Electronic Chart Display & Information System (ECDIS)

Instructor

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Course Description

This course provides the generic knowledge, skill and understanding of ECDIS and electronic navigation charts (ENC's) needed to safely navigate vessels whose primary means of navigation is ECDIS. Course content covers the theory and practical use of ECDIS, IMO regulations and Performance Standards governing the use of ECDIS and meets the STCW requirements for ECDIS certification.

IMO Definition of Generic ECDIS Training
"ECDIS training to ensure that navigators can use and understand ECDIS in the context of navigation and can demonstrate all competencies contained in and implied by STCW 2010. Such training should ensure that the navigator learns to use ECDIS and can apply it in all aspects of navigation, including the knowledge, understanding and proficiency to transfer that skill to the particular ECDIS system(s) actually encountered on board, prior to taking over navigational duties. This level of training should deliver the competencies at least equivalent to those given in Model Course 1.27".

Course Topics

- Basic functions, system configuration settings of ECDIS
- Display setup
- Cursor and miscellaneous functions
- Information Panel
- Toolbars
- Operational settings –Alarms
- Charts, license, settings, loading and correction
- Safety values
- Route planning
- Tides and currents
- Passage Planning
- User charts

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Course Format

The course is presented in an integrated lecture and laboratory (3 hours) format. Each class will begin with knowledge based lecture information and continue with sophisticated navigation simulation that provides each trainee with individual unshared access to ownship operations integrated with a complete type-approved ECDIS.

Learning Objectives

Those who successfully complete this course should be able to demonstrate sufficient knowledge, skill and understanding of ECDIS navigation and electronic charts to undertake the duties of a navigational watch officer defined by STCW Code.

Demonstrate knowledge and understanding of the following STCW elements

Each individual will demonstrate their knowledge and understanding of ECDIS and electronic navigation charts (ENC's) and the following STCW elements through practical simulator exercises and written examination:

- OICNW-A4.1 thorough understanding of Electronic Navigational Chart (ENC) data, data accuracy, presentation rules, display options and other chart data formats
- OICNW-A4.1 the dangers of over-reliance
- OICNW-A4.1 familiarity with the functions of ECDIS required by performance standards in force
- OICNW-A4.2 use of functions that are integrated with other navigation systems in various installations, including proper functioning and adjustment to desired settings
- OICNW-A4.2 safe monitoring and adjustment of information, including own position, sea area display, mode and orientation, chart data displayed, route monitoring, user-created information layers, contacts (when interfaced with AIS and/or radar tracking) and radar overlay functions (when interfaced)
- OICNW-A4.2 confirmation of vessel position by alternative means
- OICNW-A4.2 efficient use of settings to ensure conformance to operational procedures, including alarm parameters for anti-grounding, proximity to contacts and special areas, completeness of chart data and chart update status, and backup arrangements
- OICNW-A4.2 adjustment of settings and values to suit the present conditions
- OICNW-A4.2 situational awareness while using ECDIS including safe water and proximity of hazards, set and drift, chart data and scale selection, suitability of route, contact detection and management, and integrity of sensors

Each individual will demonstrate their proficiency, **skill and understanding of ECDIS and electronic navigation charts (ENC's) by demonstrating of the following practical skills as per STCW performance requirements:**

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- [OICNW-3-3A](#) Operational Settings - Safety Depth
- [OICNW-3-3B](#) Operational Settings - Display/Change Safety contour
- [OICNW-3-3C](#) Operational Settings - Display/change CPA/TCPA limits
- [OICNW-3-3D](#) Operational Settings - Display/Change spot sounding limits
- [OICNW-3-3E](#) Operational Settings - Resume of Navigation Mode
- [OICNW-3-3F](#) Monitoring Sea Area - Chart Scaling
- [OICNW-3-3G](#) Monitoring Sea Area - Chart selection
- [OICNW-3-3H](#) Monitoring Sea Area - Gain information
- [OICNW-3-3I](#) Monitoring Sea Area - ERBL
- [OICNW-3-3J](#) Display User Charts
- [OICNW-3-3K](#) Merge User Charts
- [OICNW-3-3L](#) Display Route Plans
- [OICNW-3-3M](#) Modify Waypoints
- [OICNW-3-3N](#) Check revised route for safety
- [OICNW-3-3O](#) Convert Route Plan to Passage Plan
- [OICNW-3-3P](#) Convert Route Plan to a Route
- [OICNW-3-3Q](#) Environmental Data - Identify tidal data
- [OICNW-3-3R](#) Environmental Data - Display tide bars and current vectors

Other Objectives

At the completion of the course the student will be able to:

- Operate an ECDIS and use its functions for safe navigation and understand the capabilities and limitations of ECDIS.

Prerequisites

MT-3222 ARPA, minimum grade (C-)

Required Text

Ralph Becker-Heins, **ECDIS BASICS**, *A Guide to the Operational Use of Electronic Chart Display and Information Systems*, First Edition 2014.

Exams and Grading

Weekly Quizzes – 10%
Mid-Term Written – 20%
Mid-Term Practical – 25%
Final Written – 20%
Final Assessments – 25%, Successful Demonstration of Proficiency on first attempt = 100, Second attempt = 75. Failure to successfully demonstrate proficiency in two attempts will result in a 0 averaged in for Assessments and an incomplete for the course.

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Attendance

Attendance is mandatory for the entire scheduled class period. This is an STCW regulated course requiring 40 hours of training. The course meets only once per week for three hours and each student is allowed only one absence throughout the semester. Missing more than one class will result in a failure to meet STCW requirements and the student will be asked to withdraw from the course.

Documented Disability

Massachusetts Maritime Academy is committed to providing reasonable accommodations to students with documented disabilities. Students who believe they may need accommodations in this class are required to contact Dr. Fran Tischavich within the first two weeks of class. ftischavich@maritime.edu.

Note: Accommodations will be granted for knowledge based performance measures but WILL NOT be granted for all skill and practical performance based assessments.

Successful completion of this course is determined by you the student. Do not fall behind, do the reading, ask questions when in doubt, and report to class ready to work and learn. Our mutual goal for this course is for each of you to enhance your professional watchstanding knowledge and become a licensed mate in the U. S. Merchant Marine. I look forward to working with you this semester.

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SYLLABUS

TOPIC	READING/HOMEWORK

1. Introduction - Elements of ECDIS, Training
    a. Introduction to ECDIS
    b. Purpose of ECDIS
    c. ECDIS value to navigation
    d. Limitations of ECDIS: Correct and Incorrect use of ECDIS
	Chapter 1,4

2. A. Carriage Requirements
    a. SOLAS Chapters V, Regulations 19, 27
    b. Flag State Requirements
	Chapter 2,3

2. B. Functionality Requirements
    a. Performance Standards
    b. Power supply
    c. Back up
    d. Software upgrade
    e. Official ENC charts
    f. Type Approval
	Chapter 2,3

3. Sensor Requirements
    a. Required sensors
    b. Sensor selection
    c. Primary and Secondary position source
    d. Sensor alarms
    e. Sensor reference point
    f. Own ship presentation
    g. Own ship vectors COG/HDG
    h. Predicted vectors
    i. Past history
	Chapter 10

4. Chart Data
    a. Official and unofficial chart data
    b. Types of charts, Vector/Raster
    c. ENC
    d. SENC
    e. Chart objects, understanding chart data
    f. Chart Standards, Data format, presentation library
    g. Characteristics of a vector chart
    h. Chart numbering, scaling
    i. Chart selection
	Chapters 5, 8

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j. Chart quality and accuracy	
5. Chart Presentation a. Automatic chart loading b. Chart selection c. Chart orientation d. Own ship movement e. Overscaling and underscaling f. Base, Standard, All, Custom Display modes g. SCAMIN h. Primary/Secondary Display i. Safety contour j. Safety depth k. Depth shades – 2 depth shades, 4 depth shades l. Required Alarms/Indications	Chapters 6,13
6. Target Presentation a. Radar Overlay (RIB functions) b. Radar targets c. AIS Targets – target symbol features d. ARPA targets– target symbol features e. AIS, ARPA Set up requirements f. AIS, ARPA Alarms	Chapter 6
7. Voyage/Route Planning a. Waypoints, creation, labeling b. Construction a draft route c. Waypoints, refining/adjusting d. Visual route check	Chapters 11,13
8. Voyage/Route Planning cont' e. Voyage plan creation f. Voyage plan auto route check g. Route planning Indications/warnings h. ETA's, CN, Dist. i. Naming and saving the voyage plan j. Loading/unloading voyage plan k. Route monitoring Activated State l. Alarms/Indications m. Tide, current, port information	Chapters 11,13

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9. Effective Navigation With ECDIS a. Potential errors b. Errors of interpretation c. System errors a. EBL/VRM b. Lines of Position/Position fixing c. User additions to chart d. Event Marker/MOB function	Chapter 7,14
10. Chart Licensing, Distribution, Maintenance a. License b. Installation procedures c. Format requirements d. Data distribution sources for ENC and conversion to SENC e. Chart installation history	Chapter 9
11. Installing Chart Corrections a. Maintaining up to date charts b. Automatic chart corrections c. Manual chart corrections d. Chart update history e. Temporary and preliminary corrections and warnings	Chapter 9