Advanced Certificate in Marine Navigation and Nautical Science

Ship Management and Operations

ABS Classification – A classification society that sets technical standards for ship design, construction and survey.
Related terms: Class Society, Survey, Statutory Compliance.
Explanation: The American Bureau of Shipping (ABS) issues rules that vessels must meet for safety and environmental protection.
Example: A bulk carrier built to ABS “A” rules undergoes periodic hull inspections to verify compliance.
Challenges: Keeping up-to-date with evolving ABS amendments and integrating them into existing ship management procedures.

Admiralty Law – The body of maritime law governing private maritime activities and the relationship between private entities.
Related terms: International Maritime Organization (IMO), Flag State, Marine Claims.
Explanation: Also known as the law of the sea, it covers issues such as collisions, salvage, and carriage of goods.
Practical application: Ship managers must ensure that charter parties and crew contracts conform to Admiralty principles.
Challenges: Navigating conflicts between national legislation and universal maritime conventions.

Agency – A maritime agency provides port, logistical and administrative services on behalf of ship owners.
Related terms: Ship Owner, Port Agent, Stevedore.
Explanation: Agencies coordinate pilotage, berth allocation, customs clearance and crew changes.
Example: A vessel calling at Rotterdam uses a Dutch agency to arrange tug assistance and bunker delivery.
Challenges: Maintaining 24-hour availability, managing language barriers, and handling unexpected port restrictions.

Alarm Management – The systematic process of handling vessel alarm signals to ensure timely and appropriate response.
Related terms: Bridge Watchkeeping, Integrated Bridge System (IBS), Human Factors.
Explanation: Includes alarm prioritisation, crew training, and regular testing of alarm circuits.
Practical application: Bridge officers use a visual alarm log to track and acknowledge alarms during a passage.
Challenges: Alarm fatigue, false alarms, and ensuring crew retain proficiency during low-traffic periods.

Anti-Collision Regulations (COLREGs) – International rules that prescribe safe navigation and maneuvering to avoid collisions at sea.
Related terms: Rule 5, Rule 16, Radar Plotting.
Explanation: The COLREGs define responsibilities of stand-by and give-way vessels, require proper lighting, and set sound signal requirements.

Example: In a crossing situation, the vessel on the starboard side must give way according to Rule 15.
Challenges: Interpreting rules in congested waterways, integrating electronic aids while preserving manual watch-keeping.

Annual Survey – A comprehensive inspection performed once every twelve months to verify a ship's continued compliance with classification society rules.
Related terms: Continuous Survey, Condition Monitoring, Planned Maintenance System (PMS).
Explanation: The survey covers hull, machinery, safety equipment and pollution control devices.
Practical application: Findings are recorded in a survey report and any deficiencies must be rectified before the next certification.
Challenges: Scheduling downtime, coordinating with shipyards for corrective work, and managing cost overruns.

Barometer – An instrument that measures atmospheric pressure, used to anticipate weather changes affecting navigation.
Related terms: Weather Routing, METAR, Pressure Tendency.
Explanation: A falling barometer indicates an approaching low-pressure system, prompting route adjustments.
Example: The chief officer notes a rapid pressure drop and orders a deviation to avoid a developing cyclone.
Challenges: Interpreting rapid fluctuations and integrating barometric data with satellite forecasts.

Berth Allocation – The process of assigning a vessel a specific location in a port for loading, unloading or bunkering.
Related terms: Port Call Planning, Draft Restriction, Tide Window.
Explanation: Allocation considers vessel size, cargo type, draft and terminal capacity.
Practical application: The ship's agent secures a berth that matches the vessel's LOA and draft at the desired tide.
Challenges: Port congestion, last-minute changes, and coordination with terminal operators.

Bridge Resource Management (BRM) – A set of training and operational principles designed to optimise the use of all bridge personnel and equipment.
Related terms: Teamwork, Decision Making, Situational Awareness.
Explanation: BRM emphasizes communication, role clarity and error management to enhance safety.
Example: During a maneuver, the officer of the watch conducts a brief "call-outs" session to confirm actions.
Challenges: Overcoming hierarchical barriers, maintaining proficiency during long passages, and integrating automation.

Bulk Cargo Handling – The procedures for loading, securing and discharging dry bulk commodities such as grain, ore or coal.
Related terms: Stowage Plan, Trim, Cargo Holds.
Explanation: Correct handling prevents cargo shift, maintains vessel stability and avoids contamination.
Practical application: The chief officer monitors cargo moisture content to prevent spontaneous combustion in coal.
Challenges: Weather-related delays, cargo moisture variability, and ensuring compliance with port

regulations.

Cargo Securing – The methods and equipment used to prevent cargo movement during a voyage.
Related terms: Lashing, Stowage Factor, Stability.
Explanation: Securing includes lashings, dunnage, and proper stowage sequencing.
Example: Containers are locked with twist-locks and checked against the vessel's lashing plan before departure.
Challenges: Dealing with uneven cargo weight distribution, verifying correct tension, and meeting classification society standards.

Certificate of Registry – An official document issued by a flag state that records a vessel's ownership, nationality and technical particulars.
Related terms: Flag State, International Tonnage Certificate, Ship Identity.
Explanation: The certificate proves legal ownership and is required for port entry and insurance.
Practical application: The master presents the certificate during a customs inspection to verify the vessel's flag.
Challenges: Updating the certificate after ownership transfer or major modifications, and ensuring it matches other documentation.

Charter Party – A contract between a shipowner and a charterer governing the terms of vessel employment.
Related terms: Voyage Charter, Time Charter, Bareboat Charter.
Explanation: The charter party outlines freight rates, lay-days, demurrage, and responsibilities for cargo.
Example: A time charter includes a daily hire rate and specifies the vessel's speed and fuel consumption limits.
Challenges: Interpreting vague clauses, handling disputes over performance, and aligning charter terms with operational capabilities.

Chief Engineer – The senior officer responsible for the operation, maintenance and repair of a ship's propulsion and auxiliary machinery.
Related terms: Engine Room, Planned Maintenance System (PMS), Marine Diesel Engine.
Explanation: The chief engineer supervises watch-standing engineers, manages spare parts inventory and ensures compliance with emission standards.
Practical application: During a voyage, the chief engineer monitors fuel consumption to meet the charterer's performance clause.
Challenges: Balancing preventive maintenance with operational demands, handling unexpected breakdowns, and meeting stringent emission regulations.

Coastal Navigation – Navigation performed within 20 nautical miles of land, requiring detailed chart work, tide and current knowledge.
Related terms: Electronic Chart Display and Information System (ECDIS), Depth Sounder, Compass Deviation.
Explanation: Coastal navigation relies on visual landmarks, buoys, and radio aids in addition to electronic systems.
Example: A vessel transits the English Channel using a combination of radar, GPS and visual bearings from lighthouse beacons.

Challenges: High traffic density, rapidly changing weather, and the need for precise position fixing.

Compliance Audit – A systematic review of a ship's policies, procedures and records to verify adherence to regulations and company standards.
Related terms: Internal Audit, Flag State Inspection, Safety Management System (SMS).
Explanation: Audits assess documentation, training records, equipment condition and operational practices.
Practical application: An auditor checks the ship's oil record book for completeness and accuracy during a quarterly review.
Challenges: Identifying non-conformities without disrupting operations, and implementing corrective actions promptly.

Condition Monitoring – The continuous observation of equipment performance parameters to predict failures before they occur.
Related terms: Vibration Analysis, Thermography, Predictive Maintenance.
Explanation: Sensors collect data on temperature, pressure and vibration, feeding it into trend-analysis software.
Example: The main engine's oil temperature trend shows a gradual rise, prompting an early oil change to avoid wear.
Challenges: Managing large data sets, ensuring sensor reliability, and integrating alerts into crew workflows.

Continuous Survey – An alternative to periodic surveys where classification societies conduct ongoing inspections throughout a vessel's service life.
Related terms: Annual Survey, Class Interval, Risk Based Surveying.
Explanation: Continuous surveys reduce the need for large, infrequent inspections by spreading verification tasks.
Practical application: A tanker's hull plates are inspected during routine dry-docking, satisfying both survey and maintenance needs.
Challenges: Coordinating inspection schedules with operational plans and maintaining consistent documentation.

Deadweight Tonnage (DWT) – The total weight a ship can safely carry, including cargo, fuel, provisions, crew and ballast.
Related terms: Displacement, Lightweight, Load Line.
Explanation: DWT is a key design parameter influencing stability, draft and port fees.
Example: A vessel with a DWT of 70,000 t can load 65,000 t of cargo while retaining sufficient reserve buoyancy.
Challenges: Accurately estimating fuel consumption and ballast requirements to avoid exceeding DWT during a voyage.

Demurrage – A penalty payable by a charterer to a shipowner for delays beyond the agreed lay-days.
Related terms: Lay-Days, Detention, Freight.
Explanation: Demurrage compensates the owner for lost earning potential caused by extended port stays.
Practical application: A vessel delayed by a labor strike incurs demurrage charges calculated per day of excess lay-time.

Challenges: Negotiating fair rates, documenting the cause of delay, and managing cash-flow impacts.

Distress Signal – An internationally recognised signal indicating a vessel is in grave and imminent danger and requires immediate assistance.
Related terms: Mayday, Pan-Pan, Safety of Life at Sea (SOLAS).
Explanation: The signal is transmitted via VHF, MF/HF radio or visual means (flares).
Example: A ship experiencing a hull breach radios “Mayday” on VHF Channel 16, providing position and nature of emergency.
Challenges: Ensuring crew are trained to send correct signals and that receiving stations respond promptly.

Dynamic Positioning (DP) – A computer-controlled system that automatically maintains a vessel’s position and heading using its propellers and thrusters.
Related terms: DP1, DP2, DP3, Reference Sensors, Redundancy.
Explanation: DP is essential for offshore operations such as drilling, cable laying and wind-farm installation.
Practical application: A DP2 vessel holds position over a subsea pipeline while a ROV conducts inspection.
Challenges: Power loss, sensor failure, and maintaining crew competence in manual override procedures.

Electronic Chart Display and Information System (ECDIS) – An electronic navigation tool that integrates chart data, position information and route planning.
Related terms: ENC (Electronic Navigational Chart), Voyage Planning, Regulatory Compliance.
Explanation: ECDIS must be approved by the flag state and used in accordance with IMO Resolution A.938(23).
Example: The master creates a passage plan on ECDIS, setting waypoints that automatically generate a safe route.
Challenges: Keeping ENC updates current, preventing over-reliance on automation, and ensuring redundancy with paper charts.

Engine Room Watchkeeping – The systematic monitoring of propulsion and auxiliary plant systems by engineers on duty.
Related terms: Engine Logbook, Shift Handover, Alarm Response.
Explanation: Watchkeepers record parameters, respond to alarms, and perform routine checks to maintain safe operation.
Practical application: During a watch, the second engineer checks oil pressure, coolant temperature and fuel flow rate.
Challenges: Fatigue management, maintaining situational awareness in a noisy environment, and handling multiple simultaneous alarms.

Environmental Management System (EMS) – A structured framework for controlling a ship’s environmental impact, aligned with ISO 14001.
Related terms: Pollution Prevention, Ballast Water Management, Emission Reporting.
Explanation: EMS includes policies, procedures, training and performance monitoring to meet regulatory requirements.
Example: The ship’s EMS requires quarterly oil tank cleaning and documentation in the oil record book.
Challenges: Integrating EMS with the Safety Management System, ensuring crew participation, and tracking

compliance across multiple jurisdictions.

Flag State – The country under whose laws a vessel is registered and which exercises jurisdiction over the ship.
Related terms: Port State Control, Certificate of Registry, Statutory Inspection.
Explanation: The flag state issues certificates, enforces safety standards and may impose additional regulations.
Practical application: A vessel flying the Pan-American flag must comply with that nation's maritime labour conventions.
Challenges: Flag-state reputation, varying enforcement rigor, and the impact of flag changes on insurance premiums.

Fuel Oil Quality (FOQ) – The specification and testing of marine fuel to ensure it meets performance and emission standards.
Related terms: ISO 8217, Sulphur Content, Viscosity.
Explanation: FOQ testing includes density, sulphur, flash point and water content measurements.
Example: Before bunkering, the chief engineer samples the fuel and confirms compliance with the ship's IMO 2020 sulphur limit.
Challenges: Variability in bunker supply, contamination risk, and maintaining accurate records for audits.

General Average – A principle of maritime law where all parties in a voyage proportionally share the costs of sacrifices made to save the vessel.
Related terms: Salvage, Marine Insurance, Joint Venture.
Explanation: When cargo is jettisoned or the ship is repaired after a peril, the expenses are apportioned among cargo owners and the shipowner.
Practical application: After a storm, the crew jettisons part of the cargo; a General Average adjuster calculates each party's contribution.
Challenges: Determining liability, coordinating with insurers, and handling disputes over expense allocation.

Global Maritime Distress and Safety System (GMDSS) – An internationally coordinated set of communication protocols and equipment for emergency situations.
Related terms: VHF Channel 16, EPIRB, Sea-Area A, B, C, D.
Explanation: GMDSS ensures that a ship in distress can transmit alerts and receive assistance regardless of location.
Example: A ship in Sea-Area A activates its EPIRB, which transmits a distress signal via satellite to rescue coordination centres.
Challenges: Maintaining equipment certification, ensuring crew proficiency, and managing battery replacements.

Hull Inspection – The examination of a vessel's structural integrity, including plates, frames and welds.
Related terms: Non-Destructive Testing (NDT), Corrosion Monitoring, Class Survey.
Explanation: Inspections may be visual, ultrasonic or magnetic particle based, aiming to detect defects early.
Practical application: During a dry-docking, inspectors use ultrasonic thickness gauges to verify hull plate wear.

Challenges: Access limitations in tight spaces, interpreting inspection data, and scheduling repairs without disrupting service.

IMO 2020 Sulphur Regulation – A global cap limiting the sulphur content of marine fuel to 0.50 % mass/mass, effective from 1 January 2020.
Related terms: Emission Control Area (ECA), Scrubber, Bunker Delivery Note (BDN).
Explanation: The regulation aims to reduce SOx emissions and improve air quality.
Example: A vessel operating in an ECA must use low-sulphur fuel (Integrated Bridge System (IBS) – A suite of electronic navigation and control equipment that shares data across multiple bridge consoles.
Related terms: ECDIS, Radar, Auto-Pilot.
Explanation: IBS enhances situational awareness by integrating radar, AIS, GPS, and gyro-compass information.
Practical application: The officer of the watch can display radar overlays on the ECDIS to identify traffic conflicts.
Challenges: System interoperability, cyber-security vulnerabilities, and the need for thorough crew training.

International Safety Management (ISM) Code – A set of standards for the safe operation of ships and the prevention of marine pollution.
Related terms: Safety Management System (SMS), Document of Compliance (DOC), Company Code.
Explanation: The ISM Code requires shipowners to develop an SMS, conduct internal audits and certify compliance.
Example: The master conducts a monthly SMS audit to verify that emergency drills meet ISM requirements.
Challenges: Keeping the SMS current with regulatory changes, ensuring crew engagement, and addressing audit findings promptly.

ISPS Code – The International Ship and Port Facility Security Code, establishing security measures for ships and ports.
Related terms: Ship Security Plan (SSP), Port Facility Security Plan (PFSP), Security Officer.
Explanation: The code mandates risk assessments, access control, and security drills to prevent unlawful acts.
Practical application: The ship's security officer conducts a muster drill simulating a piracy boarding attempt.
Challenges: Balancing security with operational efficiency, updating threat assessments, and coordinating with port authorities.

Key Performance Indicators (KPIs) – Quantitative metrics used to assess the efficiency and effectiveness of ship management processes.
Related terms: Operational Efficiency, Fuel Consumption Rate, On-Time Performance.
Explanation: KPIs may include days at sea per month, maintenance backlog, and compliance audit scores.
Example: A manager tracks the vessel's average fuel consumption (tons per day) as a KPI for cost control.
Challenges: Selecting relevant indicators, ensuring data accuracy, and translating results into actionable improvement plans.

Lay-Days – The period allotted in a charter party for loading and discharging cargo without incurring demurrage.

Related terms: Demurrage, Detention, Port Call.
Explanation: Lay-days are calculated based on cargo volume, berth availability and agreed loading rates.
Practical application: The charterer negotiates a 48-hour lay-day window for a vegetable cargo at a Mediterranean port.
Challenges: Unexpected port congestion, equipment failure, and weather interruptions that reduce the available lay-day period.

Marine Diesel Engine – The primary propulsion engine on most merchant vessels, operating on heavy fuel oil or marine diesel.
Related terms: Turbo-charger, Fuel Injection System, Power Rating.
Explanation: Engines are rated by brake horsepower (BHP) and must meet emission standards such as IMO Tier II/III.
Example: A 12,000 BHP two-stroke engine provides the thrust needed for a container ship's 22-knot service speed.
Challenges: Managing wear on pistons and liners, controlling exhaust emissions, and ensuring reliable fuel supply.

Marine Environmental Protection (MEP) Regulations – A suite of international rules aimed at preventing pollution from ships.
Related terms: MARPOL Annexes, Ballast Water Management Convention, Oil Pollution Act.
Explanation: MEP regulations cover oil, sewage, garbage, air emissions and invasive species.
Practical application: The ship's waste management plan specifies segregation of plastics, food waste and oily residues.
Challenges: Keeping up-to-date with evolving standards, training crew on proper disposal, and documenting compliance for inspections.

Marine Insurance – Coverage that protects shipowners, charterers and cargo interests against loss or damage.
Related terms: Hull and Machinery (H&M) Insurance, Protection & Indemnity (P&I), Loss of Hire.
Explanation: Policies may include coverage for collision, grounding, piracy, and environmental liability.
Example: After a hull breach, the H&M insurer pays for repair costs while the P&I insurer covers third-party claims.
Challenges: Accurately assessing risk, negotiating premiums, and handling claim disputes in foreign jurisdictions.

Marine Personnel Certification – The process of verifying that seafarers possess the qualifications required by the STCW Convention.
Related terms: Certificate of Competency (CoC), Continuous Professional Development (CPD), Medical Fitness.
Explanation: Certifications cover navigation, engineering, electro-technical and safety specialties.
Practical application: The chief mate holds a Master's CoC, enabling him to assume command if the master becomes incapacitated.
Challenges: Ensuring timely renewal, managing training records across multiple flag states, and aligning

crew qualifications with vessel type.

Marine Pollution (MARPOL) Annex I – Oil – Regulations governing the prevention of oil discharge from ships.
Related terms: Oil Record Book, Segregated Ballast Tank (SBT), Annex I Certification.
Explanation: Annex I sets limits on oil discharge, requires double-hull construction for tankers and mandates oily water separators.
Example: The vessel's OWS system treats bilge water to meet the Marine Pollution (MARPOL) Annex II – Noxious Liquid Substances – Controls the discharge of harmful liquid cargoes.
Related terms: Category X, Special Care Cargo, Discharge Monitoring Report (DMR).
Explanation: Annex II requires cargoes to be classified, and discharges must be reported with details of volume and location.
Practical application: A chemical tanker discharges cleaning water after cargo loading, logging the event in the DMR.
Challenges: Accurate cargo classification, avoiding prohibited discharges, and ensuring proper documentation.

Marine Pollution (MARPOL) Annex III – Harmful Substances in Packaged Form – Addresses pollution from packaged goods such as drums or containers.
Related terms: UN Number, Material Safety Data Sheet (MSDS), Packaging Integrity.
Explanation: Annex III requires proper labeling, stowage and reporting of any spills involving hazardous packaged cargo.
Example: A vessel transports hazardous chemicals in IBCs, each bearing the correct UN number and hazard label.
Challenges: Detecting leaks, training crew in spill response, and complying with diverse national regulations.

Marine Pollution (MARPOL) Annex IV – Sewage – Regulates the discharge of sewage from ships to protect marine environments.
Related terms: Sewage Treatment Plant (STP), Marine Sanitation Device (MSD), Discharge Permit.
Explanation: Annex IV permits sewage discharge only after treatment or at a specified distance from shore.
Practical application: The ship's STP processes waste to meet the Marine Pollution (MARPOL) Annex V – Garbage – Controls the disposal of solid waste from ships.
Related terms: Garbage Management Plan, Plastic Ban, Incineration.
Explanation: Annex V categorises garbage types and sets distance-based discharge restrictions, with a total ban on plastic waste.
Example: The crew segregates food waste for incineration and stores plastic for shore-based disposal.
Challenges: Accurate segregation, ensuring storage capacity, and meeting port reception facilities' requirements.

Marine Pollution (MARPOL) Annex VI – Air Pollution – Sets limits on NOx, SOx, and particulate emissions from ship engines.
Related terms: Emission Control Area (ECA), Scrubber, Tier II/III.
Explanation: Annex VI introduces NOx emission standards based on engine speed and requires fuel sulphur

limits in ECAs.
Practical application: A vessel operating in a NOx-controlled area complies with Tier III limits using low-speed diesel engines.
Challenges: Retrofitting scrubbers, selecting compliant fuels, and monitoring emissions to avoid penalties.

Marine Surveyor – A qualified professional who inspects ships, cargoes and equipment to verify compliance with standards.
Related terms: Classification Society, Flag State Inspector, Condition Survey.
Explanation: Surveyors may be engaged for initial certification, damage assessment or periodic inspections.
Example: After a grounding, a marine surveyor evaluates hull damage and recommends repair methods.
Challenges: Coordinating access to the vessel, delivering unbiased reports, and staying current with regulatory updates.

Marine Traffic Management – The coordinated planning and control of vessel movements to enhance safety and efficiency.
Related terms: Vessel Traffic Service (VTS), Traffic Separation Scheme (TSS), Routeing Services.
Explanation: Traffic management includes monitoring vessel positions, issuing advisories and managing congestion.
Practical application: In the Gulf of Aden, VTS provides real-time guidance to ships navigating a high-risk piracy corridor.
Challenges: Integrating data from AIS, radar and satellite, and balancing commercial pressures with safety imperatives.

Maritime Labour Convention (MLC) 2006 – An international treaty establishing minimum working and living standards for seafarers.
Related terms: Seafarers' Rights, Shipboard Labour Agreement, Inspection.
Explanation: MLC covers employment contracts, accommodation, health protection and grievance mechanisms.
Example: A crew member files a complaint through the ship's MLC liaison officer regarding inadequate rest hours.
Challenges: Ensuring compliance across multinational crews, conducting audits, and addressing discrepancies during port inspections.

Mechanical Draft – The reduction in a vessel's draught caused by the propeller thrust when moving forward.
Related terms: Static Draught, Propeller Slip, Trim.
Explanation: Mechanical draft varies with speed, propeller pitch and water density, affecting load line calculations.
Practical application: The chief officer calculates the vessel's loaded draught, adding mechanical draft to ensure safe passage through a shallow channel.
Challenges: Accurate prediction under varying sea conditions and reconciling with ballast management.

Mid-Ocean Refueling (MOR) – The transfer of fuel to a vessel while at sea, usually via a bunker barge or another ship.
Related terms: Bunkering, Fuel Transfer System, Safety Procedures.

Explanation: MOR enables long-range voyages without returning to port, but requires strict safety protocols to prevent spills.
Example: A container ship refuels from a dedicated bunker vessel in the North Atlantic, using a flexible hose and double-bottom tanks.
Challenges: Weather constraints, coordination of both parties, and compliance with MARPOL fuel transfer regulations.

Navigation Watch Alarm System (NWAS) – An integrated system that alerts bridge watch-keepers to navigational hazards, equipment failures and procedural breaches.
Related terms: Bridge Alarm Panel, Alarm Prioritisation, Human-Machine Interface.
Explanation: NWAS consolidates alarms from radar, AIS, ECDIS and other sensors, assigning levels of urgency.
Practical application: An alarm indicating a loss of GPS signal prompts the officer to switch to alternative navigation methods.
Challenges: Preventing alarm overload, ensuring timely acknowledgment, and maintaining system reliability.

Navigation Safety Management System (NSMS) – A structured approach to managing navigation risks, complementing the broader SMS.
Related terms: Risk Assessment, Bridge Training, Procedural Documentation.
Explanation: NSMS includes policies for passage planning, bridge resource management and emergency response.
Example: The ship's NSMS requires a pre-departure briefing covering weather, traffic and route alternatives.
Challenges: Integrating NSMS with existing SMS processes, updating procedures after incidents, and ensuring crew adherence.

Oil Record Book (ORB) – A mandatory log that records all oil-related operations on board, such as bunkering, discharge and tank cleaning.
Related terms: Annex I, Discharge Monitoring Report, Port State Control.
Explanation: The ORB provides evidence of compliance with MARPOL regulations and is inspected during surveys.
Practical application: The chief engineer records the quantity of fuel oil transferred from one tank to another, noting dates and signatures.
Challenges: Accurate entry, preventing falsification, and maintaining legibility under harsh shipboard conditions.

Port State Control (PSC) – The authority of a coastal state to inspect foreign vessels for compliance with international conventions.
Related terms: Flag State, Inspection Regime, Detention.
Explanation: PSC inspections may cover safety, pollution, crew welfare and certification.
Example: A vessel entering the EU undergoes a PSC inspection at Rotterdam, focusing on ballast water management.
Challenges: Unexpected detentions, remedial actions required before departure, and the impact on commercial schedules.

Power Management – The optimisation of a vessel's energy consumption to reduce fuel costs and emissions.
Related terms: Energy Efficiency Operational Index (EEOI), Renewable Energy Integration, Load Management.
Explanation: Power management involves monitoring generator load, adjusting propeller pitch and employing waste-heat recovery.
Practical application: The chief engineer reduces auxiliary generator operation during low-speed cruising to save fuel.
Challenges: Balancing power availability with safety-critical systems, forecasting demand, and integrating new technologies.

Propeller Pitch Control – The adjustment of the propeller blade angle to optimise thrust and fuel efficiency at varying speeds.
Related terms: Controllable Pitch Propeller (CPP), Fixed Pitch Propeller (FPP), Thrust Coefficient.
Explanation: CPP allows rapid reversal of thrust for manoeuvring, while FPP offers simplicity but less flexibility.
Example: During a docking maneuver, the master orders a pitch reduction to achieve fine speed control.
Challenges: Mechanical wear, control system reliability, and ensuring crew proficiency in pitch adjustments.

Propulsion System – The combination of machinery that generates thrust to move a vessel through water.
Related terms: Engine Room, Reduction Gear, Propeller.
Explanation: Systems may be diesel-electric, steam turbine, gas turbine or hybrid, each with distinct operational characteristics.
Practical application: A container ship uses a diesel-electric propulsion system, allowing flexible power allocation between propulsion and hotel loads.
Challenges: Integrating propulsion with auxiliary power, maintaining efficiency across speed ranges, and meeting emission standards.

Quality Assurance (QA) – A systematic process to ensure that ship management activities meet defined standards and specifications.
Related terms: Auditing, Continuous Improvement, Documentation Control.
Explanation: QA involves establishing procedures, training personnel and conducting regular checks to verify compliance.
Example: The QA team reviews the vessel's maintenance records to confirm adherence to the Planned Maintenance System.
Challenges: Aligning QA across multiple subsidiaries, handling non-conformities, and maintaining up-to-date procedures.

Radar Plotting – The manual or electronic tracking of nearby vessels and objects on a radar display to assess collision risk.
Related terms: Automatic Radar Plotting Aid (ARPA), Target Tracking, Range and Bearing.
Explanation: Plotting determines course, speed and closest point of approach (CPA) for each target.
Practical application: The officer of the watch uses a handheld tablet to record radar contacts and compute

CPA values.
Challenges: Cluttered displays, false targets, and ensuring accuracy in high-traffic environments.

Regatta Navigation – The practice of navigating vessels during organized sailing competitions, requiring precise manoeuvring and timing.
Related terms: Race Committee, Mark Roundings, Start Line.
Explanation: Participants must adhere to race rules, maintain course, and respond to wind shifts quickly.
Example: A sailing yacht adjusts its heading to exploit a shifting wind gust, gaining advantage over competitors.
Challenges: Balancing competitive tactics with safety, handling rapid rule changes, and managing crew coordination.

Remote Monitoring – The use of telemetry and satellite communication to observe vessel performance from shore-based facilities.
Related terms: Vessel Performance Management (VPM), Satellite AIS, Data Analytics.
Explanation: Sensors transmit data on fuel consumption, engine health and emissions for real-time analysis.
Practical application: A shore-based operations centre alerts the chief engineer of an abnormal rise in exhaust temperature.
Challenges: Data latency, cybersecurity threats, and ensuring on-board equipment compatibility.

Risk Assessment – The systematic identification and evaluation