot into the bridge team;



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- (D) demonstrate an understanding of how to respond to typical maritime scenarios;
 - (E) describe and explain key leadership qualities needed by a member of the bridge team;
 - (F) describe the steps to take for emergency preparedness;
 - (G) propose action to take in emergency situations;
 - (H) formulate a plan bridge emergency responses;
 - (I) demonstrate bridge watch standing duties;
 - (J) explain standard operating procedures;
 - (K) complete passage planning;
 - (L) plan, execute, and monitor the progress of a vessel;
 - (M) simulate the operation of safe navigation of a vessel in high-risk areas;
 - (N) practice error chain analysis; and
 - (O) evaluate passage planning and execution.
- (3) The student understands different human factors that can affect bridge team and ship operations. The student is expected to:
- (A) describe ways to mitigate the effects of stress and fatigue on the crew;
 - (B) propose actions to address teamwork among members with diverse perspectives
 - (C) determine communication barriers and recommend corrective action;
 - (D) discuss possible treatments of impaired shipboard personnel;
 - (E) evaluate the importance of common terminology; and
 - (F) identify causal factors of work load on team coordination and performance
- (4) The student explores ways to safely navigate various types of vessels. The student is expected to:
- (A) demonstrate the techniques for navigating vessels such as off-shore supply, container ships, tankers, bulk carriers, roll-on roll-off, tug and tow, fishing, liquefied natural gas (LNG) carriers, and recreational vessels;
 - (B) explain ways to conduct a passage and determine position of a vessel;
 - (C) outline safe navigational watch practices;



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- (D) simulate response to emergencies;
 - (E) practice response to a distress signal at sea;
 - (F) maneuver the ship in simulation;
 - (G) determine position using a variety of means including GPS;
 - (H) determine and allow for compass error;
 - (I) coordinate search and rescue operations in simulation;
 - (J) establish watch keeping arrangements and procedures;
 - (K) maintain safe navigation through the use of information from navigation equipment and systems to assist command decision making;
 - (L) simulate the maneuvering of a ship in a variety of visibility and weather conditions such as ice, storm, fog, and snow; and
 - (M) operate remote controls of propulsion plant and engineering systems and services.
- (5) The student explores bridge-to-bridge communications, equipment, and procedures. The student is expected to:
- (A) simulate proper radio procedures in different situations such as stand on, meeting, crossing, and overtaking as the give way vessel and stand on vessel;
 - (B) describe communication standards and protocols for vessel traffic systems (VTS);
 - (C) contact local VTS to report ship identification, positions, and intentions;
 - (D) differentiate between urgent communications including pon pon, mayday, and security broadcasts;
 - (E) practice sending and receiving simulated distress alerts; and
 - (F) describe maritime cell phone regulations.
- (6) The student assesses maritime accidents and actions needed during a disaster response. The student is expected to:
- (A) indicate scene size up requirements for potential maritime accidents;
 - (B) describe the most common techniques for locating a vessel in distress;
 - (C) practice safe techniques for victim extrication on sea; and
 - (D) propose and simulate a search and rescue operation.



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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 regional 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 assessed from industry partners, such as the Port of Houston Authority. After completion of a maritime career pathway, students will be able to graduate as 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

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=navRuleChanges>



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Recommended course activities:

Students may be provided the opportunity to participate in all of the the following activities: (a) Research; (b) Career assessment and career plan development; (c) Online learning; (d) Industry speakers; (e) Interviews with industry personnel; (f) Multimedia videos; (g) Onsite visits to industry sites; (h) Written papers; (i) Written tests; (j) Tours/speakers of college campuses; (k) Hands-on experiences with industry tools tests; (l) Bridge simulations; (m) First aid skills assessment; (n) Ship channel field experiences.

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: