CONCEPT

Marine Navigation and Bridge Equipment: ECDIS, Radar/ARPA and Passage Planning

7 – 11 February 2027
Dammam - Eastern Province five-star



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Introduction:

Marine navigation errors rarely come from a missing instrument; they come from ECDIS safety settings left at default, radar and ARPA data trusted without cross-checks, and passage plans drawn without appraisal. Groundings and close-quarters incidents then reach fleet managers and port teams as delays, claims and detentions. This Core Concept course gives marine operations, port, fleet and junior deck staff working knowledge of charts, ECDIS, radar and ARPA, GNSS, AIS, compasses, echo sounder, speed log and voyage data recorder, and of passage planning. Participants produce a Case Voyage Passage Plan and Bridge Equipment Checklist.

Course Objectives:

- Read nautical charts and electronic navigational charts, including chart datums, soundings, symbols and corrections, and judge their fitness for a voyage
- Configure and check ECDIS safety contour, safety depth, look-ahead and anti-grounding alarm settings against the ship's draught and under keel clearance
- Interpret radar and ARPA target data, including CPA, TCPA and trial manoeuvre results, and cross-check them against AIS and visual bearings
- Verify position from GNSS, radar ranges, bearings and dead reckoning, and detect errors from gyro, magnetic compass, echo sounder and speed log inputs
- Prepare a passage plan through appraisal, planning, execution and monitoring, with no-go areas, wheel-over points and abort points
- Assess navigational equipment status, voyage data recorder readiness and cyber exposure of integrated bridge systems using a structured checklist

Target Audience:

- Marine operations staff who support vessel voyages, review passage plans and follow fleet navigational performance
- Port and terminal marine staff who deal with arriving vessels, pilotage approaches and berthing channels
- Fleet and technical support staff who look after bridge equipment defects, spares and voyage data recorder surveys
- Junior deck staff who keep a navigational watch under supervision and maintain charts and publications
- Marine assurance and navigation audit staff who review bridge practice and navigational incidents

Course Outline:

Day 1: Nautical Charts, Chart Datums and Position Fixing Basics

- Mercator Projection, Latitude, Longitude and Chart Scale Selection
- Chart Datums, Horizontal Datum Shifts and Tidal Height Reference
- Paper Chart Symbols, Soundings, Notices to Mariners and Chart Correction Log
- Dead Reckoning, Estimated Position and Set and Drift Calculation
- Navigational Equipment Inventory Review for a Case Vessel Bridge

Day 2: ECDIS Principles, ENC Data and Safety Settings

- ECDIS Architecture, ENC Cells and SOLAS Chart Carriage
- IHO S-57 Data, S-52 Presentation Library and the S-100 and S-101 Transition
- Safety Contour, Safety Depth and Shallow Contour Settings Against Draught
- Look-Ahead Sector, Anti-Grounding Alarms and Category Zoom Checks
- Raster Chart Display Mode Limits and ENC Update Verification

Day 3: Radar, ARPA, GNSS, AIS and Heading and Depth Sensors

- Radar Range Scale, Gain, Sea and Rain Controls for Target Detection
- ARPA Target Acquisition, Vector Modes, CPA and TCPA and Trial Manoeuvre
- GNSS Position Accuracy, Dilution of Precision and Radar Range Position Fix
- AIS Static and Dynamic Data Cross-Check Against Radar Echoes
- Gyro Compass Error, Magnetic Compass Deviation Card, Echo Sounder and Speed Log Checks

Day 4: Passage Planning, Collision Avoidance and Navigation Risk

- IMO Voyage Planning Stages: Appraisal, Planning, Execution and Monitoring
- Route Plotting With No-Go Areas, Wheel-Over Points, Abort Points and Contingency Anchorages
- Under Keel Clearance, Squat and Air Draught Margins in Restricted Waters
- Collision Regulations Overview: Lights, Shapes, Sound Signals and Give-Way Duties
- Integrated Bridge System Sensor Failure Modes and Cyber Risk to Navigation Data

Day 5: Case Voyage: Passage Plan and Bridge Equipment Checklist

- Case Voyage Briefing: Departure Port, Coastal Leg and Pilot Boarding Approach
- Appraisal Worksheet Build From Charts, Tidal Data and Weather Routing
- ECDIS Route Check Report and Waypoint Table Drafting
- Voyage Data Recorder Readiness and Bridge Equipment Pre-Departure Checklist
- Passage Plan and Checklist Presentation With Navigation Audit Panel Feedback

Skills You Will Gain:

- Chart Datum Interpretation
- ECDIS Safety Parameter Setting
- Radar Target Assessment
- Position Fixing and Verification
- Navigational Sensor Error Detection
- Passage Plan Preparation
- Collision Regulation Awareness
- Bridge Equipment Status Review

Why Attend This Course:

- Leave with a Case Voyage Passage Plan and Bridge Equipment Checklist tested against a navigation audit panel
- Recognise when an ECDIS display, radar picture or GNSS position looks right but is wrong
- Talk with masters, pilots and equipment suppliers using correct navigation terms and numbers
- Compare navigation practice with peers from tanker, container, offshore support, port and ferry operations

Conclusion:

Safe marine navigation depends on charts, sensors and plans that agree with each other, and on people ashore and on the bridge who can tell when they do not. The course moves from nautical charts, datums and dead reckoning, through ECDIS data and safety settings, to radar, ARPA, GNSS, AIS, compass, echo sounder and speed log checks, then to passage planning, collision regulations and cyber risk. The final day produces a Case Voyage Passage Plan and Bridge Equipment Checklist ready for fleet use.