

**ANNEX B OF CMO NO. 20, SERIES OF 2015
BACHELOR OF SCIENCE IN MARINE TRANSPORTATION
COURSE SPECIFICATIONS**

Course Code	:	Seam 1
Course Descriptive Title	:	Ship, Ship Routines and Ship Construction
Course Credits	:	4 units
Lecture Contact Hours per Week	:	3 hours
Laboratory Contact Hours per Week	:	3 hours
Prerequisite	:	None
Reference/s	:	1. Table A-II/5 of the 1978 STCW Code as amended 2. Table A-II/1 of the 1978 STCW Code as amended 3. Annex A of CMO No. 20, Series of 2015 (Curriculum Mapping for BSMT)

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
Contribute to berthing, anchoring and other mooring operations	<p><i>Working knowledge of the mooring system and related procedures, including:</i></p> <p>.1 the function of mooring and tug lines and how each line functions as part of an overall system</p> <p>.2 the capacities, safe working loads, and breaking strengths of mooring equipment, including mooring wires, synthetic and fibre lines, winches, anchor windlasses, capstans, bits, chocks and bollards</p> <p>.3 the procedures and order of events for making fast and letting go mooring and tug lines and wires, including towing lines</p>	<p>Mooring system, Tug handling and Anchoring</p> <ul style="list-style-type: none"> - Sketches and label the different parts of an anchor, and state their use and construction (and their required certification) - Sketches and label the different parts of an anchor chain, including the kenter shackle and the joining links - Explains how anchor chains are marked and measured - Describes the procedure in laying an anchor, including the necessary preparations - Explains the inspection and maintenance procedure for anchor and its chains - Sketches a typical mooring arrangement 	6

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
	<p>.4 the procedures and order of events for the use of anchors in various operations</p> <p>Working knowledge of the procedures and order of events associated with mooring to a buoy or buoys</p>	<ul style="list-style-type: none"> - Explains the safety precautions and regulations during mooring / unmooring are followed in accordance with safe working practices - Explains the operational hazards during mooring / unmooring are identified and addressed - State that shipboard emergency and contingency plans are followed in the event of a failure or emergency associated with mooring equipment and associated system as per safe working practices - Demonstrates the use of throwing heaving lines - Describes the running out, securing, letting go and recovering and stowage of mooring lines - Describes the making fast fore and aft to a fixed terminal or jetty letting go tugs - Explains the need for adjusting mooring during a port stay - Describes the rigging of gangways, accommodation ladders and pilot ladders - Describes the mooring operation when practicing spider mooring - Defines Safe Working Load (SWL) and Breaking Strength for Mooring equipment and all related equipment. 	
<p>Contribute to the safe operation of deck equipment and machinery</p>	<p><i>Knowledge of deck equipment, including:</i></p> <p>.1 function and uses of valves and pumps, hoists, cranes, booms, and related equipment</p> <p>.2 function and uses of winches, windlasses, capstans and related equipment</p> <p>.3 hatches, watertight doors, ports, and related equipment</p>	<p>Deck Equipment and Fittings</p> <ul style="list-style-type: none"> - Describes how valves and pumps work in discharging or taking in countless types of ship's liquids - Describes the uses of booms. - Describes the operation of hoists, winches, windlasses and cranes using the basic hand signals for safe operations. - Describes the operation and use of hatches, watertight doors, ports and related equipment and explain how it maintains the vessel's watertight integrity 	<p>6</p>

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
	<p>.4 fibre and wire ropes, cables and chains, including their construction, use, markings, maintenance and proper stowage</p> <p>.5 ability to use and understand basic signals for the operation of equipment, including winches, windlasses, cranes, and hoists</p> <p>.6 ability to operate anchoring equipment under various conditions, such as anchoring, weighing anchor, securing for sea, and in emergencies</p>	<ul style="list-style-type: none"> - Explains the difference of uses between fibre ropes, wire ropes, cables and chains - Differentiate the kinds of materials used for fibre ropes (manila, hemp, etc) - Describe the proper securing, maintenance and markings of fibre and wire ropes, cables and chains - Describes how anchoring, weighing anchor, securing for seas and preparing for emergencies are conducted. 	
	<p>Knowledge of the following procedures and ability to:</p> <p>.1 rig and unrig bosun's chairs and staging</p>	<p>Rigging and Unrigging Bosun's chairs and Staging</p> <ul style="list-style-type: none"> - Illustrates the parts of the Bosun's chair and staging with emphasis on proper use of knots in securing - Demonstrates the rigging and unrigging of bosun's chairs and staging 	2
	<p>.2 rig and unrig pilot ladders, hoists, rat-guards and gangways</p>	<p>Rigging and Unrigging pilot ladders, hoists, rat-guards and gangways</p> <ul style="list-style-type: none"> - Illustrates the parts of the pilot ladder, hoist, rat-guard and gangway with emphasis on proper and safe set up prior usage - Demonstrates the rigging and unrigging of pilot ladder, hoist, rat-guard and gangway with emphasis on proper and safe set up prior usage 	2
	<p>.3 use marlin spike seamanship skills, including the proper use of knots, splices and stoppers</p>	<p>Seamanship Skills with marlin spikes, knots, splices and stoppers</p> <ul style="list-style-type: none"> - Demonstrate the use of: - marlin spike - different kinds of knots and uses of each onboard ships. - Splices - Stoppers 	12

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
Contribute to shipboard maintenance and repair	<p>Ability to use painting, lubrication and cleaning materials and equipment</p> <p>Ability to understand and execute routine maintenance and repair procedures</p> <p>Knowledge of surface preparation techniques</p> <p>Understanding manufacturer's safety guidelines and shipboard instructions</p> <p>Knowledge of safe disposal of waste materials</p> <p>Knowledge of the application, maintenance and use of hand and power tools</p>	<p>Routine Maintenance in keeping the vessel ship shape</p> <ul style="list-style-type: none"> - Explain the health and safety procedures before painting, lubricating and cleaning the various parts of the vessel and key equipment - Explain what is a "job order" given by the support level personnel's department head - Describe the mixing and coating of paint after a thorough surface preparation - Demonstrate how to prepare a movable part prior lubrication, including use of associated materials like WD40 in taking out the rust. - Explain why manufacturer's safety guidelines and shipboard instructions should be followed to keep a healthy and safe environment including the proper disposal of waste materials - States the safety procedures before using any handheld deck maintenance equipment - Explain the use of power tools and how to maintain and secure it to prolong its usable life. 	6
Maintain seaworthiness of the ship	<p><i>Ship construction</i></p> <p>General knowledge of the principal structural members of a ship and the proper names for the various parts</p>	<p>.1 Ship dimensions and form</p> <p>Illustrates the general arrangement of the following ship types:</p> <ul style="list-style-type: none"> - general cargo - oil, chemical and gas tankers - bulk carriers - combination carriers - container 	12

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
		<ul style="list-style-type: none"> - RO-RO - passenger <p>Sketches an elevation and plan views of various ship types such as a general cargo ship, crude oil carrier, and bulker showing the arrangement and illustrate a general knowledge of the primary structural members and indicate the proper names for the various parts to include holds, engine - room, peak tanks, double - bottom tanks, hatchway, tween deck and position of bulkheads, cofferdams, pump - room, cargo tanks, slop tank and permanent ballast tanks:</p> <ul style="list-style-type: none"> - camber - rise of floor - tumblehome - flare - sheer - rake - parallel middle body - entrance - run <p>Defines:</p> <ul style="list-style-type: none"> - forward perpendicular(FP) - after perpendicular (AP) - length between perpendiculars(LBP) - length on the waterline (LWL) 	

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		<ul style="list-style-type: none"> - length overall (LOA) - base line - moulded depth, beam and draught - extreme depth, beam and draught 	
		<p>.2 Ship Stresses</p> <ul style="list-style-type: none"> - Describes in qualitative terms shear force and bending moments - Explains what is meant by 'hogging' and by 'sagging' and distinguishes between them - Describes the loading conditions which give rise to hogging and sagging stresses - Describes how hogging and sagging stresses are caused by the sea state - Explains how hogging and sagging stresses result in tensile or compressive forces in the deck and bottom structure - Describes water pressure loads on the ship's hull - Describes liquid pressure loading on the tank structures - Calculates the pressure at any depth below the liquid surface, given the density of the liquid - Describes qualitatively the stresses set up by liquid sloshing in a partly filled tank - Describes racking stress and its causes - Explains what is meant by 'pounding' or 'slamming' and states which part of the ship is affected - Explains what is meant by 'panting' and states which part of the ship is affected - Describes stresses caused by localized loading - Describes corrosion 	8

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
		<ul style="list-style-type: none"> - Describes the causes of corrosion onboard - Describes the various methods that being used to minimize the effect of corrosion <p>.3 Hull structure</p> <ul style="list-style-type: none"> - Identifies structural components on ships' plans and drawings: <ul style="list-style-type: none"> - frames, floors, transverse frames, deck beams, knees, brackets - shell plating, decks, tank top, stringers - bulkheads and stiffeners, pillars - hatch girders and beams, coamings, bulwarks - bow and stern framing, cant beams, breasthooks - Describes the types of materials that are used in the construction of a ship - Describes and illustrates standard steel sections: <ul style="list-style-type: none"> - flat plate - offset bulb plate - equal angle - unequal angle - channel - tee - Describes with aids of sketches the longitudinal, transverse and combined systems of framing on transverse sections of the ships - Sketches the arrangement of frames, webs and transverse members for each system 	11

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
		<ul style="list-style-type: none"> - Illustrates double - bottom structure for longitudinal and transverse framing - Illustrates hold drainage systems and related structure - Illustrates a duct keel - Sketches the deck edge, showing attachment of sheer strake and stringer plate - Sketches a radiused sheer strake and attached structure - Describes the stress concentration in the deck round hatch openings - Explains compensation for loss of strength at hatch openings - Sketches a transverse section through a hatch coaming, showing the arrangement of coamings and deep webs - Sketches a hatch corner in plain view, showing the structural arrangements - Sketches deck - freeing arrangements, scuppers, freeing ports, open rails - Illustrates the connection of superstructures to the hull at the ship's side 	

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		<ul style="list-style-type: none"> - Sketches a plane bulkhead, showing connections to deck, sides and double bottom and the arrangement of stiffeners - Sketches a corrugated bulkhead - Explains why transverse bulkheads have vertical corrugations and for-and-aft bulkheads have horizontal ones - Describes the purpose of bilge keels and how they are attached to the ship's side 	
		<p>.4 Bow and stern regions</p> <ul style="list-style-type: none"> - Describes the provisions of additional structural strength to withstand pounding - Describes and illustrates the structural arrangements forward to withstand panting - Describes the function of the stern frame - Describes and sketches a stern frame for a single - screw ship - Describes and illustrates the construction of a transom stern, showing the connections to the stern frame 	6
		<p>.5 Fittings</p> <ul style="list-style-type: none"> - Describes and sketches an arrangement of modern weather - deck mechanical steel hatches - Describes how watertightness is achieved at the coamings and cross joints - Describes the cleating arrangements for the hatch covers 	10

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
		<ul style="list-style-type: none"> - Describes the arrangement of portable beams, wooden hatch covers and tarpaulins - Sketches an oiltight hatchcover - Describes roller, multi - angle, pedestal and Panama fairleads - Sketches mooring bitts, showing their attachment to the deck - Sketches typical forecastle mooring and anchoring arrangements showing the leads of moorings - Describes the construction and attachment to the deck of tension winches and explains how they are used - Describes the anchor handling arrangements from hawse pipe to spurling pipe - Describes the construction of chain lockers and how the bitter-ends are secured in the lockers - Explains how to secure anchors and make spurling pipes watertight in preparation for a sea passage - Describes the construction and use of a cable stopper - Describes the construction of masts and Sampson posts and how they are supported at the base - Describes the construction of derricks and deck cranes - Describes the bilge piping system of a cargo ship - States that each section is fitted with a screw-down non-return suction valve - Describes and sketches a bilge strum box - Describes a ballast system in a cargo ship - Describes the arrangement of a fire main and states what pumps may be used to pressurize it - Describes the provision of sounding pipes and sketches a sounding pipe arrangement - Describes the fitting of air pipes to ballast tanks or fuel oil tanks - Describes the arrangement of fittings and lashings for the carriage of containers on deck 	
		.6 Rudders and propellers	11

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
		<ul style="list-style-type: none"> - Describes the action of the rudder in steering a ship - Reproduces drawings of modern rudders: semi balanced, balanced and spade - Explains the purpose of the rudder carrier and pintles - Explains how the weight of the rudder is supported by the rudder carrier - Describes the rudder trunk - Describes the arrangement of a watertight gland round the rudder stock - Explains the principle of screw propulsion - Describes a propeller and defines, with respect to : <ul style="list-style-type: none"> - boss - rake - skew - face - back - tip - radius - pitch - Compares fixed - pitch with controllable - pitch propellers - Sketches the arrangement of an oil - lubricated sterntube and tailshaft - Describes how the propeller is attached to the tailshaft - Sketches a cross - section of a shaft tunnel for water cooled and oil cooled type - Explains why the shaft tunnel must be of watertight construction and how water is prevented from entering the engine - room if the tunnel becomes flooded 	

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
		<p data-bbox="1056 293 1503 321">.7 Load lines and draught marks</p> <ul style="list-style-type: none"> <li data-bbox="1056 391 1560 418">- Explains where the deck line is marked <li data-bbox="1056 423 1325 451">- Defines 'freeboard' <li data-bbox="1056 456 1629 516">- Explains what is meant by 'assigned summer freeboard' <li data-bbox="1056 521 1755 646">- Draws to scale the load line mark and the load lines for a ship of a given summer moulded draught, displacement and tonnes per centimetre immersion in salt water <li data-bbox="1056 651 1717 711">- Explains how the chart of zones, areas and seasonal periods is used to find the applicable load line <li data-bbox="1056 716 1528 743">- Demonstrates how to read draughts <li data-bbox="1056 748 1755 873">- Explains that the freeboard, measured from the upper edge of the deck line to the water on each side, is used to check that the ship is within its permitted limits of loading <li data-bbox="1056 878 1682 938">- Lists the items in the conditions of assignment of freeboard <li data-bbox="1056 943 1703 1003">- Describes why the height of sill are varies between different type of vessels based on Load Line Rules 	5
TOTAL			97