MARA A157: RADAR OBSERVER

Item	Value
Curriculum Committee Approval Date	10/04/2023
Top Code	095900 - Marine Technology
Units	2 Total Units
Hours	40 Total Hours (Lecture Hours 40)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

Students will learn fundamentals of marine Radar, its uses, limitations, and how to interpret data from a radar system. Primary focuses will be on Radar Navigation and Collision avoidance. Students with satisfactory level of completion will be qualified for a Certificate of Completion for U.S. Coast Guard Radar Observer license endorsement, establishing competency in the operation and utilization of marine radar equipment. This endorsement may be added to any U.S. Coast Guard Deck Officer License. ADVISORY: MARA A150 or MARA A153. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Demonstrate proper tuning and use of Radar for Navigation and collision avoidance
2. Determine if a risk of collision exists
3. Interpret and analyze Radar information
4. Plot by graphical means, required contact information derived from the Radar presentation

Course Objectives

- 1. Recognize benefits and limitations of modern marine Radar
- 2. Identify controls for proper operation and tuning of Radar
- 3. Demonstrate understanding of principles for Radar operation
- 4. Identify targets on Radar display
- 5. Use the relative motion triangle to determine true course and speed of contacts
- 6. Ascertain dangerous meeting conditions between contacts
- 7. Determine appropriate response for own ship when risk of collision exists
- 8. Plot position based on Radar information
- 9. Maintain navigational awareness through use of Radar ranges and bearings

Lecture Content

Radar Fundamentals Defines and understands the fundamentals of radar 46 CFR 10.305 (1)(i) Explains how a radar works Lists factors affecting the performance accuracy of marine radar States purposes identifies functions of the main components that constitute a typical marine radar system Radar Operation and Use Operates and uses radar 46 CFR 10.305 (1) (ii) States purposes demonstrates adjustment of controls Identifies: Detection of malfunctions False echoes Indirect echoes Other radar phenomena State the effect of sea return, weather and other environmental conditions Identifies limitations of radar resulting from design factors States safety precautions associated with use and maintenance of marine radar Demonstrates measurement of ranges bearing States the effect of size, shape, composition distance of vessels terrestrial targets on echo Radar Information Analysis and Interpretation Interprets and analyze radar information 46 CFR 10.305 (1) (iii) Demonstrates radar navigation (including visual techniques): Determining position of other vessels Detecting changes in relative motion of other vessels Demonstrates collision avoidance, including visual techniques, appropriate to the circumstances the equipment in use Demonstrates determining the course speed of another vessel Demonstrates time distance of closest point of approach of a crossing, meeting, overtaking, or overtaken vessel Detects changes of course or speed of another vessel after its initial course and speed have been established Applies Navigation Rules M16672.2D, and other factors to consider when determining changes of course or speed of a vessel to prevent collisions on the basis of radar observation Demonstrates use of radar in maintaining situational awareness Radar Plotting Plot by graphical means, required contact information from radar information 46 CFR 10.305 (1) (iv) Demonstrate principles and methods of plotting relative true motion Using the R-T-M method, determine the seven required solutions on practice plotting

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)

Instructional Techniques

Lecture Written exams Practical application through simulator exercises. Practical exams on the navigation simulator.

Reading Assignments

The Radar Instruction Handook and addtional handouts are given as reading assignments. These are approximately 2 hours/week.

Writing Assignments

Written analysis of case studies of Maritime incidents of 1 hour/week.

Out-of-class Assignments

Radar Paper Plotting problem assignments 4/hours / week. Approximately 1.5 - 2 hour physical plotting and theory review for USCG exams.

Demonstration of Critical Thinking

Multiple choice and short answer quizzes and tests. Written paper on approved topic. Practical skill assessment where students must answer questions and make practical adjustments to compass courses of vessels underway.

Required Writing, Problem Solving, Skills Demonstration

Written analysis of case studies of Maritime incidents

Eligible Disciplines

Marine diving technology: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience. Marine engine technology: Any bachelors degree and two years of professional experience, or any associate degree and

six years of professional experience. Search and rescue: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience. Ship and boat building and repair: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience. Transportation: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Chapman, Charles F.. Chapman Piloting Seamanship, 69 ed. New York: Hearst Books, 2021 Rationale: -

Other Resources

1. Publication 1310 Reprints 2. Selected handout materials to be provided and distributed by the instructor.