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MARITIME ECONOMICS

**TEACHING CONTENT
(Abridged)**

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MARITIME ECONOMICS ABRIDGED SYLLABUS

Learning Outcome 1: Maritime World

Grade 10

AS 10.1.1 Define and use terminology used by the shipping industry e.g.

- **parts of ships and equipment aboard ships**

Naming and explaining the particular characteristics and uses of:

Bow, Stern, Hull, Keel, Superstructure, Forecastle, Bridge, Wheelhouse, Mast, Derrick, Crane, Foredeck, Afterdeck, Hatch, Hatchcover, Hatch Coaming, Hold, Tweendeck, Lower Hold, Tank Tops, Deep Tanks, Topside Tanks, Engine room, Galley, Cabin, Deck, Bulkhead, Deckhead, Alley, Ladder, Porthole, Load Line, Anchor, Propeller, Rudder.

- **various ship types**

Naming and explaining the particular characteristics and uses of:

Containerships, Multipurpose ships, Bulk Carriers (various classes of bulk carriers), Tankers (various classes of tankers), Gas carriers, Passenger ships, Refrigerated vessels, Ro-ro ships, Ferries, Fishing vessels, Tugs, Vessels associated with oil & gas exploration, Dredgers, Warships (various classes of warships)

General terminology relating to ship types, including Liner, Trampship, Panamax, post-Panamax, Coaster, Near-sea trader, Geared ship, Gearless ship, Bulk cargo, Break-bulk cargo, Neo-bulk cargo, Palletised cargo

- **units of measurement**

Naming and explaining terms such as:

gross registered tons, deadweight, nett registered tons, knot (speed)

- **relative position aboard ships, or positions relative to one's own ship**

Naming and explaining terms such as:

bow, stern, port, starboard, port bow, starboard bow, port quarter, starboard quarter, midships, thwartships, forward, aft, aloft, atop, ahead, astern, abeam

AS 10.1.2 Use map reading skills to identify continents, water masses, canals, sea currents and major ports:

Using map reading including map orientation (position, types of grid reference), different types of scales, direction and true bearing to identify:

- **Continents:** Asia, Africa, Europe, North America, South America, Australasia
- **Water Masses:**
 - **Oceans** e.g.: Atlantic, Indian, Pacific, Arctic and Southern Oceans
 - **Seas:** e.g. Mediterranean, Black, Adriatic, North, Baltic, Red, Arabian, South China, East China, Japan, Tasman, Bering, Caribbean Seas
 - **Gulfs:** e.g. Gulf of Aden, Arabian (Persian) Gulf, Bay of Bengal, Bay of Biscay, Gulf of Mexico (US Gulf), Hudson Bay
 - **Canals:** e.g.- Suez Canal, Panama Canal, Kiel Canal, St Lawrence Seaway
 - **Navigable Rivers:** Amazon, Rhine, Mississippi, Congo, Two navigable Asian Rivers

AS 10.1.3 Display a working knowledge, as they affect shipping, of

- **International time zones**

- **International date line**

Performing simple calculations taking into account the 24 hours nature of shipping, maps, and gaining or repeating time depending on direction of travel.

AS 10.1.4 Investigate and presenting the careers related to Maritime Economics

Investigating and describing maritime careers such as:

Sea-Going Careers including Navigation or Engineering (Merchant Navy or S.A. Navy)	Ship-Broking, Ship Chartering and Ship Management
Ships' Agency Operations	Harbour Operations
Maritime Environmental Conservation	Oceanography or Hydrography
Maritime Economics	Maritime-Related Tourism
Marine Surveying	Liner Services
Bunker Trade	Cargo Forwarding and Clearing
Cargo Planning and Handling	Maritime Training or Education
Maritime Land-Use Advisers	Fisheries Patrol Services.
Salvage	Maritime Law
Marine Insurance	Port State Control and Flag State Control
Ship Chandling	Ship Repair and Maintenance
Naval architecture	Fishing Industries

Grade 11

AS 11.1.1 Interpret and use information contained in Lloyd's Register of Shipping and assess the suitability of ships for particular cargoes and trades

Using data from extracts from Lloyd's Register of Shipping to solve problems and make decisions relating to the suitability of ships to move cargo taking into consideration type of ship, size of ship, cargo capacity, draught, cargo gear, speed and fuel consumption.

AS 11.1.2 Use maps to interpret trade routes, port location.

Reading and analyzing maps to obtain data on local, regional and global ports and trade routes including:

- South African Ports: Richards Bay, Durban, East London, Port Elizabeth, Ngqura, Cape Town, Saldanha Bay
- Other African Ports: Maputo, Mombasa, Luanda, Walvis Bay, Abidjan, Dakar, Port Said.
- Major Foreign Ports: Rotterdam, Antwerp, Hamburg, London, Felixstowe, New York, San Francisco, Los Angeles (Long Beach), Vancouver, Singapore, Hong Kong, Shanghai, Yokohama, Sydney

AS 11.1.3 Apply knowledge of international time zones and the international date line to shipping operations

Performing calculations involving realistic voyages across time zones and the International Date Line

AS 11.1.4 Investigate and explain the training, education and experience needed to pursue the various maritime related careers

Conducting research to find out about:

- Formal tertiary education and training, on-the-job training, industry related courses (including the location of training institutions and broad content of training and entry requirements).
- Rank structure of seafarers and promotion requirements.
- Broad job descriptions of the major maritime-related careers

Grade 12

AS 12.1.1 Differentiate between the main types of marine propulsion systems.

- Tracing the effects on shipping operations of the change from sail to steam, and from steam to motorships
- Explaining the operation of a marine engine commonly used in modern merchant ships

AS 12.1.2 Analyse and use graphic displays of information and text from a variety of sources.

- Exploring the various sources of information such as maps, graphs, tables, Internet websites, newspaper, magazine, journal, television and radio reports relevant to shipping.
- Extracting relevant information and data from the sources and organising it logically for presentation.

AS 12.1.3 Analyse the issues pertaining to the international employment of seafarers.

Investigating and debating seafaring employment issues such as:

- STCW 95 Convention
- Contract seafaring
- The major sources of the world's seafarers (e.g. Philippines, China, Eastern Europe); Reasons for the decline in previously major seafaring nations
- Incentives for countries to promote seafaring (e.g. tonnage tax, cabotage, training incentives)

Learning Outcome 2: Shipping Operations

Grade 10

AS 10.2.1 Comment on factors relating to port location, construction, operations changes to harbour land use and the effect of rejuvenation of derelict zones within a harbour area.

Investigating and discussing information pertaining to:

- Factors relating to port location: sustainable cargo flows, shelter from prevailing wind and swell, depth of water, flat land, services (water, electricity), labour, access (road and rail links) finance, ancillary services
- Port management structures, including the rank structure of the marine operations personnel.
- Procedures, personnel and vessels involved in ships' movements in harbours and dry-dock and locks.
- Rejuvenation of derelict zones – reasons for dereliction, reasons for rejuvenation e.g. Cape Town Waterfront and Durban Point Area

AS 10.2.2 Describe major shipping companies that operate to and in South Africa.

- Naming of major shipping companies and spheres of operation – what types of ships they operate, where they trade.
- Conducting research on the history of one company.

AS 10.2.3 Classify cargo handling techniques used in shipping

- bulk
- break-bulk
- containers
- liquids
- refrigerated cargoes
- vehicle cargoes

AS 10.2.4 Explain the basic principles of marine salvage

Finding information, defining concepts and developing terminology to discuss

- Marine salvage
- Lloyd's Open Form
- SCOPIC (salvage costs to P&I club)

AS 10.2.5 Calculate voyage duration, given appropriate information including speed and distance.

Performing simple calculations to find voyage duration and time of arrival of ships.

Grade 11

AS 11.2.1. Discuss the role of a harbour as the interface between sea transport and other modes of transport

- Identifying terms relating to ports: hinterland, break-of-bulk point, entrepot (hub port), trans shipment, feeder service, free trade area.
- Investigating the link between sea transport and road or rail e.g. case studies involving point-to-point transport.

AS 11.2.2 Investigate, and evaluate the role of ship operations

Engaging with a broad range of roles within the shipping industry:

- ship owning (brief reference to ship financing, operations, including cargo bookings, legal requirements, ship registration, maintenance, safety, insurance.)
- ship management – the role of specialized ship management companies
- ship broking – the role of shipbrokers in chartering, the sale and purchase of ships
- ship chartering, including reference to general charter markets, chartering procedures, types of charter, charter party, laycan, laytime, demurrage, dispatch, notices of readiness, voyage instructions, factors influencing fluctuations in charter rates
- ship scrapping, including reference to the interrelationship between ship charter markets, shipbuilding trends and scrap prices
- ship's agency operations and procedures, including reference to the role of ship owners' agents, charterers' agents, cargo agents
- bunkering, including reference to various types of ships' fuel and precautions taken when bunkering to avoid pollution or fire
- stevedoring, with reference to cargo handling for the various types of cargo
- ship repair and maintenance, with reference to the need for regular maintenance and repair of ships, dry-docking, synchrolifts
- ship chandling: suppliers of stores to ships e.g. food, paint, engine room spares
- personnel logistics, with reference to STCW 95, employment of contract seafarers, career paths for sea-going personnel, and those in the National Port Authority, as well as potential shoreside careers in the shipping industry.

AS 11.2.3 Explain cargo work, with special reference to:

- **stowage plans** – factors to be taken into account when compiling cargo stowage plans (e.g. stresses on the ship, stability, port rotation, hazardous cargoes, non-compatible cargoes, heavy lifts, cargo handling equipment)
- **time** – calculating port stays using realistic examples
- **costs** – calculations relating to time in port
- **labour requirement** – comparing labour requirements for the handling of bulk, breakbulk and containerized cargo

AS 11.2.4 Effectively use information relating to salvage operations in order to analyse case studies.

Determining causes of marine accidents, methods of salvage, the application of Scopic or Lloyd's Open Form in recent case studies, and salvage arbitration.

AS 11.2.5 Calculate shipping voyage costs with given parameters.

Performing calculations with a range of parameters including but not limited to:

- speed
- distance

- length of stay in port
- port costs
- agency fees
- volume of cargo
- rate of loading
- fuel
- sundry costs

Grade 12

AS 12.2.1 Analyse and evaluate intermodal transport systems.

Tracing of routes and mode of transport and procedures (e.g. checking the container for damage, container number, container seals, customs clearances) and documentation (especially the characteristics and use of a bill of lading)

AS 12.2.2 Explain and discuss issues relating to the registration of ships and the role of classification societies.

Understanding and debating issues around

- The need to register ships; the concept of flag state control; the concept of flags of convenience (advantages and disadvantages)
- The role of classification societies with special reference to ship construction, seaworthiness, accidents, and special surveys

AS 12.2.3 Apply the correct INCOTERMS to case studies in cargo logistics, especially in the context of container shipping

- Defining the term INCOTERMS, and determining its purpose and use
- Determining where to find the information and evaluating which is most appropriate in a particular case study.

AS 12.2.4 Use information relating to marine insurance effectively to discuss case studies involving various aspects of maritime risk, including general average.

Synthesising information on aspects of marine insurance mentioned below to evaluate or suggest resolutions in selected case studies:

- Hull & Machinery Insurance
- Protection & Indemnity Clubs
- TT Club
- Fixed & Floating Objects
- General Average

AS 12.2.5 Apply knowledge relating to ship chartering in lay time calculations.

- Calculating the difference between the agreed duration of cargo work and the actual duration of cargo work
- Defining demurrage and dispatch
- Determining factors that are taken into account when demurrage or dispatch is ascertained.

Learning Outcome 3: International Trade

Grade 10

AS 10.3.1 Investigate and present major elements of and milestones in the history of the South African maritime trade

- Exploring concepts of indigenous knowledge systems and identifying how they may have contributed to early use of water bodies for trade(e.g. Nile River)
- Examining the factors that have stimulated (or stunted) the growth of the South African shipping industry, including the following :
 - Early explorers, Dutch & British colonization, and early shipping services
 - Influence of major events on the local shipping industry, especially the mineral discoveries, opening of the Suez Canal, Anglo-Boer War, World Wars 1 & 2, both closures of the Suez Canal, Apartheid era and trade sanctions, Abolition of apartheid and full democracy, the post-apartheid trade boom, global trade fluctuation, especially the global shipping boom based on Far Eastern economic growth
 - Development of major South African shipping lines

AS 10.3.2 Identify and describe the locations and inter-relationships of the world's leading trading nations

- Accessing a variety of sources including map reading to locate leading trading nations and regions including China and other Far eastern nations, North America Western Europe, Russia, India, Arabian Gulf, Australia
- Identifying and listing major commodities imported and exported from each of the above nations/regions

AS 10.3.3 Describe containerisation with special reference to its advantages.

Understanding containerisation terminology, definitions and concepts such as:

- A brief history of containerisation,
- Types of containers and their uses
- Markings on containers
- Container terminal, container depot, container stack
- Shoreside equipment used in container shipping
- Basic layout of a containership
- The terms TEU and FEU

AS 10.3.4 Investigate the extent of transgressions of maritime law

Defining types of transgressions and counter-measures, citing recent case studies:

- Transgressions: piracy, smuggling, cargo broaching, ship hijacking, terrorism, stowing away, illegal transportation of humans, drugs and weapons, poaching of marine resources.
- Counter measures taken by navies, coastguards, immigration authorities, fisheries protection agencies and customs.

Grade 11

AS 11.3.1 Analyse and explain the principles governing transport and trade.

Analysing and explaining principles including:

- Economies of scale in relation to sea transport
- Principles of supply and demand
- Major global areas of supply and demand
- Definitions of competitive advantage and absolute advantage
- Definitions of export and import
- Factors influencing trade fluctuations

AS 11.3.2 Analyse international trade routes involving major commodities past and present

- Identifying areas of supply and demand of commodities such as:
 - oil
 - coal
 - iron ore
 - other minerals
 - grain
 - containerised cargo
- Identifying the shortest route between these areas and the most appropriate type of vessel to support this commodity
- Briefly outlining periods of boom or depression in the above trades and the impact of global events (e.g. war,) natural disasters (e.g. drought, floods, tsunamis, earthquakes, volcanoes or hurricanes)

AS 11.3.3 Examine and report on procedures pertaining to shipping containers.

Referring to the roles of:

- Customs services in international shipping
- Forwarding agents
- Documentation (brief reference to bills of lading)
- Logistics warehousing

11.3.4 Interpret the role of territorial waters and economic exclusion zones as these affect littoral states, and routing of shipping.

Investigating and explaining:

- The need for littoral states to declare areas of control over passing traffic and economic activities
- Concept of 'right of innocent passage'
- The role of the state in controlling and monitoring these areas e.g. fisheries patrols and naval patrols

Grade 12

AS 12.3.1 Critically interrogate the notion of fair trade with special reference to human rights issues.

Asking critical questions about controversial issues of maritime trade such as:

- The concept of 'dumping' i.e. flooding markets with cheaper products
- State subsidies that prevent fair trade
- The positive and negative consequences of international trade on local employment opportunities

AS 12.3.2 Evaluate the strategic importance of convergence zones in the historical context and in current global politics.

Access and synthesise information to evaluate the importance of convergence zones such as:

- Identifying zones on maps where major shipping routes converge
- Determining reasons for the economic and political importance of the following convergence zones: Suez Canal, Panama Canal, Straits of Malakka, Straits of Hormuz.
- Investigating the impact of periods and events when major convergence zones assumed greater importance or were inaccessible to normal shipping e.g. during war – closing zones, war zones

AS 12.3.3. Discuss elementary aspects of South African Maritime law and how it conforms to international law, conventions and regulations.

Analysing the roles of each of the following bodies, codes or conventions in shipping:

- International Maritime Organisation
- Port State Control
- Flag State Control
- South African Maritime Safety Authority
- SOLAS
- MARPOL
- STCW 95
- ISM
- ISPS
- Loadline restrictions
- Carriage of Goods by Sea

Learning Outcome 4: Maritime Environmental Challenges

Grade 10

AS 10.4.1 Display a working knowledge of

- Tides: understanding how tides are formed.
- Ocean Currents: engaging with sources to find the location and direction of the currents (North Atlantic Drift (Gulf Stream), Benguela Current, Mozambique Current, Agulhas Current, Canary Current).

AS 10.4.2 Describe meteorological factors that impact on shipping operations, in port and at sea.

Investigating the effects on shipping of:

- Fog
- Wind
- Sea Conditions
- Ice

AS 10.4.3 Explain the fragility of marine ecosystems and the need to safeguard such systems.

Defining the concept of ecosystems and investigating:

- The marine food chain
- The need for safe shipping practices that aid conservation of marine resources
- Management and protection of marine resources

AS 10.4.4 Describe the processes involved in the extraction of marine resources with special reference to fishing, minerals (diamond dredging) from the ocean floor and oil and gas from beneath the ocean floor.

Investigating operations such as:

- Diamond dredging operations
- Prospecting for sub-sea oil and gas
- Exploitation of sub-sea oil and gas
- Deep sea fishing
- Vessels and floating structures associated with these operations

Grade 11

AS 11.4.1 Express reasoned opinions regarding environmental aspects which could affect maritime operations.

Engaging in problem solving activities regarding positive and negative effects of tides and ocean currents on ship operations.

AS 11.4.2 Analyse the influence of depressions, tropical cyclones, and monsoons to explain their influence on shipping operations.

Understanding of the formation of depressions, tropical cyclones, and monsoons and the consequences of these phenomena for shipping

AS 11.4.3 Discuss aspects of the fishing industry and the need for careful conservation of marine resources

Investigating and presenting findings regarding:

- Southern African waters as a global source of seafood
- Depletion of global marine resources
- Methods of sea fishing (trawling, long line fishing, crayfishing, shell fishing operations)
- Methods of conservation to control exploitation e.g. quotas, permits, fisheries patrol

AS 11.4.4 Evaluate the environmental impact of the extraction of marine resources and minerals from the ocean floor, and oil and gas from beneath the ocean floor

- Investigating the need for exploiting marine diamond deposits and sub-sea oil and gas reserves and the long term impact on the environment e.g. disturbances to the ocean floor, possible pollution
- Investigating and recommending alternative energy sources and alternative lifestyles

Grade 12

AS 12.4.1 Recommend solutions regarding environmental aspects which could be affected by maritime operations e.g. oil pollution, waste disposal, ballast water discharge

Researching current maritime environmental challenges and expressing reasoned opinions regarding environmental aspects that relate to or could be affected by shipping operations. In particular, the following aspects should be understood in broad outline, and applied to case studies:

- Marine ecosystems
- Damage caused to marine ecosystems by over-fishing and poaching
- Marine pollution (including oil pollution, waste disposal at sea)
- Uncontrolled deballasting
- Shipping accidents

AS 12.4.2 Apply meteorological knowledge to maritime weather forecasting, shipping routing and other operations.

- Simulating realistic voyages to determine meteorological effects on shipping - analysing meteorological data that will affect a ship during her voyage
- Describing the effects of weather on cargo operations

AS 12.4.3 Investigate and suggest solutions regarding human rights and fair trade issues around the fishing industry and the import-export industry

Discussing aspects of the fishing industry with special reference to:

- Southern Africa and the southern islands
- The need for careful management of fish resources
- Aspects of crewing the fishing fleets

AS 12.4.4 Promote responsible attitudes towards the marine environment.

Creating innovative ways to inform the public regarding the need for marine conservation and how individuals and society at large should respond to this need.