

Republic of the Philippines OFFICE OF THE PRESIDENT COMMISSION ON HIGHER EDUCATION



CHED MEMORANDUM ORDER No. 14 Series of 2018

SUBJECT: ADDENDUM TO CHED MEMORANDUM ORDER NO. 67, SERIES 2017 ENTITLED "REVISED POLICIES, STANDARDS AND GUIDELINES FOR THE BACHELOR OF SCIENCE IN MARINE TRANSPORTATION (BSMT) AND MARINE **ENGINEERING** BACHELOR OF SCIENCE IN PROGRAMS"

Pursuant to the pertinent provisions of Republic Act (RA) No. 7722, otherwise known as the "Higher Education Act of 1994", and by virtue of Commission en Banc (CEB) Resolution No. 251-2018 dated May 29, 2018, the following Annexes of CMO No. 67, s. 2017 entitled "Revised Policies, Standards and Guidelines for the Bachelor of Science in Marine Transportation (BSMT) and Bachelor of Science in Marine Engineering (BSMarE) Programs", are hereby adopted and promulgated by the Commission for the guidance of all concerned:

Annex A - Curriculum Mapping

Annex C - Course Specifications

Annex D - Minimum Required Equipment

This CMO shall take effect immediately 15 days after its publication in the Official Gazette or in a newspaper of general circulation.

Issued this 26th of June 2018 Quezon City, Philippines.

For the Commission:

J. PROSPERO E. DE VERA III, DPA

Officer-In-Charge Commission on Higher Education



Annex A of CMO No. 67, s. 2017 Revision No: 00

				Professional Courses									
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7			
A-IV1	Function 1 Navigati	on at the	operational level		Control of	100	-			THE WAY			
C1	Plan and conduct a		Celestial navigation				X						
	passage and		Ability to use celestial bodies to determine the ship's position				х			1000			
	determine position		Terrestrial and coastal navigation			Х			114/2				
			Ability to determine the ship's position by use of landmarks			х		Marca and and		y semi-			
		.2	Ability to determine the ship's position by use of aids to navigation, including lighthouses, beecons and buoys			х							
		.3	Ability to determine the ship's position by use of dead reckoning, taking into account winds, tides, currents and estimated speed			x							
		KUP3	Thorough knowledge of and ability to use nautical charts, and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routeing information		×								
		KUP4	Electronic systems of position fixing and navigation	Х						BW-			
		.1	Ability to determine the ship's position by use of electronic navigational aids	х									
		KUP5	Echo-sounders	Х						- 10V/s-10=			
		.1	Ability to operate the equipment and apply the information correctly	x									
		KUP6	Compass - magnetic and gyro										
		.1	Knowledge of the principles of magnetic and gyro-compasses	Х			- 22207.01						
			Steering and control systems		STORY OF THE								
			Knowledge of steering control systems, operational procedures and change-over from manual to automatic control and vice versa. Adjustment of controls for optimum performance										
		KUP8	Meteorology				2010						
		.1	Ability to use and interpret information obtained from shipborne meteorological instruments										
		.2	Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems										
		.3	Ability to apply the meteorological information available										
C2	Maintain a safe navigational watch	KUP1	Watchkeeping										
		.1	Thorough knowledge of the content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended										





Annex A of CMO No. 67, s. 2017 Revision No: 00

COMPETENCE		1/116				Profe	ssional Co	urses		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 2
		.2	Thorough knowledge of the Principles to be observed in keeping a navigational watch							
		.3	The use of routeing in accordance with the General Provisions on Ships' Routeing							х
		.4	The use of information from navigational equipment for maintaining a safe navigational watch							
		.5	Knowledge of blind pilotage techniques							
		.6	The use of reporting in accordance with the General Principles for Ship Reporting Systems and with VTS procedures							
		KUP2	Bridge resource management							
C3	Use of RADAR and	KUP1	Rader navigation					Х		
	ARPA to maintain safety of navigation	.1	Knowledge of the fundamentals of radar and automatic radar plotting aids (ARPA)					x		
		.2	Ability to operate and to interpret and analyse information obtained from radar, including the following:					x		
			Performance, including:					Х		lan -
			factors affecting performance and accuracy				1970	X		
		.2a.2	setting up and maintaining displays detection of misrepresentation of information, false echoes, sea return, etc., racons and SARTs	*******				×		
		.2b	Use, including:					×		
		.2b.1	range and bearing; course and speed of other ships; time and distance of closest approach of crossing, meeting overtaking ships					х		
		.2b.2	other ships; effect of changes in own ship's course or speed or both					х		
		.2b.3	application of the International Regulations for Preventing Collisions at Sea, 1972, as amended					×		
		.2b.4	plotting techniques and relative and true-motion concepts					x		
		.2b.5	parallel indexing	2 / L				x	y	- 52
		KUP2	Principal types of ARPA, their display characteristics, performance standards and the dangers of over-reliance on ARPA					×		
C4	Use of ECDIS to	KUP1	Navigation using ECDIS		\$160 - 1 - W-				X	-





Annex A of CMO No. 67, s. 2017

		100		Professional Courses												
INDEX	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7						
	maintain the safety of navigation	.1	Knowledge of the capability and limitations of ECDIS operations, including:						×							
		.1.1	a thorough understanding of Electronic Navigational Chart (ENC) data, data accuracy, presentation rules, display options and other chart data formats						×							
		.1.2	the dangers of over-reliance						×							
		.1.3	familiarity with the functions of ECDIS required by performance standards in force						x							
		.2	Proficiency in operation, interpretation, and analysis of information obtained from ECDIS, including:						×							
		.2.1	use of functions that are integrated with other navigation systems in various installations, including proper functioning and adjustment to desired settings						x							
		.2.2	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)						×							
		.2.3	confirmation of vessel position by alternative means						×							
								.2.4	efficient use of settings to ensure conformance to operational						х	
		.2.5	adjustment of settings and values to suit the present conditions						x							
		.2.6	situational awareness while using ECDIS including safe water and						x							
C5	Respond to emerger	KUP1	Emergency procedures													
	Respond to ensergering	.1	Precautions for the protection and safety of passengers in emergency situations													
		.2	Initial action to be taken following a collision or a grounding; initial damage assessment and control													
		.3	Appreciation of the procedures to be followed for rescuing persons from the sea, assisting a ship in distress, responding to emergencies which arise in port													





Annex A of CMO No. 67, s. 2017

				Professional Courses								
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7		
	information by visual	.1	Ability to use the International Code of Signals									
	signating	.2	Ability to transmit and receive, by Morse light, distress signal SOS as specified in Annex IV of the International Regulations for Preventing Collisions at Sea, 1972, as amended, and appendix 1 of the International Code of Signals, and visual signalling of single-letter signals as also specified in the International Code of Signals									
C9	Manoeuver the ship	KUP1	Ship manoeuvering and handling		_							
		.1	Knawledge of:				_					
		,1,1	the effects of wind onthe effects of deadweight, draught, trim, speed and under-keel clearance on luming circles and stopping distancesd current on ship handling									
		.1.2	the effects of wind and current on ship handling									
			manoeuvres and procedures for the rescue of person overboard									
			squat, shallow-water and similar effects				<u> </u>					
		.1.5	proper procedures for anchoring and mooring			<u> </u>						





Annex A of CMO No. 67, s. 2017 Revision No: 00

				Professional Courses								
COMPETENCE	COMPETENCE	KUP INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7		
A-11/2	Function 1 Navigation	on at the	management level							1778		
C1	Plan a voyage and conduct navigation	KUP1	Voyage planning and nevigation for all conditions by acceptable methods of plotting ocean tracks							×		
		.1_	restricted waters			11/21/2019	A SHIRT WOO			x		
		.2	meteorological conditions			ine				×		
		.3	ice			Alv				X		
		.4	restricted visibility			4-20				X		
		,5	traffic separation schemes							X		
		.6	vessel traffic service (VTS) areas	AND RESIDENCE					ANTE COLOR	X		
		,7	areas of extensive tidal effects							×		
C2	Determine position	KUP1	Position determining in all conditions									
	and the accuracy of	.1	Celestial observations						Same of the second			
	resultant position fix by any means	.2	Terrestrial observations, including the ability to use appropriate charts, notices to mariners and other publications to assess the accuracy of the resulting fix							×		
		.3	Modern electronic navigational aids with specific knowledge of their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing							x		
C8	Forecast weather and oceanographic conditions	KUP1	Ability to understand and interpret a synoptic chart and to forecast area weather, taking into account local weather conditions and information received by weather fax									
		KUP2	Knowledge of the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous quadrants									
		KUP3	Knowledge of ocean current systems				Leave — II head to be					
		KUP4	Ability to calculate tidal conditions									
		KUP5	Use all appropriate nautical publications on tides and currents									
C11	Operate remote controls of	KUP1	Operating principles of marine power plants									
	propulsion plant and engineering systems	KUP2	Ships' auxiliary machinery		100							
	and services	KUP3	General knowledge of marine engineering terms				4					
	Contribute to berthling, anchoring	KUP1	Working knowledge of the mooring system and related procedures									
	and other mooring operations	1.1	the function of mooring and tug lines and how each line functions as part of an overall system									





Annex A of CMO No. 67, s. 2017 Revision No: 00

		(James				Profe	ssional Co	urses		
COMPETENCE	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	<u>Nav 5</u>	Nav 6	Nav 7
		1.2	the capacities, safe working loads, and breaking strengths of mooring equipment, including mooring wires, synthetic and fibre lines, winches, anchor windlasses, capstans, bitts, chocks and bollards			7				
		1.3	the procedures and order of events for making fast and letting go mooring and tug lines and wires, including towing lines							
		1.4	the procedures and order of events for the use of anchors in various operations							
		KUP2	Working knowledge of the procedures and order of events associated with mooring to a buoy or buoys							
A-11/1	Function 2 Cargo ha	indiing a	nd stowage at the operational level		HENRY DO		RECORD IN		TO SHAPE	100 100
C1	Monitor the loading,	KUP1	Cargo handling, stowage and securing							
	stowage, securing, care during the	.1	Knowledge of the effect of cargo, including heavy lifts, on the seeworthiness and stability of the ship						_	
	voyage and the unloading of cargoes	.2	Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship			_	·			
		.3	Ability to establish and maintain effective communications during loading and unloading							
C2	Inspect and report defects and damage	KUP1	Knowledge and ability to explain where to look for damage and defects most commonly encountered due to:							
	to cargo spaces,	.1	loading and unloading operations							
	hatch covers and	.2	corrosion							
	ballast tanks	.3	severe weather conditions		1					





Annex A of CMO No. 67, s. 2017 Revision No: 00 Revision Date: 00

						Profe	ssional Co	urses		
COMPETENCE	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7
		KUP2	Ability to state which parts of the ship shall be inspected each time in order to cover all parts within a given period of time							
		KUP3	Identify those elements of the ship structure which are critical to the safety of the ship							
		KUP4	State the causes of corrosion in cargo spaces and ballast tanks and how corrosion can be identified and prevented							
		KUP5	Knowledge of procedures on how the inspections shall be carried out						578	
		KUP6	Ability to explain how to ensure reliable detection of defects and demaces							12/
		KUP7	Understanding of the purpose of the "enhanced survey programme"					aka ===		and the same of th
A-11/2	Function 2 Naviget	ion at the	operational level				Massie			
C1	Plan and ensure safe loading, stowage, securing,	KUPI	Knowledge of and ability to apply relevant international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargoes							
	care during the voyage and	KUP2	Knowledge of the effect on trim and stability of cargoes and cargo operations							
	unloading cargoes	KUP3	Use of stability and trim diagrams and stress-calculating equipment, including automatic data-based (ADB) equipment, and knowledge of loading cargoes and ballasting in order to keep hull stress within acceptable limits							
		KUP4	Stowage and securing of cargoes on board ships, including cargo- handling gear and securing and lashing equipment							
		KUP5	Loading and unloading operations, with special regard to the transport of cargoes identified in the Code of Safe Practice for Cargo Slowage and Securing							
		KUP6	General knowledge of tankers and tanker operations							
		KUP7	Knowledge of the operational and design limitations of bulk carriers					Nen-us		
		KUPB	Ability to use all available shipboard data related to loading, care and unloading of bulk cargoes							
		KUP9	Ability to establish procedures for safe cargo handling in accordance with the provisions of the relevant instruments etc							
		KUP10	Ability to explain the basic principles for establishing effective communications and improving working relationship between ship and terminal personnel					V		





Annex A of CMO No. 67, s. 2017 Revision No: 00 Revision Date: 00

		100.00				Profe	ssional Co	urses																	
COMPETENCE	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7															
СЗ	Carriage of dangerous goods	KUP1	International regulations, standards, codes and recommendations on carriage of dangerous goods																						
		KUP2	Carriage of dangerous, hazardous and harmful cargoes, precautions during loading and unloading and care during the voyage							1041															
A-II/1	Function 3 Controlli	ng the o	peration of the ship and care for persons on board at the operational i	level																					
C1		KUP1	Prevention of pollution of the marine environment and anti-pollution procedures																						
	Ensure compliance with pollution	.1	Knowledge of the precautions to be taken to prevent pollution of the marine environment																						
	prevention requirements	.2	Anti-pollution procedures and all associated equipment					- His																	
		.3	importance of proactive measures to protect the marine environment		We Jane																				
C2	Maintein	KUP1	Ship stability																						
	seaworthiness of the ship	.1	Working knowledge and application of stability, trim and stress tables, diagrams and stresscalculating equipment																						
		.2	Understanding of the fundamentals of watertight integrity				ALEXA:																		
															K	K	K	.3	Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy						
		KUP2	Ship construction																						
		.1	General knowledge of the principal structural members of a ship and the proper names for the various parts																						
C6	Monitor compliance with legislative requirements	KUP1	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment	41-																					
C7	Application of leadership and	KUP1	Working knowledge of shipboard personnel management and training																						
	teamworking skills	KUP2	A knowledge of related international maritime conventions and recommendations, and national legislation																						
		KUP3	Ability to apply task and workload management	1000																					
		,1	planning and co-ordination																						
		.2	personnel assignment																						
	THE RESIDENCE	.3	time and resource constraints																						
	Maria de la compansión de	.4	prioritization					4 P/10(F)	100	1															





Annex A of CMO No. 67, s. 2017 Revision No: 00 Revision Date: 00

				Professional Courses								
OMPETENCE	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7		
		KUP4	Knowledge and ability to apply effective resource management									
		.1	allocation, assignment, and prioritization of resources						778			
		.2	effective communication onboard and ashere									
		.3	decisions reflect consideration of team experiences									
		.4	assertiveness and leadership, including motivation									
		.5	obtaining and maintaining situational awareness									
		KUP5	Knowledge and ability to apply decision-making techniques				7					
A-11/2	Function 1 Navigati	on at the	operational level						No.			
C1	Control trim, stability and stress	KUP1	Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability									
		KUP2	Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and countermeasures to be taken									
		KUP3	Knowledge of IMO recommendations concerning ship stability									
C2	Monitor and control compliance with legislative measures to ensure safety of	KUP1	Knowledge of relevant international maritme law embodied in international agreements and conventions. Regard shall be paid to responsibilities under the International Convention for the Prevention of Pollution from Ships as amended.									
	life at sea and	KUP2	Regard shall be paid especially to the following subjects:			- San Park (Park)						
	protection of the marine environment	.1	certificates and other documents required to be carried on board ships by International conventions, how they may be obtained and their period of validity									
		.2	responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended			S						
		.3	responsibilities under the relevant requirements of the international Convention for the Safety of Life at Sea									
		.4	responsibilities under the International Convention for the Prevention of Pollution from Ships	60								





Annex A of CMO No. 67, s. 2017

						Profe	ssional Co	urses		
OMPETENCE	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7
		.5	maritime declarations of health and the requirements of the international Health Regulations			17/26				
		.6	responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo							
		.7	methods and aids to prevent pollution of the marine environment by ships							
		.6	national legislation for implementing international agreements and conventions							
A-11/5	Function 3 Controlli	ng the O	peration of the ship and care for persons on board at the support leve	1						N
C1	Contribute to the safe operation of	KUP1	Knowledge of deck equipment							
		KUP2	Knowledge of the following procedures and ability to:							
	machinery	.1	Rig and unrig bosun's chairs and staging							
		.2	Rig and unrig pilot ladders, hoists, rat-guards and gangways							
		.3	Use martin spike seamanship skilfs, including the proper use of knots, splices and stoppers							
A-11/5	Function 4 Maintena	ince and	repair at the support level							216
C1	Contribute to shipboard	KUP1	Ability to use painting, lubrication and cleaning materials and equipment							
	maintenance and repair	KUP2	Ability to understand and execute routine maintenance and repair procedures							
		KUP3	Knowledge of surface preparation techniques							
		KUP4	Understanding manufacturer's safety guidelines and shipboard instructions							
		KUP5	Knowledge of safe disposal of waste materials							
		KUP6	Knowledge of the application, maintenance and use of hand and power tools							
A-IIV6		l, electro	onic and control engineering at the operational level							
C5	Operate computers and computer networks on ships	KUP1	Understanding of:							





Annex A of CMO No. 67, s. 2017 Revision No: 00

						Profe	ssional Co	urses		
COMPETENCE	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Nav 1	Nav 2	Nav 3	Nav 4	Nav 5	Nav 6	Nav 7
			Theoretical knowledge							
	THE RESERVE OF STREET		main features of data processing							
	The second	1.3	construction and use of computer networks on ships							
		1.4	bridge-based, engine-room based and commercial computer use			150			-W	
	GMDSS									
C1	Transmit and receive information using	KUP1	In addition to the requirements of the Radio Regulations, a knowledge of:							
	GMDSS subsystems and equipment and fulfilling the	.1	search and rescue radiocommunications, including procedures in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual		SH == 5440					
	functional requirements of	.2	the means to prevent the transmission of false distress alerts and the procedures to mitigate the effects of such alerts							
	GMDSS	.3	ship reporting systems							
	(Table A-IV/2)	.4	radio medical services							
		.5	use of the International Code of Signals and the IMO Standard Marine Communication Phrases			34.50				
		.6	the English language, both written and spoken, for the communication of information relevant to safety of life at sea			7				
C2	Provide radio	KUP1	The provision of radio services in emergencies such as						- 22	
	services in	0.1	abandon ship					-700		
	emergencies (Table	0.2	fire on board ship							
	A-IV/2)	0.3	partial or full breakdown of radio installations							
		0,0	POLYMONE DELICION OF THE CONTROL OF							
		KUP2	Preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical and non- ionizing radiation hazards							
				8		-			-	-
			total indicative class hours	0	0	0	0	0	0	0

Competences from Table A-II/1 OIC Navigational Watch
Competences from Table A-II/2 Management Level Deck
Competences from Table A-II/5 Able Seafarer Deck
Competence from Table A-IV/2 GMDSS Radio Operators





Annex A of CMO No. 67, s. 2017

						Profession	al Course	•	
INDEX	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6
A-II/1	Function 1 Navigati	on at the	operational level	Na Charles			Tel Control		
C1	Plan and conduct a		Celestial navigation						12
	passage and	.1	Ability to use celestial bodies to determine the ship's position						
	determine position	KUP2	Terrestrial and coastal navigation						
		.1	Ability to determine the ship's position by use of landmarks						
		.2	Ability to determine the ship's position by use of aids to navigation, including lighthouses, beacons and buoys						
		.3	Ability to determine the ship's position by use of dead reckoning, taking into account winds, tides, currents and estimated speed						
		KUP3	Thorough knowledge of and ability to use nautical charts, and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routeing information						
		KUP4	Electronic systems of position fixing and navigation						
		.1	Ability to determine the ship's position by use of electronic navigational aids						
		KUP5	Echő-sounders						
		.1	Ability to operate the equipment and apply the information correctly						
		KUP6	Compass - magnetic and gyro			District Co.	- F-2-3-1X		
		.1	Knowledge of the principles of magnetic and gyro-compasses						
		KUP7	Steering and control systems						
		.1	Knowledge of steering control systems, operational procedures and change-over from manual to automatic control and vice versa. Adjustment of controls for optimum performance						
		KUP8	Meteorology						
		.1	Ability to use and interpret information obtained from shipborne meteorological instruments						
		.2	Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems						
		.3	Ability to apply the meteorological information available						
C2	Maintain a safe	KUP1	Watchkeeping						1 22
		.1	Thorough knowledge of the content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended						





Annex A of CMO No. 67, s. 2017

Revision No: 00

				Professional Courses							
COMPETENCE	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam (
		,2	Thorough knowledge of the Principles to be observed in keeping a navigational watch								
		.3	The use of routeing in accordance with the General Provisions on Ships' Routeing		3437		7				
		.4	The use of information from navigational equipment for maintaining a safe navigational watch								
		.5	Knowledge of blind pilotage techniques								
		.6	The use of reporting in accordance with the General Principles for Ship Reporting Systems and with VTS procedures								
hett like		KUP2	Bridge resource management				TONIE CONTRACTOR				
C3	Use of RADAR and	KUP1	Radar navigation								
	ARPA to maintain safety of navigation	.1	Knowledge of the fundamentals of radar and automatic radar plotting aids (ARPA)								
		.2	Ability to operate and to interpret and analyse information obtained from radar, including the following:								
			Performance, including:								
			factors affecting performance and accuracy		111070						
		.2a.2	setting up and maintaining displays								
		.2a.3	detection of misrepresentation of information, false echoes, sea return, etc., racons and SARTs			-					
		.2b	Use, including:								
		.26.1	range and bearing; course and speed of other ships; time and distance of closest approach of crossing, meeting overtaking ships				7000 (11500)				
		.2b.2	identification of critical echoes; detecting course and speed changes of other ships; effect of changes in own ship's course or speed or both								
		.2b.3	application of the International Regulations for Preventing Collisions at Sea, 1972, as amended								
		.2b.4	plotting techniques and relative and true-motion concepts								
		.2b.5	parallel indexing								
		KUP2	Principal types of ARPA, their display characteristics, performance standards and the dangers of over-reliance on ARPA								





Annex A of CMO No. 67, s. 2017

Revision No: 00

						rofession	al Courses		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam (
	maintain the safety of nevigation	.1	Knowledge of the capability and limitations of ECDIS operations, including:						
		.1.1	a thorough understanding of Electronic Navigational Chart (ENC) data, data accuracy, presentation rules, display options and other chart data formats						
		,1.2	the dangers of over-reliance						
		,1.3	familiarity with the functions of ECDIS required by performance standards in force					-	
		.2	Proficiency in operation, interpretation, and analysis of information obtained from ECDIS, including:			_			
		.2.1	use of functions that are integrated with other navigation systems in various installations, including proper functioning and adjustment to desired settings						
		.2.2	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)						
		.2.3	confirmation of vessel position by alternative means						
		.2.4	efficient use of settlings 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						
		.2.5	adjustment of settings and values to suit the present conditions						\vdash
		.2.6	situational awareness while using ECDIS including safe water and						
C5	Respond to emergen	KUP1	Emergency procedures		Γ			x	T^{-}
		a	Precautions for the protection and safety of passengers in emergency situations					x	
		.2	Initial action to be taken following a collision or a grounding; initial damage assessment and control					х	
		.3	Appreciation of the procedures to be followed for rescuing persons from the sea, assisting a ship in distress, responding to emergencies which arise in port					х	





Annex A of CMO No. 67, s. 2017

				Professional Courses							
COMPETENCE	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6		
	Information by visual	.1	Ability to use the International Code of Signals								
	signatling	.2	Ability to transmit and receive, by Morse light, distress signal SOS as specified in Annex IV of the International Regulations for Preventing Collisions at Sea, 1972, as amended, and appendix 1 of the International Code of Signals, and visual signalling of single-letter signals as also specified in the International Code of Signals								
C9	Manoeuver the ship	KUP1	Ship manoeuvering and handling					X			
		.1	Knowledge of:					x			
		.1.1	the effects of wind anthe effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distancesd current on ship handling					х			
		.1.2	the effects of wind and current on ship handling					X			
		.1.3	manoeuvres and procedures for the rescue of person overboard					х			
		.1.4	squat, shallow-water and similar effects					х			
		.1.5	proper procedures for anchoring and mooring					κ			





Annex A of CMO No. 67, s. 2017

					1	Profession	al Course	5	
INDEX	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6
A-II/2	Function 1 Navigation	n at the	management level		3556	200			MI TOSS
C1	Plan a voyage and conduct navigation	KUP1	Voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks	300		1011			
		.1	restricted waters	2.15 (W. S.)	TREE TAYANI				
		.2	meteorological conditions						
		.3	ice						
		.4	restricted visibility			7 3 3 3 6 1 1 1			
			traffic separation schemes		THE RESERVE			data a	
		.6	vessel traffic service (VTS) areas						
		.7	areas of extensive tidal effects					- MIRESTAN	
C2	Determine position	KUP1	Position determining in all conditions						
	and the accuracy of	.1	Celestial observations						1
	resultant position fix by any means	.2	Terrestrial observations, including the ability to use appropriate charts, notices to mariners and other publications to assess the accuracy of the resulting fix						
		.3	Modern electronic navigational aids with specific knowledge of their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing						
C8	Forecast weather and oceanographic K conditions	KUP1	Ability to understand and interpret a synoptic chart and to forecast area weather, taking into account local weather conditions and information received by weather fax						
		KUP2	Knowledge of the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous quadrants						
		KUP3	Knowledge of ocean current systems						
		KUP4	Ability to calculate tidal conditions		A CONTRACTOR OF THE PARTY OF TH				
		KUP5	Use all appropriate nautical publications on tides and currents						
C11	Operate remote controls of	KUP1	Operating principles of marine power plants						
	propulsion plant and engineering systems	KUP2	Ships' auxiliary machinery						
	and services	KUP3	General knowledge of marine engineering terms						
	Contribute to berthing, anchoring	KUP1	Working knowledge of the mooring system and related procedures	х					
	and other mooring operations	1.1	the function of mooring and tug lines and how each line functions as part of an overall system	x					





Annex A of CMO No. 67, s. 2017

		NATION .				Profession	al Course	3	
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6
		1.2	the capacities, safe working loads, and breaking strengths of mooring equipment, including mooring wires, synthetic and fibre lines, winches, anchor windlasses, capstans, bitts, checks and bollards	x					
		1.3	the procedures and order of events for making fast and letting go mooring and tug lines and wires, including towing lines	×					
		1.4	the procedures and order of events for the use of anchors in various operations	×	_	_			
		KUP2	Working knowledge of the procedures and order of events associated with mooring to a buoy or buoys	х					
A-II/1	Function 2 Cargo ha	indling a	nd stowage at the operational level	William Street		3-5-3			12 May 19
C1		KUP1	Cargo handling, stowage and securing		Х	Х	X		
	stowage, securing, care during the	.1	Knowledge of the effect of cargo, including heavy lifts, on the seaworthiness and stability of the ship		×	×			
	voyage and the unloading of cargoes	.2	Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship				х		
		.3	Ability to establish and maintain effective communications during loading and unloading			x	хх		
C2	inspect and report defects and damage	KUP1	Knowledge and ability to explain where to look for damage and defects most commonly encountered due to:			х		·	
	to cargo spaces,	.1	loading and unloading operations			X	<u> </u>		
	hatch covers and	.2	corresion			х			
	ballast tanks	.3	severe weather conditions			x			





Annex A of CMO No. 67, s. 2017

					1	Profession	al Course	8	
COMPETENCE INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6
		KUP2	Ability to state which parts of the ship shall be inspected each time in order to cover all parts within a given period of time			Х			
		KUP3	Identify those elements of the ship structure which are critical to the safety of the ship			х			
		KUP4	State the causes of corrosion in cargo spaces and ballast tanks and how corrosion can be identified and prevented			Х			
		KUP5	Knowledge of procedures on how the inspections shall be carried out			X			
		KUP6	Ability to explain how to ensure reliable detection of defects and damages			Х			
		KUP7	Understanding of the purpose of the "enhanced survey programme"			х	х	2018	
A-11/2	Function 2 Navigati	ion at the	operational level					WINE	
C1	Plan and ensure safe loading, stowage, securing,	KUP1	Knowledge of and ability to apply relevant international regulations, codes and standards concerning the safe handling, slowage, securing and transport of cargoes						
	care during the voyage and	KUP2	Knowledge of the effect on trim and stability of cargoes and cargo operations					-1112-2	
	unloading cargoes	KUP3	Use of stability and trim diagrams and stress-calculating equipment, including automatic data-based (ADB) equipment, and knowledge of loading cargoes and ballasting in order to keep hull stress within accaptable limits						
		KUP4	Stowage and securing of cargoes on board ships, including cargo- handling gear and securing and lashing equipment						
		KUP5	Loading and unloading operations, with special regard to the transport of cargoes identified in the Code of Safe Practice for Cargo Stowage and Securing					X XII C	
		KUP6	General knowledge of tankers and tanker operations				X		
		KUP7	Knowledge of the operational and design limitations of bulk carriers						
		KUP8	Ability to use all available shipboard data related to loading, care and unloading of bulk cargoes						
		KUP9	Ability to establish procedures for safe cargo handling in accordance with the provisions of the relevant instruments etc						
		KUP10	Ability to explain the basic principles for establishing effective communications and improving working relationship between ship and terminal personnel						





Annex A of CMO No. 67, s. 2017

						Profession	el Course	5	
INDEX	COMPETENCE	KUP INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6
C3	Carriage of dangerous goods	KUP1	International regulations, standards, codes and recommendations on carriage of dangerous goods				×		
		KUP2	Carriage of dangerous, hazardous and harmful cargoes, precautions during loading and unloading and care during the voyage				x		
A-IV1	Function 3 Controlli	ng the o	peration of the ship and care for persons on beard at the operational						
C1		KUP1	Prevention of pollution of the marine environment and anti-pollution procedures						
	Ensure compliance with pollution	.1	Knowledge of the precautions to be taken to prevent pollution of the marine environment						
	prevention requirements	.2	Anti-pollution procedures and all associated equipment						
	requirements	.3	Importance of proactive measures to protect the marine environment						
C2	Maintain	KUP1	Ship stability		X				
	seaworthiness of the	.1	Working knowledge and application of stability, trim and stress lables, diagrams and stresscalculating equipment		х				
		.2	Understanding of the fundamentals of watertight integrity		x				
		.3	Understanding of fundamental actions to be taken in the event of partial toss of intact buoyancy		×				
		KUP2	Ship construction	Х			AND SOME IN		
		.1	General knowledge of the principal structural members of a ship and the proper names for the various parts	×					
C6	Monitor compliance with legislative requirements	KUP1	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment						
C7	Application of leadership and	KUP1	Working knowledge of shipboard personnel management and training	Х					
	teamworking skills	KUP2	A knowledge of related international mantime conventions and recommendations, and national legislation						
	K	KUP3	Ability to apply task and workload management	100					
		.1	planning and co-ordination						
		.2	personnel assignment				and the same	1	
		.3	time and resource constraints						
		4	prioritization			- Collection			





Annex A of CMO No. 67, s. 2017

						Profession	al Courses	В	
OMPETENCE	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6
		KUP4	Knowledge and ability to apply effective resource management						
		.1	allocation, assignment, and prioritization of resources						
		.2	effective communication onboard and ashore					-32-34-300	
		.3	decisions reflect consideration of team experiences						
		.4	assertiveness and leadership, including motivation						
		.5	obtaining and maintaining situational awareness						
		KUP5	Knowledge and ability to apply decision-making techniques		AVE. SHEEP, ST				5.5
A-II/2	Function 1 Navigati	on at the	operational level						
C1	Control trim, stability and stress		Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability						х
		KUP2	Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and countermeasures to be taken						х
		KUP3	Knowledge of IMO recommendations concerning ship stability	-220#					Х
C2	Monitor and control compliance with legislative measures to ensure safety of	KUP1	Knowledge of relevant international maritme law embodied in international agreements and conventions. Regard shall be paid to responsibilities under the International Convention for the Prevention of Pollution from Ships as amended.						
	life at sea and	KUP2	Regard shall be paid especially to the following subjects:			N=50/A=			
	protection of the marine environment	.1	certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and their period of validity						
		.2	responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended						
		.3_	responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea		- 1				
		.4	responsibilities under the International Convention for the Prevention of Pollution from Ships			S .			





Annex A of CMO No. 67, s. 2017

Revision No: 00

						Profession	al Course:		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6
		.5	maritime declarations of health and the requirements of the International Health Regulations						
		.6	responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo						
		.7	methods and aids to prevent pollution of the marine environment by ships						
		.8	national legislation for implementing international agreements and conventions						
A-II/5	Function 3 Controlli	ng the O	peration of the ship and care for persons on board at the support leve						
C1	Contribute to the safe operation of	KUP1	Knowledge of deck equipment	Х					
	deck equipment and	KUP2	Knowledge of the following procedures and ability to:	X					
	machinery	.1	Rig and unrig bosun's chairs and staging	x					
		.2	Rig and unrig pilot ladders, hoists, rat-guards and gangways	х					
		.3	Use marlin spike seamanship skills, including the proper use of knots, splices and stoppers	x					
A-II/5	Function 4 Maintena	nce and	repair at the support level						
C1	Contribute to shipboard	KUP1	Ability to use painting, lubrication and cleaning materials and equipment	х					
	maintenance and repair	KUP2	Ability to understand and execute routine maintenance and repair procedures	Х					
		KUP3	Knowledge of surface preparation techniques	X					
		KUP4	Understanding manufacturer's safety guidelines and shipboard instructions	Х					
		KUP5	Knowledge of safe disposal of waste materials	Х					
		KUP6	Knowledge of the application, maintenance and use of hand and power tools	х					
A-111/6	Function 1 Electrica	i, electro	onic and control engineering at the operational level						
C5	Operate computers and computer networks on ships	KUP1	Understanding of:						





Annex A of CMO No. 67, s. 2017

		-				rofession	al Courses	5	
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Seam 1	Seam 2	Seam 3	Seam 4	Seam 5	Seam 6
		KUP2	Theoretical knowledge						
		1.2	main features of data processing						
	125/6		construction and use of computer networks on ships						
		1.4	bridge-based, engine-room based and commercial computer use	7	A			40.70	
LANGE HONE	GMDSS	- WALL		W-1 - 1 - 1 - 1 - 1					
C1	Transmit and receive	KUP1	In addition to the requirements of the Radio Regulations, a knowledge of:						
	GMDSS subsystems and equipment and fulfilling the	.1	search and rescue radiocommunications, including procedures in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual						
	functional requirements of	.2	the means to prevent the transmission of false distress alerts and the procedures to mitigate the effects of such alerts						8
	GMDSS	.3	ship reporting systems						
	(Table A-IV/2)	.4	radio medical services					lun - v	
		.5	use of the International Code of Signals and the IMO Standard Marine Communication Phrases						
		.6	the English language, both written and spoken, for the communication of information relevant to safety of life at sea						
C2	Provide radio	KUP1	The provision of radio services in emergencies such as					11809	
	services in	0.1	abandon ship	1000					
	emergencies (Table	0.2	fire on board ship						
	A-IV/2)		partial or full breakdown of radio installations						
		KUP2	Preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical and non-ionizing radiation hazards						
		S CONTRACTOR		100 To 10					
			total indicative class hours	a	0	0	0	0	

	Competences from Table A-II/1 OIC Navigational Watch
	Competences from Table A-II/2 Management Level Deck
	Competences from Table A-II/S Able Seafarer Deck
-	Competence from Table A-IV/2 GMDSS Radio Operators





Annex A of CMO No. 67, s. 2017

					Profe	essional Cou	rees		
INDEX	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	Met-O 1	Met-0 2	Mar Pow	Marcom
A-IV1	Function 1 Navigati	on at the	operational level						
C1	Plan and conduct a		Celestial navigation						
	passage and		Ability to use celestial bodies to determine the ship's position						
	determine position		Terrestrial and coastal navigation	The Art of the					No.
			Ability to determine the ship's position by use of landmarks						
		.2	Ability to determine the ship's position by use of aids to navigation, including lighthouses, beacons and buoys						
		.3	Ability to determine the ship's position by use of dead reckoning, taking into account winds, tides, currents and estimated speed						
		KUP3	Thorough knowledge of and ability to use nautical charts, and publications, such as seiling directions, tide tables, notices to mariners, radio navigational warnings and ships' routeing information						
		KUP4	Electronic systems of position fixing and navigation						
		.1	Ability to determine the ship's position by use of electronic navigational aids						
		KUP5	Echo-sounders						
		.1	Ability to operate the equipment and apply the information correctly				7		
		KUP6	Compass - magnetic and gyro						
			Knowledge of the principles of magnetic and gyro-compasses						
			Steering and control systems		X				
		.1	Knowledge of steering control systems, operational procedures and change-over from manual to automatic control and vice versa. Adjustment of controls for optimum performance		x				
		KUP8	Meteorology			X			THAT IS NOT THE
		.1	Ability to use and interpret information obtained from shipborne meteorological instruments			×			
		.2	Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems			х			
		.3	Ability to apply the meteorological information available			х			
C2	Maintain a safe navigational watch	KUP1	Watchkeeping	х					
	ner-gaudia water	.1	Thorough knowledge of the content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended	x					



THIGHT TO SEE THE PROPERTY OF THE PROPERTY OF

Bachelor of Science in Marine Transportation CURRICULUM MAPPING

Annex A of CMO No. 67, s. 2017

Revision No: 00

COMPETENCE INDEX	COMPETENCE	KUP / INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	Met-O 1	Met-O 2	Mar Pow	Marcom
A-II/1	Function 1 Navigation at the	operationa	al level						
	, , , , , , , , , , , , , , , , , , ,	.2	Thorough knowledge of the Principles to be observed in keeping a navigational watch		х				
		.3	The use of routeing in accordance with the General Provisions on Ships' Routeing		х				
		.4	The use of information from navigational equipment for maintaining a safe navigational watch		х				
		.5	Knowledge of blind pilotage techniques		х				
		.6	The use of reporting in accordance with the General Principles for Ship Reporting Systems and with VTS procedures		x				
		KUP2	Bridge resource management		х				
C3	Use of RADAR and ARPA to	KUP1	Radar navigation						
	maintain safety of navigation	.1	Knowledge of the fundamentals of radar and automatic radar plotting aids (ARPA)						
		.2	Ability to operate and to interpret and analyse information obtained from radar, including the following:						
		.2a	Performance, including:						
		.2a.1	factors affecting performance and accuracy						
		.2a.2	setting up and maintaining displays						
		.2a.3	detection of misrepresentation of information, false echoes, sea return, etc., racons and SARTs						
		.2b	Use, including:						
		.2b.1	range and bearing; course and speed of other ships; time and distance of closest approach of crossing, meeting overtaking ships						
			identification of critical echoes; detecting course and speed changes of other ships; effect of changes in own ship's course or speed or both						
		.2b.3	application of the International Regulations for Preventing Collisions at Sea, 1972, as amended						
		.2b.4	plotting techniques and relative and true-motion concepts						
			parallel indexing						
		KUP2	Principal types of ARPA, their display characteristics, performance standards and the dangers of over-reliance on ARPA						
C4	Use of ECDIS to maintain the	KUP1	Navigation using ECDIS						





Annex A of CMO No. 67, s. 2017

				Professional Courses					
OMPETENCE	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	Met-O 1	Met-O 2	Mar Pow	Marcom
	maintain the safety of navigation	.1	Knowledge of the capability and limitations of ECDIS operations, including:						
		.1.1	a thorough understanding of Electronic Navigational Chart (ENC) data, data accuracy, presentation rules, display options and other chart data formats						
		.1.2	the dangers of over-reliance				59/20 15 15		
		.1.3	familiarity with the functions of ECDIS required by performance standards in force						2005
		.2	Proficiency in operation, interpretation, and analysis of information obtained from ECDIS, including:						
		.2.1	use of functions that are integrated with other navigation systems in various installations, including proper functioning and adjustment to desired settings						
		.2.2	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)						
		.2.3	confirmation of vessel position by alternative means						
		.2.4	efficient use of settings to ensure conformance to operational procedures, including alarm parameters for anti-grounding, proximity to confacts and special areas, completeness of chart data and chart update status, and backup arrangements						
		.2.5	adjustment of settings and values to suit the present conditions						
		.2.6	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						
C5	Respond to emerger	KUP1	Emergency procedures			· ·		14-11-1	
		.1	Precautions for the protection and safety of passengers in emergency situations						
		.2	Initial action to be taken following a collision or a grounding; initial demage assessment and control				3-1		
		.3	Appreciation of the procedures to be followed for rescuing persons from the sea, assisting a ship in distress, responding to emergencies which arise in port						
СВ	Transmit and receive		Visual signalling						





Annex A of CMO No. 67, s. 2017

				Professional Courses					
INDEX	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	Mel-O 1	Met-0 2	Mar Pow	Marcom
	Information by visual	.1	Ability to use the International Code of Signals						×
	signalling	.2	Ability to transmit and receive, by Morse light, distress signal SOS as specified in Annex IV of the International Regulations for Preventing Cellisions at Sea, 1972, as amended, and appendix 1 of the International Code of Signals, and visual signalling of single-letter signals as also specified in the International Code of Signals.						х
C9	Manoeuver the ship	KUP1	Ship manoeuvering and handling						
		.1	Knowledge of:						
		.1.1	the effects of wind anthe effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distancesd current on ship handling						
		.1.2	the effects of wind and current on ship handling						
		.1.3	manoeuvres and procedures for the rescue of person overboard						
			squat, shellow-water and similar effects						
		.1.5	proper procedures for anchoring and mooring						<u> </u>





Annex A of CMO No. 67, s. 2017

					Profe	essional Cou	irses		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	Met-O 1	Met-O 2	Mar Pow	Marcom
A-11/2	Function 1 Navigation	on at the	management level						
C1	Plan a voyage and conduct navigation	KUP1	Voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks						
	33/1120///31/32/10//	.1	restricted waters						
		.2	meteorological conditions		331-333-4-4	20730			9 1111 111
		.3	ice						
			restricted visibility		W	7/4/1			
			traffic separation schemes	-9/55-32-1		4 5 th 12 1			
			vessel treffic service (VTS) areas						
		.7	areas of extensive tidal effects						
C2	Determine position	KUP1	Position determining in all conditions			And a supplied to the second second			
	and the accuracy of		Celestial observations						
	resultant position fix by any means	.2	Terrestrial observations, including the ability to use appropriate charts, notices to mariners and other publications to assess the accuracy of the resulting flx						
		.3	Modern electronic navigational aids with specific knowledge of their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing						
C8	Forecast weather and oceanographic conditions	KUP1	Ability to understand and interpret a synoptic chart and to forecast area weather, taking into account local weather conditions and information received by weather fax				х		
		KUP2	Knowledge of the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dengerous quadrants				x		
		KUP3	Knowledge of ocean current systems				X		VIII
		KUP4	Ability to calculate tidal conditions				X		
		KUP5	Use all appropriate nautical publications on tides and currents				X		
C11	Operate remote controls of	KUP1	Operating principles of marine power plants					X	
	propulsion plant and engineering systems	KUP2	Ships' auxiliary machinery			y.		х	
	and services	KUP3	General knowledge of marine engineering terms					X	
	Contribute to berthing, anchoring	KUP1	Working knowledge of the mooring system and related procedures						
	and other mooring operations	1.1	the function of mooring and tug lines and how each line functions as part of an overall system						





Annex A of CMO No. 67, s. 2017

		14115			Profe	essional Cou	rses		
COMPETENCE	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	<u>Met-0 1</u>	Met-O 2	Mar Pow	<u>Marcom</u>
		1.2	the capacities, safe working loads, and breaking strengths of mooring equipment, including mooring wires, synthetic and fibre lines, winches, anchor windlasses, capstans, bitts, chocks and bollards						
		1.3	the procedures and order of events for making fast and letting go mooring and tug lines and wires, including towing lines						
		1.4	the procedures and order of events for the use of anchors in various operations						
		KUP2	Working knowledge of the procedures and order of events associated with mooring to a buoy or buoys						
Á-II/1	Function 2 Cargo ha	indling a	nd stowage at the operational level	STORES OF THE					
C1	Monitor the loading,	KUP1	Cargo handling, stowage and securing						
	stowage, securing, care during the	.1	Knowledge of the effect of cargo, including heavy lifts, on the seaworthiness and stability of the ship						
	voyage and the unloading of cargoes	.2	Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship						
		.3	Ability to establish and maintain effective communications during loading and unloading						
C2	Inspect and report defects and damage	KUP1	Knowledge and ability to explain where to look for damage and defects most commonly encountered due to:						
	to cargo spaces,	.1	loading and unloading operations						
	hatch covers and	.2	corrosion						
	ballast tanks	.3	severe weather conditions						





Annex A of CMO No. 67, s. 2017

		14115			Prof	essional Cou	rses		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	Met-0 1	Met-O 2	Mar Pow	Marcom
		KUP2	Ability to state which perts of the ship shall be inspected each time in order to cover all parts within a given period of time				*		
		KUP3	Identify those elements of the ship structure which are critical to the safety of the ship						
		KUP4	State the causes of corrosion in cargo spaces and ballast tanks and how corrosion can be identified and prevented						
		KUP5	Knowledge of procedures on how the inspections shall be carried out					er avanski – me	
		KUP6	Ability to explain how to ensure reliable detection of defects and damages						
		KUP7	Understanding of the purpose of the "enhanced survey programme"						
A-11/2	Function 2 Naviget	ion at the							
C1	Plan and ensure safe loading, stowage, securing,	KUP1	Knowledge of and ability to apply relevant international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargoes						
	care during the voyage and	KUP2	Knowledge of the effect on trim and stability of cargoes and cargo operations						
	unloading cargoes	KUP3	Use of stability and trim diagrams and stress-calculating equipment, including automatic data-based (ADB) equipment, and knowledge of loading cargoes and ballasting in order to keep hull stress within accaptable limits						
		KUP4	Stowage and securing of cargoes on board ships, including cargo- handling gear and securing and lashing equipment						
		KUP5	Loading and unloading operations, with special regard to the transport of cargoes identified in the Code of Safe Practice for Cargo Stowage and Securing						
		KUP6	General knowledge of tankers and tanker operations			200			
		KUP7	Knowledge of the operational and design limitations of bulk carriers						
		KUP8	Ability to use all available shipboard data related to loading, care and unloading of bulk cargoes						
		KUP9	Ability to establish procedures for safe cargo handling in accordance with the provisions of the relevant instruments etc						
		KUP10	Ability to explain the basic principles for establishing effective communications and improving working relationship between ship and terminal personnel						





Annex A of CMO No. 67, s. 2017

					Profe	essional Cou	rses		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	Met-O 1	Met-O 2	Mar Pow	Marcom
C3	Carriage of dangerous goods	KUP1	International regulations, standards, codes and recommendations on carriage of dangerous goods						
		KUP2	Carriage of dangerous, hazardous and harmful cargoes, precautions during loading and unloading and care during the voyage						
A-II/1	Function 3 Controlling	ng the or	peration of the ship and care for persons on board at the operational i						NAME OF THE OWNER.
C1		KUP1	Prevention of pollution of the marine environment and enti-pollution procedures						
	Ensure compliance with pollution	.1	Knowledge of the precautions to be taken to prevent pollution of the marine environment					18	
	prevention requirements	.2	Anti-pollution procedures and all associated equipment						
	C2 Maintain	.3	Importance of proactive measures to protect the marine environment						
The second secon	Maintain	KUP1	Ship stability						
	seaworthiness of the ship	.1	Working knowledge and application of stability, trim and stress tables, diagrams and stresscalculating equipment						
		,2	Understanding of the fundamentals of watertight integrity		1				
		.3	Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy						
		KUP2	Ship construction	. 510 11					
		.1	General knowledge of the principal structural members of a ship and the proper names for the various parts						
C6	Monitor compliance with legislative requirements	KUP1	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment						
C7	Application of leadership and	KUP1	Working knowledge of shipboard personnel management and training						
	teamworking skills	KUP2	A knowledge of related international maritime conventions and recommendations, and national legislation						
		KUP3	Ability to apply task and workload management						
		.1	planning and co-ordination						
	MISSISSER PROPERTY.	.2	personnel assignment						
		.3	time and resource constraints						





Annex A of CMO No. 67, s. 2017

		Leur			Prof	essional Cou	rses		
OMPETENCE	COMPETENCE	KUP INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Walch 2	Mei-O 1	Met-O 2	Mar Pow	Marcom
		KUP4	Knowledge and ability to apply effective resource management						
		.1	allocation, assignment, and prioritization of resources						
		.2	effective communication onboard and ashore						
		.3	decisions reflect consideration of team experiences						
		.4	assertiveness and leadership, including motivation						
		.5	obtaining and maintaining situational awareness						
		KUP5	Knowledge and ability to apply decision-making techniques		1				
A-11/2	Function 1 Navigation	on at the	operational level						
C1	Control trim, stability and stress		Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability						
		KUP2	Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and countermeasures to be taken						
		KUP3	Knowledge of IMO recommendations concerning ship stability						
C2	Monitor and control compliance with legislative measures to ensure safety of	KUP1	Knowledge of relevant international maritme law embodied in international agreements and conventions. Regard shall be paid to responsibilities under the International Convention for the Prevention of Pollution from Ships as amended.						
	life at sea and	KUP2	Regard shall be paid especially to the following subjects:		X = 1				
	protection of the marine environment	.1	certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and their period of validity						
		.2	responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended						
		.3	responsibilities under the relevant requirements of the International Convention for the Safety of Life at See		9				
		.4	responsibilities under the International Convention for the Prevention of Pollution from Ships						





Annex A of CMO No. 67, s. 2017

					Prof	essional Cou	rses		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	Met-O 1	Met-O 2	Mar Pow	Marcom
		.5	maritime declarations of health and the requirements of the International Health Regulations						
		.6	responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo						
		.7	methods and aids to prevent pollution of the marine environment by ships						
		.8	national legislation for implementing international agreements and conventions						
A-11/5	Function 3 Controlli	ng the O	peration of the ship and care for persons on board at the support leve						
C1	Contribute to the safe operation of	KUP1	Knowledge of deck equipment						
	deck equipment and	KUP2	Knowledge of the following procedures and ability to:						
	machinery	.1	Rig and unrig bosun's chairs and staging						
			Rig and unrig pilot ladders, hoists, rat-guards and gangways						
			Use marlin spike seamanship skills, including the proper use of knots, splices and stoppers						
A-II/5	Function 4 Maintena	nce and	repair at the support level						
C1	Contribute to shipboard		Ability to use painting, lubrication and cleaning materials and equipment						
	maintenance and repair	KUP2	Ability to understand and execute routine maintenance and repair procedures						
		KUP3	Knowledge of surface preparation techniques						
		KUP4	Understanding manufacturer's safety guidelines and shipboard instructions						
		KUP5	Knowledge of safe disposal of waste materials			Alle			
		KUP6	Knowledge of the application, maintenance and use of hand and power tools						
A-HI/6	Function 1 Electrica	l, electro	nic and control engineering at the operational level						
C5	Operate computers and computer networks on ships	KUP1	Understanding of:						





Annex A of CMO No. 67, s. 2017

					Profe	essional Cou	rses		
OMPETENCE	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	D-Watch 1	D-Watch 2	<u>Met-O 1</u>	Met-O 2	Mar Pow	Marcon
			Theoretical knowledge					The second	
		1.2	main features of data processing						
			construction end use of computer networks on ships		21000 - 2000				
		1.4	bridge-based, engine-room based and commercial computer use	4.40	B-x0100				A STATE OF THE STA
	GMDSS								
C1	Transmit and receive information using	KUP1	In addition to the requirements of the Radio Regulations, a knowledge of:						х
	GMDSS subsystems and equipment and fulfilling the	.1	search and rescue radiocommunications, including procedures in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual						х
	functional requirements of	.2	the means to prevent the transmission of false distress alerts and the procedures to mitigate the effects of such alerts						х
	GMDSS	.3	ship reporting systems		N. L. V.				×
	(Table A-IV/2)	.4	radio medical services						X
		.5	use of the International Code of Signals and the IMO Standard Marine Communication Phrases		21912 W45				x
		.6	the English language, both written and spoken, for the communication of information relevant to safety of life at sea						×
C2	Provide radio	KUP1	The provision of radio services in emergencies such as					- War 11 11 12 1	X
	services in	0.1	abandon ship		PORT TO THE REAL PROPERTY.			0.558///144584	х
	emergencies (Table	0.2	fire on board ship	PA_THEMANATURE				- W	×
	A-IV/2)	0.3	partiel or full breakdown of radio installations						×
		KUP2	Preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical and non-ionizing radiation hazards						х
			total indicative class hours	0	0	0	6	0	0

Competences from Table A-II/1 OIC Navigational Watch
Competences from Table A-II/2 Management Level Deck
Competences from Table A-II/5 Able Seafarer Deck
Competence from Table A-IV/2 GMDSS Radio Operators





Annex A of CMO No. 67, s. 2017

COMPETENCE INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Professional Courses				
				MarEnv	<u>Mar Law</u>	Mgmt 1	Mgmt 2	ICT
A-II/1	Function 1 Navigati	on at the	operational level				0.0000000000000000000000000000000000000	100000
Ċi	Plan and conduct a		Celestial navigation					
	passage and		Ability to use celestial bodies to determine the ship's position		NE BATALLO			
			Terrestrial and coastal navigation					
			Ability to determine the ship's position by use of landmarks					
		.2	Ability to determine the ship's position by use of aids to navigation, including lighthouses, beacons and buoys					
		.3	Ability to determine the ship's position by use of dead reckoning, taking into account winds, tides, currents and estimated speed					
		KUP3	Thorough knowledge of and ability to use nautical charts, and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routeing information					
		KUP4	Electronic systems of position fixing and navigation					-170-0
		.1	Ability to determine the ship's position by use of electronic navigational aids					
		KUP5	Echo-sounders					
		.1	Ability to operate the equipment and apply the information correctly					
		KUP6	Compass - magnetic and gyro					
		.1	Knowledge of the principles of magnetic and gyro-compasses			C ESSERVENCE W		
			Steering and control systems	10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -				
		.1	Knowledge of steering control systems, operational procedures and change-over from manual to automatic control and vice versa, Adjustment of controls for optimum performance					
		KUP8	Meteorology					W/65-1-
		.1	Ability to use and interpret information obtained from shipborne meteorological instruments	- /************************************				
		.2	Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems					
		.3	Ability to apply the meteorological information available					
C2	Maintain a safe navigational watch	KUP1	Watchkeeping					
		.1	Thorough knowledge of the content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended					





Annex A of CMO No. 67, s. 2017

COMPETENCE INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Professional Courses				
				MarEnv	MarLaw	Mgmt 1	Mgmt 2	ICT
		.2	Thorough knowledge of the Principles to be observed in keeping a navigational watch					
		.3	The use of routeing in accordance with the General Provisions on Ships' Routeing					
		.4	The use of information from navigational equipment for maintaining a safe navigational watch			350		
		.5	Knowledge of blind pilotage techniques					
		.6	The use of reporting in accordance with the General Principles for Ship Reporting Systems and with VTS procedures					
		KUP2	Bridge resource management					
C3	Use of RADAR and ARPA to maintain safety of nevigation	KUP1	Radar navigation				T	-
			Knowledge of the fundamentals of radar and automatic radar plotting aids (ARPA)					
		.2	Ability to operate and to interpret and analyse information obtained from radar, including the following:					
			Performance, including:					
			factors affecting performance and accuracy					100
		.2a.2	setting up and maintaining displays					
		.2a,3	detection of misrepresentation of information, false echoes, sea return, etc., recons and SARTs					
		.2ხ	Use, including:					
		.2b.1	range and bearing; course and speed of other ships; time and distance of closest approach of crossing, meeting overtaking ships					
		.2b.2	identification of critical echoes; detecting course and speed changes of other ships; effect of changes in own ship's course or speed or both					
		.2b.3	application of the International Regulations for Preventing Collisions at Sea, 1972, as amended					
		.25.4	plotting techniques and relative and true-motion concepts			e energan		
		.2b.5	parallel indexing					
		KUP2	Principal types of ARPA, their display characteristics, performance standards and the dangers of over-reliance on ARPA					





Annex A of CMO No. 67, s. 2017

		MILE		Profe	ssional Cours	68	N-market	
OMPETENCE	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	MarEnv	Mar Law	Mgmt 1	Mgmt 2	ICT
	maintain the safety of navigation	.1	Knowledge of the capability and limitations of ECDIS operations, including:					
		.1.1	a thorough understanding of Electronic Navigational Chart (ENC) data, data accuracy, presentation rules, display options and other chart data formats					
		.1.2	the dangers of over-reliance	7-2-4				700
		1.3	familiarily with the functions of ECDIS required by performance		220 200			
		.2	Proficiency in operation, interpretation, and analysis of information obtained from ECDIS, including:					
		.2.1	use of functions that are integrated with other navigation systems in various installations, including proper functioning and adjustment to desired settings					
		.2.2	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)					
		.2.3	confirmation of vessel position by alternative means					
		.2.4	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					
			adjustment of settings and values to suit the present conditions					
		.2.6	situational awareness while using ECDIS including safe water and					
C5	Respond to emergen	KUP1	Emergency procedures					
		-71	Precautions for the protection and safety of passengers in emergency situations					
		.2	Initial action to be taken following a collision or a grounding; initial damage assessment and control					
			Appreciation of the procedures to be followed for rescuing persons from the sea, assisting a ship in distress, responding to emergencies which arise in port					





Annex A of CMO No. 67, s. 2017

						Profe	ssional Co	ourses		
COMPETENCE INDEX	COMPETENCE	KUP INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mar Pow	Marcom	MarEnv	Mar Law	Mgmt 1	Mgmt 2	ICT
	information by visual signalling	.1	Ability to use the International Code of Signals							
		.2	Ability to transmit and receive, by Morse light, distress signal SOS as specified in Annex IV of the International Regulations for Preventing Collisions at Sea, 1972, as amended, and appendix 1 of the International Code of Signals, and visual signalling of single-letter signals as also specified in the International Code of Signals							
C9	Manoeuver the ship	KUP1	Ship manoeuvering and handling							
			Knowledge of:							
		.1.1	the effects of wind anthe effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distancesd current on ship handling							
		.1.2	the effects of wind and current on ship handling							
		.1.3	manoeuvres and procedures for the rescue of person overboard							
		.1.4	squat, shallow-water and similar effects							
		.1.5	proper procedures for anchoring and mooring							





Annex A of CMO No. 67, s. 2017

				Profe	ssional Cours	108		
INDEX	COMPETENCE	INDEX	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	MarEnv	Mar Law	Mamt 1	Mgmt 2	ICT
A-I1/2	Function 1 Navigation	on at the	management level	Manage				NEW
C1	Plan a voyage and conduct navigation	KUP1	Voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks			THE REPORT OF THE PERSON OF TH		4
		.1	restricted waters					
		.2	meteorological conditions					
		.3	ice	2011 ALCOHOL: 1				
		.4	restricted visibility					
		.5	traffic separation schemes		3			
	Part Down William	.6	vessel traffic service (VTS) areas					
		.7	areas of extensive tidal effects					-50
C2	Determine position	KUP1	Position determining in all conditions					
	and the accuracy of	.1	Celestial observations				S No.	
	resultant position fix by any means	.2	Terrestrial observations, including the ability to use appropriate charts, notices to mariners and other publications to assess the accuracy of the resulting fix					
		,3	Modern electronic navigational aids with specific knowledge of their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing					
C8	Forecast weather and oceanographic conditions	KUP1	Ability to understand and interpret a synoptic chart and to forecast area weather, taking into account local weather conditions and information received by weather fax					
		KUP2	Knowledge of the characteristics of verious weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous guadrants					
		KUP3	Knowledge of ocean current systems					
		KUP4	Ability to calculate tidal conditions					
		KUP5	Use all appropriate nautical publications on tides and currents					
C11	Operate remote controls of	KUP1	Operating principles of marine power plants					
	propulsion plant and engineering systems	KUP2	Ships' auxiliary machinery					
	and services	KUP3	General knowledge of marine engineering terms					
	Contribute to berthing, anchoring	KUP1	Working knowledge of the mooring system and related procedures					
	and other mooring operations	1.1	the function of mooring and tug lines and how each line functions as part of an overall system					





Annex A of CMO No. 67, s. 2017

				Profe	salonal Cours	es		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	MarEnv	Mar Law	Mgmt 1	Mgmt 2	ICT
		1.2	the capacities, safe working loads, and breaking strengths of mooring equipment, including mooring wires, synthetic and fibre lines, winches, anchor windlasses, capstans, bitts, chocks and bollards					
		1.3	the procedures and order of events for making fast and letting go mooring and tug lines and wires, including towing lines					
		1.4	the procedures and order of events for the use of anchors in various operations					
		KUP2	Working knowledge of the procedures and order of events associated with mooring to a buoy or buoys					
A-II/1 Function 2 Cargo I		indling a	nd stowage at the operational level					NIC POSE
C1	Monitor the loading,	KUP1	Cargo handling, stowage and securing					
	stowage, securing, care during the	.1	Knowledge of the effect of cargo, including heavy lifts, on the seaworthiness and stability of the ship					
	voyage and the unloading of cargoes	.2	Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship					
		.3	Ability to establish and maintain effective communications during loading and unloading					
C2	Inspect and report defects and damage	KUP1	Knowledge and ability to explain where to look for damage and defects most commonly encountered due to:					
	to cargo spaces,	.1	loading and unloading operations					
	hatch covers and	.2	corrosion					
	hatch covers and ballast tenks	.3	severe weather conditions					





Annex A of CMO No. 67, s. 2017

				Profe	ssional Cours	es		
COMPETENCE: INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	MarEnv	Mar Law	Mgmt 1	Mgmt 2	ICT
		KUP2	Ability to state which parts of the ship shall be inspected each time in order to cover all parts within a given period of time					
		KUP3	Identify those elements of the ship structure which are critical to the safety of the ship					
		KUP4	State the causes of corrosion in cargo spaces and ballast tanks and how corrosion can be identified and prevented					
		KUP5	Knowledge of procedures on how the inspections shall be carried out					
		KUP6	Ability to explain how to ensure reliable detection of defects and damages	31/143				
		KUP7	Understanding of the purpose of the "enhanced survey programme"		. Souls all			
A-11/2	Function 2 Navigati	ion at the	operational level					
C1	Plan and ensure safe loading, stowage, securing,	KUP1	Knowledge of and ability to apply relevant international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargoes					
	care during the voyage and	KUP2	Knowledge of the effect on trim and stability of cargoes and cargo operations					
	unloading cargoes	KUP3	Use of stability and trim diagrams and stress-calculating equipment, including automatic data-based (ADB) equipment, and knowledge of loading cargoes and ballasting in order to keep hull stress within accaptable limits					
		KUP4	Stowage and securing of cargoes on board ships, including cargo- handling gear and securing and lashing equipment					
		KUP5	Loading and unloading operations, with special regard to the transport of cargoes identified in the Code of Safe Practice for Cargo Stowage and Securing					
		KUP6	General knowledge of tankers and tanker operations					
		KUP7	Knowledge of the operational and design limitations of bulk carriers					
		KUP8	Ability to use all available shipboard data related to loading, care and unloading of bulk cargoes					
		KUP9	Ability to establish procedures for safe cargo handling in accordance with the provisions of the relevant instruments etc					
		KUP10	Ability to explain the basic principles for establishing effective communications and improving working relationship between ship and terminal personnel					





Annex A of CMO No. 67, s. 2017

				Profe	ssional Cours	08			
OMPETENCE INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	MarEnv	Mar Law	Mgmt 1	Mgmt 2	ICT	
СЗ	Carriage of dangerous goods	KUP1	International regulations, standards, codes and recommendations on carriage of dangerous goods						
		KUP2	Carriage of dangerous, hazardous and harmful cargoes, precautions during loading and unloading and care during the voyage			1744			
A-11/1	Eunction 3 Controlli	na the a	peration of the ship and care for persons on board at the operational				E-1000 1000	-150	
C1		KUP1	Prevention of pollution of the marine environment and anti-pollution procedures	×					
	Ensure compliance with pollution	.1	Knowledge of the precautions to be taken to prevent pollution of the marine environment	x					
	prevention requirements	.2	Anti-pollution procedures and all associated equipment	×					
	requisition	.3	Importance of proactive measures to protect the marine environment	X					
C2	Maintain	KUP1	Ship stability		х				
	seaworthiness of the ship	.1	Working knowledge and application of stability, trim and stress tables, diagrams and stresscalculating equipment		х				
		.2	Understanding of the fundamentals of watertight integrity	6351	х				
			.3	Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy					
		KUP2	Ship construction						
		.1	General knowledge of the principal structural members of a ship and the proper names for the various parts						
C6	Monitor compliance with legislative requirements	KUP1	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment		х		х		
C7	Application of leadership and	KUP1	Working knowledge of shipboard personnel management and training			x			
	teamworking skills	KUP2	A knowledge of related international maritime conventions and recommendations, and national legislation						
		KUP3	Ability to apply task and workload management			Х			
		.1	planning and co-ordination			х			
	NET GUES TO SERVE	.2	personnel assignment			х			
		.3	time and resource constraints			×			
		.4	prioritization			х			





Annex A of CMO No. 67, s. 2017

		1		Profe	ssional Cours	88		
OMPETENCE	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	MarEnv	Mar Law	Mgmt 1	Mgmt 2	ICT
		KUP4	Knowledge and ability to apply effective resource management			×		
		.1	allocation, assignment, and prioritization of resources			х		100-1
		.2	effective communication onboard and ashore			x		
		.3	decisions reflect consideration of team experiences			×		
		.4	assertiveness and leadership, including motivation			x		
		.5	obtaining and maintaining situational awareness			X		
		KUP5	Knowledge and ability to apply decision-making techniques			х		
A-11/2	Function 1 Navigati	on at the	operational level	RA BARNE		Kern Barry		HIE
C1	Control trim, stability and stress		Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability					
		KUP2	Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and countermeasures to be taken					
		KUP3	Knowledge of IMO recommendations concerning ship stability					
C2	Monitor and control compliance with legislative measures to ensure safety of	KUP1	Knowledge of relevant international maritme law embodied in international agreements and conventions. Regard shall be paid to responsibilities under the International Convention for the Prevention of Pollution from Ships as amended.		x			
	life at sea and	KUP2	Regard shall be paid especially to the following subjects:		X			
	protection of the marine environment	.1	certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and their period of validity		x			
		.2	responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended		x			
		.3	responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea		х			
		.4	responsibilities under the International Convention for the Prevention of Pollution from Ships	x				





Annex A of CMO No. 67, s. 2017

				Profe	ssional Cours	ies		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	MarEnv	Mar Law	Mgmt 1	Mgmt 2	ICT
		.5	maritime declarations of health and the requirements of the international Health Regulations		x			
		.6	responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo		×			
		.7	methods and aids to prevent pollution of the marine environment by ships	x			in	
		.8	national legislation for implementing international agreements and conventions		х			
A-IV5	Function 3 Controlli	ng the O	peration of the ship and care for persons on board at the support lev					0/07
C1	Contribute to the safe operation of	KUP1	Knowledge of deck equipment					1000
		KUP2	Knowledge of the following procedures and ability to:					
	machinery	.1	Rig and unrig bosun's chairs and staging					
		.2	Rig and unrig pilot ladders, hoists, ret-guards and gangways					
		.3	Use marlin spike seamanship skills, including the proper use of knots, splices and stoppers					
A-II/5	Function 4 Maintena	nce and	repair at the support level					
C1	Contribute to shipboard	KUP1	Ability to use painting, lubrication and cleaning materials and equipment					
	maintenance and repair	KUP2	Ability to understand and execute routine maintenance and repair procedures					
		KUP3	Knowledge of surface preparation techniques					
		KUP4	Understanding manufacturer's safety guidelines and shipboard instructions					
		KUP5	Knowledge of safe disposal of waste materials					
		KUP6	Knowledge of the application, maintenance and use of hand and power tools					
A-HV6	Function 1 Electrica	l, electro	nic and control engineering at the operational level					
C5	Function 1 Electrical, Operate computers	KUP1	Understanding of:					x



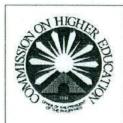


Annex A of CMO No. 67, s. 2017

				Profe	ssional Cours	es		
INDEX	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	MarEnv	Mar Law	Mgmt 1	Mgmt 2	ICT
		KUP2	Theoretical knowledge					Х
		1.2	main features of data processing			100		Х
	VI KIR DA	1,3	construction and use of computer networks on ships					X
		1.4	bridge-based, engine-room based and commercial computer use					χ
	GMDSS							
C1	Transmit and receive	E KUP1	In addition to the requirements of the Radio Regulations, a knowledge of:					
	GMDSS subsystem and equipment and fulfilling the		search and rescue radiocommunications, including procedures in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual					
	functional requirements of	.2	the means to prevent the transmission of false distress alerts and the procedures to mitigate the effects of such alerts					
	GMDSS	.3	ship reporting systems					
	(Table A-IV/2)	.4	radio medical services					
		.5	use of the International Code of Signals and the IMO Standard Marine Communication Phrases					
		.6	the English language, both written and spoken, for the communication of information relevant to safety of life at sea					
C2	Provide radio	KUP1	The provision of radio services in emergencies such as					100
	services in	0.1	abandon ship					
	emergencies (Table	0.2	fire on board ship					
	A-IV/2)	0.3	partial or full breakdown of radio installations					
		KUP2	Preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical and non-lonizing radiation hazards					
								S. H. Aller
			total indicative class hours	0	0	0		

	Competences from Table A-II/1 OIC Navigational Watch
	Competences from Table A-II/2 Management Level Deck
	Competences from Table A-II/5 Able Seafarer Deck
Ü	Competence from Table A-IV/2 GMDSS Radio Operators



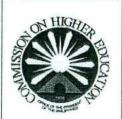


COLLISION REGULATIONS

Annex C of CMO No. 67, S. 2017 Revision No : 00

Course Code	*:	D-Watch 1			4			
Course Descriptive Title	:	Collision Regulations				Prerequisite	 :	None
Course Credits	:	4 units	Lecture Contact Hours per Week	:	3 hours	Laboratory Contact Hours per Week	:	3 hours
Competence/s	200	A-II/1 F1.C2: Maintain a	safe navigational watc	h			12000	
KUP	:	A-II/1 F1.C2.KUP1.1: Whe International Regula					ion	and intent of
Course Outcome	:	CO1: Demonstrate thorough the International F	CONTRACTOR OF THE PROPERTY OF			of the content, applicati s at Sea, 1972, as amer		
Reference/s	1	Table A-II/1 Function CMO No.67 series o BS Marine Engineeri						





DECK WATCHKEEPING WITH BRIDGE RESOURCE MANAGEMENT

Annex C of CMO No. 67, S. 2017

Course Code	:	D-Watch 2						
Course Descriptive Title	:	Deck Watchkeepin	g with Bridge Resource M	lana	gement	Prerequisite	:	D-Watch 1 Nav 6 Mgmt 1
Course Credit	•	3 units	Lecture Contact Hours per Week	:	2 hours	Laboratory Contact Hours per Week	:	3 hours
Competence/s	:	A-II/1 F1.C1: Plan a A-II/1 F1.C2: Maint	and conduct a passage ar ain a safe navigational wa	d de	termine po	sition		
			Steering control system .1 Knowledge of steering over from manual to a for optimum performar 2: Thorough knowledge of	utom ice	atic contro	l and vice versa. Adjust	tmen	nd change- it of controls





DECK WATCHKEEPING WITH BRIDGE RESOURCE MANAGEMENT

Annex C of CMO No. 67, S. 2017

Course Outcome/s	 CO1: Explain the operational procedures of steering control systems and the selection of the mode of steering suitable for the prevailing weather, sea and traffic conditions and intended maneuvers CO2: Perform assigned watchkeeping duties as part of the bridge team, in different weather, sea and traffic conditions, utilizing all bridge equipment in ensuring the safety of navigation.
Reference/s	Table A-II/1 Function 1: Navigation at the operational level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS SOFTWARE APPLICATION AND NETWORK SYSTEM USED IN SEAGOING SHIPS

Annex C of CMO No. 67, S. 2017

Course Code	:	ICT	CT								
Course Descriptive Title	:		e Application and Netwo	ork Sy	stem Used	Prerequisite	:	None			
Course Credit	:	2 Units	Lecture Contact Hours per Week	:	1 hour	Laboratory Contact Hours per Week	:	3 hours			
Competence/s		A-III/6.F	A-III/6.F1.C5: Operate computers and computer networks on ships								
KUP		A-III/6.F	A-III/6.F1.C5.KUP1: Understanding of: .1 Main features of data processing .2 construction and use of computer networks on ships .3 bridge-based, engine room-based and computer use								
Course Outcome/s	:	2. Mana	Effectively use computer applications for documents used onboard ship. Manage computer networks used onboard ships. Troubleshoot computer as per manufacturer's instructions.								
Reference/s	:	for e									





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS MARITIME COMMUNICATIONS

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

THINE COMMUNICATIONS	Revision Da
(GMDSS FOR GOC)	

Course Code	:	Mar Com								
Course Descriptive Title	:	Maritime Communication	ons (GMDSS for GOC)			Prerequisite		None		
Course Credits	:	5 units	Lecture Contact Hours per Week	:	3 hours	Laboratory Contact Hours per Week	:	6 hours		
Competence/s	:	A-II/1 F1.C8: Transmit and receive information by visual signalling A-IV/2 C1: Transmit and receive information using GMDSS subsystems and equipment and fulfilling the functional requirements of GMDSS A-IV/2 C2: Provide radio services in emergencies								
KUP/s	:	A-II/1 F1.C8.KUP1: Vis .1 A .2 A s .1 S .1 S .2 A .2 A .2 A .2 A .1 S .2 Inte		ion ona ona ona ona ona ona ona ona ona o	re, by Mon Il Regulati endix 1 of ter signals f the Radia nunication Maritime emission o	rse light, distress signal ons for Preventing Collist the International Code is as also specified in the Regulations, a knowled s, including procedures Search and Rescue (IAN)	sion of S Integration	ns at Sea, Signals, and ternational e of: he AR) Manual		





MARITIME COMMUNICATIONS (GMDSS FOR GOC)

Annex C of CMO No. 67, S. 2017 Revision No: 00

Revision Date: 00

	.3 ship reporting systems
	.4 radio medical services
	.5 use of the International Code of Signals and the IMO Standard Marine Communication Phrases
	.6 the English language, both written and spoken, for the communication of information
	relevant to safety of life at sea
	A-IV/2 C2.KUP1: The provision of radio services in emergencies such as: .1 abandon ship
	.2 fire on board ship
	.3 partial or full breakdown of radio installations
	A-IV/2 C2.KUP2: Preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical and non-ionizing radiation hazards
Course Outcome/s	CO 1: Transmit and receive messages by Morse light, distress signal SOS in accordance with Annex IV of International Regulations for Preventing Collisions at Sea (COLREGS) 1972 as amended and International Code of Signals (ICS).
Course Outcome/s	CO2: Transmit and receive "Distress, Urgency, Safety, and Routine" communication using GMDSS sub-systems and equipment.
	CO3: Explain how to test, maintain, and activate SART and EPIRB.
	1. Table A-II/1 Function 1: Navigation at the operational level
Reference/s	2. Table A-IV/2 Function: Radio Communications at the operational level
Reference/S	 CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs



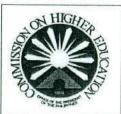


PROTECTION OF THE MARINE ENVIRONMENT

Annex C of CMO No. 67, S. 2017

Course Code	:	Mar Env	Mar Env									
Course Descriptive Title	:	Protection of the Marine Environment				Prerequisite		None				
Course Credit	:	3 Units	Lecture Contact Hours per Week		3 Hours	Laboratory Contact Hours per Week		0 Hours				
Competence/s	;		A-II/1.F3.C1 Ensure compliance with pollution-prevention requirements A-II/2.F3.C2 Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and protection of marine environment									
KUP/s		A-II/1.F3. A-II/1.F3. A-II/2.F3.	A-II/1.F3.C1.KUP1.1 Knowledge of the precaution to prevent pollution to marine environment A-II/1.F3.C1.KUP1.2 Anti-pollution procedures in all associated equipment A-II/1.F3.C1.KUP1.3 Importance of proactive measures to protect the marine environment A-II/2.F3.C2.KUP2.4 Knowledge of relevant international maritime law embodied in international agreements and conventions, regard shall be paid to responsibilities under the International Convention for the Prevention of Pollution from Ships. A-II/2.F3.C2.KUP 2.8 Methods and aids to prevent pollution of the marine environment by ships.									
Course Outcome/s		CO1: Eva CO2: Rela	CO1: Evaluate the impact of shipping operations to the environment in case of marine pollution. CO2: Relate the balance between the 3P's (people, planet and profit) in order to attain sustainable shipping CO3: Apply MARPOL Annexes 1-6 legislation to a specific situation by recommending corrective actions									
 Table A-II/1 Function 3: Controlling the Operation of the Ship and care at the Operational Level Table A-II/2. Function 3: Controlling the Operation of the Ship and Care at the Management level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation BS Marine Engineering Programs 												





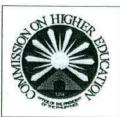
MARITIME LAW

Annex C of CMO No. 67, S. 2017 Revision No : 00

Revision Date: 00

Course Code	•	Mar Law								
Course Descriptive Title	:	Maritime Law	Prerequisite	T:	None					
Course Credit	100	4 units	Lecture Contact Hours per Week		4 hours	Laboratory Contact Hours per Week	:	0 hours		
Competence/s	:	A-II/2 F3.C2: Monitor and c	A-II/1 F3.C6: Monitor compliance with legislative requirements A-II/2 F3.C2: Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and the protection of the marine environment							
KUP/s		A-II/1 F3.C6.KUP1: Basic v life at s A-II/2 F3.C2.KUP1: Knowle and cor A-II/2 F3.C2.KUP2: Regard .1 certif intervalid .2 responses Conv .3 responses Conv .5 marit Heal .6 responses	vorking knowledge of ea. edge of international reventions I shall be paid especificates and other documentional conventions ity consibilities under the vention on Load Line consibilities under the vention for the Safety time declarations of hith Regulations consibilities under internations, crew and call	rel rel rel rel rel	e relevant ritime law y to the for nents requow they me vant requevant requevant requevant requel Life at Sealth and the ational instance.	IMO conventions concembodied in internation lowing subjects: ired to be carried on boay be obtained and the uirements of the International lower contemporary in the learness of the learness	ern ard ard ir pe atior atior	ing safety of agreements ships by eriod of nal national ty of the ship,		





MARITIME LAW

Annex C of CMO No. 67, S. 2017 Revision No : 00

Revision Date: 00

Course Outcome/s	 CO 1: Discuss the significant provisions of the SOLAS Convention, Maritime Labor Convention (MLC 2006), Load Line Convention, United Nations Convention on the Law of the Sea (UNCLOS) and other international agreements and national legislations, applicable in the practice of the marine profession. CO 2: Demonstrate a knowledge and understanding of International Maritime Law in International Agreements and Conventions with particular regard to certificates and documents to be carried on board
Reference/s	 Table A-II/1 Function 3: Controlling the operation of the ship and care for persons on board at the operational level Table A-II/2 Function 3: Controlling the operation of the ship and care for persons on board at the management level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS BASIC MARINE ENGINEERING

Annex C of CMO No. 67, S. 2017

Course Code	:	Mar Pow	Mar Power									
Course Descriptive Title	:	Basic Marine Engineering				Prerequisite	:	None				
Course Credit		4 Units	Lecture Contact Hours per Week	ŀ	4 Hours	Laboratory Contact Hours per Week	:	0 Hours				
Competence	:	AII/2.F1.0	AII/2.F1.C11: Operate remote control of propulsion plant and engineering system and services									
KUP/s	:	AII/2.F1.C11.KUP1: Operating principles of marine power plants AII/2.F.1.C11.KUP2: Ship auxiliary machinery AII/2.F.1.C11.KUP3: General knowledge of marine engineering terms										
Course Outcome/s	:	CO1: Diff CO2: De sy: CO3: De CO4: Ex dec CO5: Sk	 CO1: Differentiate the principles of operation for various marine propulsion plants. CO2: Determine the impact of deck operations relating to generator and electrical distribution system CO3: Determine the effective use of pumps and pumping system to various deck operations CO4: Explain the operating principles of hydraulic winches, windlass and steering gear as used in deck operations CO5: Sketch a general arrangement plan of the engine room showing the basic elements, 									
Reference/s	:	1. Table 2. CMC	machinery and equipment needed for efficient operation. 1. Table II/2 Function 1: Navigation at the Management level 2. CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs									





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS METEOROLOGY AND OCEANOGRAPHY 1

Annex C of CMO No. 67, S. 2017

Course Code	:	Met – O 1	Met – O 1							
Course Descriptive Title	:	Meteorology and Oceano	ography 1		Prerequisite	:	None			
Course Credits	•	5 units	Lecture Contact Hours per Week		5 hours	Laboratory Contact Hours per Week		0 hours		
Competence	:	A-II/1 F1.C1: Plan and conduct a passage and determine position								
KUP/s	:	instrum A-II/1 F1.C1.KUP8.2: Kno	A-II/1 F1.C1.KUP8.1: Ability to use and interpret information obtained from shipborne meteorological instruments A-II/1 F1.C1.KUP8.2: Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems							
Course Outcome/s	:	CO1: Interpret information of CO2: Discuss various weath	A-II/1 F1.C1.KUP8.3: Ability to apply the meteorological information available CO1: Interpret information obtained from ship borne meteorological instruments while vessel is underway. CO2: Discuss various weather systems, reporting procedures, and recording systems over the oceans. CO3: Use appropriate meteorological information and observations in determining expected weather							
Reference/s	:	2. CMO No.67 series of	Table A-II/1 Function 1: Navigation at the Operational level							



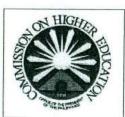


Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS METEOROLOGY AND OCEANOGRAPHY 2

Annex C of CMO No. 67, S. 2017

Course Code		Met – O 2								
Course Descriptive Title	:	Meteorology and Oce	anography 2	Prerequisite	:	Met - O 1				
Course Credits	-	4 units	Lecture Contact Hours per Week	:	4 hours	Laboratory Contact Hours per Week	:	0 hours		
Competence	:	A-II/2 F1.C8: Forecast	weather and oceanographic	con	ditions	1		L		
KUP/s	•	tal A-II/2 F1.C8.KUP2: Kr re A-II/2 F1.C8.KUP3: Kr A-II/2 F1.C8.KUP4: Ab	A-II/2 F1.C8.KUP1: Ability to understand and interpret a synoptic chart and to forecast area weather, taking into account local weather conditions and information received by weather fax A-II/2 F1.C8.KUP2: Knowledge of the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous quadrants A-II/2 F1.C8.KUP3: Knowledge of ocean current systems A-II/2 F1.C8.KUP4: Ability to calculate tidal conditions A-II/2 F1.C8.KUP5: Use all appropriate nautical publications on tides and currents							
Course Outcome/s	:	CO1: Interpret area wand information CO2: Explain tropical quadrants in the CO3: Interpret ocean publications.	CO1: Interpret area weather using a synoptic chart, taking into account local weather conditions and information received by weather fax. CO2: Explain tropical revolving storms and how to avoid and/or escape storm centers and dangerous quadrants in the northern and southern hemisphere. CO3: Interpret ocean current system and principal adjoining seas using various charts and nautical publications. CO4: Calculate the tidal conditions based on nautical publications on board and electronically obtained							
Reference/s	:		. Table A-II/2 Function 1: Navigation at the Management level . CMO No.67 series of 2017 : Revised PSG for BS Marine Transportation and BS Marine Engineering							





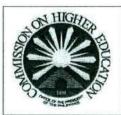
LEADERSHIP AND TEAMWORK

Annex C of CMO No. 67, S. 2017 Revision No : 00

Revision Date: 00

Course Code	:	Mgmt 1								
Course Descriptive Title	:	Leadership and Teamwork	Prerequisite	:	None					
Course Credit		3 units	Lecture Contact Hours per Week	:	3 hours	Laboratory Contact Hours per Week	:	0 hours		
Competence/s	:	A-II/1 F3.C7: Application of	A-II/1 F3.C7: Application of leadership and teamworking skills							
KUP/s	:	.2 personr .3 time an .4 prioritiz: A-II/1 F3.C7.KUP4: Knowle .1 allocatio .2 effective .3 decision .4 assertiv .5 obtainir A-II/1 F3.C7.KUP5: Knowle .1 situation .2 identify .3 selectin .4 evaluation	to apply task and wo g and coordination nel assignment d resource constrain ation edge and ability to ap on, assignment, and e communications of as reflect consideration reness and leadershing and maintaining sedge and ability to ap and risk assessment and generate option in g course of action ion of outcome effect	ts ply pri n be on ip, itua ply nt s	effective critization oard and a of team e including ation awar decision-	resource management of resources ashore experiences motivation eness making techniques				
Course Outcome/s	•	CO1: Appraise the content pertaining to the Pers CO2: Organize and manag	sonnel Management							





LEADERSHIP AND TEAMWORK

Annex C of CMO No. 67, S. 2017 Revision No : 00

	role play or other forms of simulation.
Reference/s	 Table A-II/1 Function 3: Controlling the operation of the ship and care for persons on board at the operational level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS INTEGRATED MANAGEMENT SYSTEM

Annex C of CMO No. 67, S. 2017

Course Code	:	Mgmt 2								
Course Descriptive Title	:	Integrated I	Management System			Prerequisite	:	None		
Course Credit	:	2 Units	Lecture Contact Hours per Week	:	2 Hours	Laboratory Contact Hours per Week		0 Hours		
Competence/s	:	A-II/1.F3.C	A-II/1.F3.C6: Monitor compliance with legislative requirements							
KUP/s	:	A-II/1.F3.C0	-II/1.F3.C6: KUP1: Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment							
Course Outcome/s	:	CO2: Differ the process the process constant to the process constant the	ovisions of STCW 78, as a zee the provisions of the IS ain the importance of the tions through the deploym yze the provisions of the immental performance through the compliance of a give ard provisions to demorgement that is committed duct an impact assessment.	eme ame SO 9 ent ent ough en S to he	ents for seafar nded to the IS 2001:2015 in r CW 78, as an of competent ISO 14001:20 a more efficient MS procedure ate due dilige ealth and safe on a particul	rers with and without security dut SPS Code elation to the ISM code in terms to mended in the attainment of the seafarers 015 that can help ship operate ent use of resources and reduction to OHSAS 18001, Occupational ence, good governance, low ris	o the go tors on of Heak a	eir peculiarities al-based ships improve their waste alth and Safety and competent ecurity, health,		
Reference/s	:	Operation 2. Table A Operation	onal Level -III/1 Function 4: Controllin onal Level	ng th	ne Operation o	of the Ship and care for persons of the Ship and care for persons of the Ship and care for persons or	are for persons on board at the care for persons on board at the			



Bachelor of Science in Marine Transportation **COURSE SPECIFICATIONS** INTEGRATED MANAGEMENT SYSTEM

Annex C of CMO No. 67, S. 2017

Revision No: 00 Revision Date: 00

Management Level

- Table A-III/2 Function 1 Marine Engineering at the Management Level
 Annex A of CMO No. 67, S. 2017: Revised PSG for BSMT and BSMarE Programs



Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS NAVIGATIONAL INSTRUMENTS WITH

COMPASSES

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

Course Code	:	Nav 1	/1						
Course Descriptive Title	:	Navigational Instruments with Compasses Prerequisite		ional Instruments with Compasses Prerequi		:	None		
Course Credits	:	4 units	Lecture Contact : 3 hours Laboratory Contact Hours per Week						
Competence/s	:	A-II/1 F1.C1.Plan a	A-II/1 F1.C1.Plan and conduct a passage and determine position						
KUP	:	A-II/1 F1.C1.KUP5: A-II/1 F1.C1.KUP6:	-II/1 F1.C1.KUP4: Ability to determine the ship's position by use of electronic navigational aids -II/1 F1.C1.KUP5: Ability to operate the echo-sounder and apply the information correctly -II/1 F1.C1.KUP6: Compass – magnetic and gyro .1: Knowledge of the principles of magnetic and gyro-compasses						
Course Outcome	:	CO1: Operate electro compass CO2: Determine error CO3: Determine the e	01: Operate electronic navigational equipment such as GPS, AIS, echo-sounder, gyro and magnetic						
Reference/s	:	2. CMO No.67 ser	Table A-II/1 Function 1: Navigation at the Operational Level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs						





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS TERRESTRIAL AND COASTAL NAVIGATION 1

Annex C of CMO No. 67, S. 2017 Revision No: 00

Revision Date: 00

Course Code	:	Nav 2	av 2						
Course Descriptive Title	:	Terrestrial and Coastal Navigation 1			Prerequisite	1	Nav 1		
Course Credits	:	5 units	Lecture Contact Hours per Week	:	5 hours	Laboratory Contact Hours per Week	:	0 hours	
Competence	:	A-II/1 F1.C1: Plan an	A-II/1 F1.C1: Plan and conduct a passage and determine position						
KUP	:	a	A-II/1 F1.C1.KUP3: Thorough knowledge of and ability to use nautical charts, and publications, sucl as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routeing information						
Course Outcomes	ji.	CO1: Select appropri CO2: Update navigat CO3: Measure the dis	CO1: Select appropriate navigational charts using chart catalogue CO2: Update navigational charts and publications in accordance with the latest Notice to Mariners CO3: Measure the distance between two points on a Mercator chart CO4: Distinguish the different regions in the IALA Buoyage System as used in navigation						
Reference/s	:	 Table A-II/1 Funct CMO No.67 series 	Table A-II/1 Function 1: Navigation at the operational level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs						



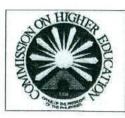


Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS TERRESTRIAL AND COASTAL NAVIGATION 2

Annex C of CMO No. 67, S. 2017

Course Code	:	Nav 3							
Course Descriptive Title	:	Terrestrial and Coastal Navigation 2				Prerequisite	:	Nav 2	
Course Credits	:	5 units	Lecture Contact Hours per Week	:	3 hours	Laboratory Contact Hours per Week	:	6 hours	
Competence/s	:	A-II/1 F1.C1: Plan and o	-II/1 F1.C1: Plan and conduct a passage and determine position						
KUP/s		.1 I .2 a .3 d A-II/1 F1.C1.KUP6: .2 a	A-II/1 F1.C1.KUP2: Terrestrial and coastal navigation - Ability to determine the ship's position by use of: .1 landmarks .2 aids to navigation, including lighthouses, beacons and buoys .3 dead reckoning, taking into account winds, tides, currents and estimated speed A-II/1 F1.C1.KUP6: .2 ability to determine errors of the gyro and magnetic compasses, using terrestrial means, and to allow for such errors						
Course Outcome/s	:	CO1: Apply relevant info planning. CO2: Determine compa CO3: Apply compass co CO4: Solve problems by CO5: Plot position lines	CO1: Apply relevant information obtained from Charts, Lists of Lights and Other Publications in passag					ns in passage	
Reference/s	:	1. Table A-II/1 Function	1: Navigation at the ope	rati	onal level	ansportation and BS Mar		Engineering	





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS CELESTIAL NAVIGATION

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

Course Code	:	Nav 4	14					
Course Descriptive Title		Celestial Navigation	estial Navigation Prerequis			Prerequisite	:	Nav 3
Course Credits	•	3 units	Lecture Contact Hours per Week	:	2 hours	Laboratory Contact Hours per Week	:	3 hours
Competence/s		A-II/1 F1.C1: Plan a	A-II/1 F1.C1: Plan and conduct a passage and determine position					
KUP	:	A-II/1 F1.C1.KUP1: A-II/1 F1.C1.KUP6: celestial means,	A-II/1 F1.C1.KUP1: Ability to use celestial bodies to determine the ship's position A-II/1 F1.C1.KUP6: .2 ability to determine errors of the gyro and magnetic compasses, using celestial means, and to allow for such errors					
Course Outcome	:	CO1: Determine com	O1: Determine compass error by observation of the sun's amplitude O2: Plot ship's position using observation of three stars during evening twilight					
Reference/s	:	Table A-II/1 Fund CMO No.67 serie	Table A-II/1 Function 1: Navigation at the Operational Level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs					





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS OPERATIONAL USE OF RADAR / ARPA

Annex C of CMO No. 67, S. 2017

Course Code	•	Nav 5				*			
Course Descriptive Title	:	Operational Use of RADAI	Prerequisite	:	D-Watch 1				
Course Credits		3 units	Lecture Contact Hours per Week	:	2 hours	Laboratory Contact Hours per Week		3 hours	
Competence	:	A-II/1 F1.C3: Use of RADA	-II/1 F1.C3: Use of <i>RADAR</i> and <i>ARPA</i> to maintain safety of navigation						
KUP/s		.2: Abil Inclinate	bwledge of the fundary lity to operate and to including the following: Performance, including factors affecting performance, including setting up and maintang detection of misrepresetc., racons and SAR Jse, including: range and bearing; concludes and bearing; concluding: range and bearing; concludes and bearing; concluding and bearing; concludes a special set of application of the Interpolation of the Interpolating techniques are parallel indexing parallel indexing the parallel i	eir	erpret and nance and ng display ntation of se and sp ssing, med choes; de anges in c ational Re relative- a display ch	information, false echoes eed of other ships; time eting overtaking ships etecting course and speed own ship's course or speed egulations for Preventing and true motion concepts	aine sand	ed from radar, sea return, d distance of changes of or both ollisions at	





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS OPERATIONAL USE OF RADAR / ARPA

Annex C of CMO No. 67, S. 2017

	including: 1 system performance and accuracy, tracking capabilities and limitations, and processing delays 2 use of operational warnings and system tests 3 methods of target acquisition and their limitations 4 true and relative vectors, graphic representation of target information and danger areas 5 deriving and analyzing information, critical echoes, exclusion areas and trial maneuvres
Course Outcome/s	: CO1: Perform manual radar plotting techniques using information obtained from RADAR observations in a crossing situation CO2: Use RADAR / ARPA in collision avoidance during restricted visibility
Reference/s	Table A-II/1 Function 1: Navigation at the operational level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS OPERATIONAL USE OF ECDIS

Annex C of CMO No. 67, S. 2017 Revision No: 00

Revision Date: 00

Course Code	:	Nav 6						
Course Descriptive Title	:	Operational Use of ECDIS				Prerequisite	:	Nav 5
Course Credits		2 units	Lecture Contact Hours per Week	•	1 hour	Laboratory Contact Hours per Week	:	3 hours
Competence/s	:	A-II/1 F1.C4: Use of ECDIS	A-II/1 F1.C4: Use of ECDIS to maintain the safety of navigation					
KUP/s	:	.c familiarity .c familiarity .2 Proficiency ECDIS, inc .a use of f installa .b safe mo display, created tracking .c confirm .d efficient u including	of the capability and gh understanding of I in presentation rules, pers of over-reliance y with the functions of its own in operation, interpreductions that are intestions, including propertions, including properties, information layers, or and radar overlay in the properties of settings to ensign alarm parameters for alarm parameters for the properties of the properties	eta graer fonen on, con fun on ure	cDIS requition, and ated with unctioning the of informattacts (what ctions (which is conformatting).	of ECDIS operations, inclaving a tional Chart (ENC) on sand other chart data uired by performance standard analysis of information of the navigation systems and adjustment to designation, including own posa displayed, route monitoren interfaced with AIS and en interfaced) ative means ance to operational proceeding, proximity to contact and chart update status	s in rec siti orir nd/	ards in force ained from various d settings on, sea area ng, user- for radar ures, and



Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS OPERATIONAL USE OF ECDIS

Annex C of CMO No. 67, S. 2017

	e adjustment of settings and values to suit the present conditions. f 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
Course Outcome/s	. CO1: Demonstrate proficiency in operation, interpretation, and analysis of information obtained from ECDIS
Reference/s	 Table A-II/1 Function 1: Navigation at the operational level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS VOYAGE PLANNING

Annex C of CMO No. 67, S. 2017

Issued Date : Dec. 12, 2017

Course Code	:	Nav 7	av 7						
Course Descriptive Title	:	Voyage Planning			Prerequisite	1:	Nav 6		
Course Credits		3 units	Lecture Contact Hours per Week	:	2 hours	Laboratory Contact Hours per Week	:	3 hours	
Competence/s		A-II/2 F1.C1: Plan a voyage	-II/1 F1.C2: Maintain a Safe Navigational Watch -II/2 F1.C1: Plan a voyage and conduct navigation -II/2 F1.C2: Determine position and the accuracy of resultant position fix by any means						
KUP		A-II/1 F1.C2.KUP1.3: The Rour A-II/2 F1.C1.KUP1: Voyag plotting .1 rest .2 met .3 .4 .5 .7 A-II/2 F1.C2.KUP1: Position .2 by te notice position .3 using its statement of the st	teing e planning and navig g ocean tracks, takin ricted waters eorological condition ice restricted visibility traffic separation so areas of extensive on determination in a rrestrial observation s to mariners and other on fix modern electronic na	gating in schedule control con	emes al effects onditions: ncluding the	th the General Provision conditions by acceptable nt, e.g.:	s o	n Ships' ethods of charts, of resulting	



Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS VOYAGE PLANNING

Annex C of CMO No. 67, S. 2017

Issued Date : Dec. 12, 2017

	misrepresentation of information and methods of correction to obtain accurate position fixing
Course Outcomes	CO 1 Create a voyage plan from berth to berth CO 2 Execute the voyage plan and monitor in accordance with the plan
Reference/s	Table A-II/1 Function 1: Navigation at the operational level Table A-II/2 Function 1: Navigation at the management level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS Ship, Ship Routines and Ship Construction

Annex C of CMO No. 67, S. 2017

Course Code	:	Seam 1						
Course Descriptive Title	:	Ship, Ship Routines and Ship Construction			Prerequisite	:	None	
Course Credits	:	4 units	Lecture Contact Hours per Week	•	3 hours	Laboratory Contact Hours per Week	:	3 hours
Competence/s	:	A-II/1 F3.C2: Maintain seaworthiness of the ship *A-II/1 F3.C7: Application of leadership and teamworking skills A-II/5 F1.C2: Contribute to berthing, anchoring and other mooring operations A-II/5 F3.C1: Contribute to the safe operation of deck equipment and machinery A-II/5 F3.C2: Apply occupational health and safety precautions A-II/5 F4.C1: Contribute to shipboard maintenance and repair						
KUP/s	:	A-II/1 F3.C2.KUP2: Ship construction - General knowledge of the principal structural members of a ship and the proper names for the various parts 1 General knowledge of the principal structural members of a ship and the proper names for the various parts *A-II/1 F3.C7.KUP1: Working knowledge of shipboard personnel (Organizations of crew, authority structure and responsibilities) A-II/5 F1.C2.KUP1: Working knowledge of the mooring system and related procedures, including: 1 working knowledge of the mooring system and related procedures 2 the capacities, safe working loads, and breaking strengths of mooring equipment, including mooring wires, synthetic and fiber lines, winches, anchor windlasses, cap stans, bitts, chocks and bollards 3 the procedures and order of events for making fast and letting go mooring and tug lines and wires, including towing lines						



Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS Ship, Ship Routines and Ship Construction

Annex C of CMO No. 67, S. 2017

Revision No: 00 Revision Date: 00

.4 the procedures and order of events for the use of anchors in various operations

A-II/5 F1.C2.KUP2: Working knowledge of the procedures and order of events associated with

mooring to a buoy or buoys

A-II/5 F3.C1.KUP1: Knowledge of deck equipment

A-II/5 F3.C1.KUP2: Knowledge of the following procedures and ability to:

.1 Rig and unrig bosun's chair and staging

.2 Rig and unrig pilot ladders, hoists, rat-guards and gangways

.3 Use marlin spikes seamanship skills, including the proper use of knots, splices and stoppers

A-II/5 F3.C2.KUP1: Working knowledge of safe working practices and personal shipboard safety including:

.1 working aloft

.2 working over the side

.3 working in enclosed spaces

.4 permit to work systems

.5 line handling

.6 lifting techniques and methods of preventing back injury

.7 electrical safety

.8 mechanical safety

.9 chemical and biohazard safety

.10 personal safety equipment

A-II/5 F4.C1.KUP1: Ability to use painting, lubrication and cleaning materials and equipment

A-II/5 F4.C2.KUP2: Ability to understand and execute routine maintenance and repair procedures

A-II/5 F4.C2.KUP3: Knowledge of surface preparation techniques

A-II/5 F4.C2.KUP4: Understanding manufacturer's safety guidelines and shipboard instructions

A-II/5 F4.C2.KUP5: Knowledge of safe disposal of waste materials

A-II/5 F4.C2.KUP6: Knowledge of the application, maintenance and use of hand and power tools



Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS Ship, Ship Routines and Ship Construction

Annex C of CMO No. 67, S. 2017

	Note: *Inclusion of Ship Organizational Diagram
Course Outcome/s	 CO1: Describe the functions in each member of a ship's organization CO2: Illustrate the types of ships and its parts. CO3: Demonstrate working knowledge of the mooring system and related procedures CO4: Perform marlinespike seamanship skills and riggings in accordance with shipboard instructions and safety standards CO5: Perform deck maintenance works in accordance with shipboard instructions and safety standards
Reference/s	Table A-II/1 Function 1: Navigation at the operational level Table A-II/5 Function: Navigation at the support level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS TRIM, STABILITY AND STRESS

Annex C of CMO No. 67, S. 2017 Revision No: 00

Revision Date: 00

Course Code	:	Seam 2	Seam 2					
Course Descriptive Title		Trim, Stability and S	Stress			Prerequisite	:	Seam 1
Course Credits	:	5 units	Lecture Contact Hours per Week	:	5 hours	Laboratory Contact Hours per Week	:	0 hours
Competence/s	:	A-II/1 F3.C2: Mainta	A-II/1 F3.C2: Maintain seaworthiness of the ship					
KUP/s	:		A-II/1 F3.C2.KUP1: Ship stability .1 Working knowledge and application of stability, trim and stress tables, diagrams and stress calculating equipment .2 Understanding of the fundamentals of watertight integrity .3 Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy					
Course Outcome/s	:	CO1: Calculate ship loading	CO1: Calculate ship stability in compliance with the IMO intact stability criteria under all conditions of					
Reference/s	:	2. CMO No.67 seri	ction3: Controlling the operatio I es of 2017: Revised PSG for B ineering Programs				oard	at the





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS CARGO HANDLING AND STOWAGE (NON-DANGEROUS GOODS)

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

Course Code	: Seam 3						
Course Descriptive Title	: Cargo Handling and	Cargo Handling and Stowage (Non-Dangerous Goods)				:	Seam 2
Course Credits	: 3 units	Lecture Contact Hours per Week	:	2 hours	Laboratory Contact Hours per Week	ŀ	2 hours
Competence/s	cargoe	r the loading, stowage, securing, cas s and report defects and damage to					8
KUP/s	A-II/1 F2.C1.KUP1: C A-II/1 F2.C1.KUP1.2: A-II/1 F2.C1.KUP1.3: A-II/1 F2.C2.KUP1: K A-II/1 F2.C2.KUP2: A W A-II/1 F2.C2.KUP3: Ic A-II/1 F2.C2.KUP4: S ic A-II/1 F2.C2.KUP5: K A-II/1 F2.C2.KUP5: K A-II/1 F2.C2.KUP7: U	Cargo Handling, Stowage and secur Knowledge of the effect of cargo, is ship Ability to establish and maintain efformed and ability to explain whencountered I loading and unloading operations Corrosion Severe weather conditions bility to state which parts of the ship within a given period of time dentify those elements of the ship state the causes of corrosion in cargo dentified and prevented Chowledge of procedures on how the bility to explain how to ensure reliand and prevented of the purpose of the enderstood that Deck Officers need in the ship of the purpose of the enderstood that Deck Officers need in the ship of the purpose of the enderstood that Deck Officers need in the ship of the purpose of the enderstood that Deck Officers need in the ship of the purpose of the enderstood that Deck Officers need in the purpose of the enderstood that Deck Officers need in the purpose of the enderstood that Deck Officers need in the purpose of the enderstood that Deck Officers need in the purpose of the enderstood that Deck Officers need in the purpose of the enderstood that Deck Officers need in the purpose of the enderstood that Deck Officers need in the purpose of the enderstood that Deck Officers need in the purpose of the enderstood that Deck Officers need in the purpose of the enderstood the purpose of the enderstood the purpose of the enderstood	fectors structured in the structure in t	duding heaver tive comments to look for the l	by lifts, on the seaworthines dunications during loading a cor damage and defects most pected each time in order to the are critical to the safety or disallast tanks and how correspond to the safety or disall be carried out of defects and damages survey programme"	s ar	nd stability of the unloading ommonly wer all parts





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS CARGO HANDLING AND STOWAGE (NON-DANGEROUS GOODS)

Annex C of CMO No. 67, S. 2017

Course Outcome/s	CO1: Interpret a plan for loading and unloading non-dangerous cargo in accordance with established safety rules / regulations, equipment operating instructions and shipboard stowage limitations CO2: Determine the significance of monitoring the cargo during the voyage CO3: Explain the importance when defects and damage to cargo spaces, hatch covers and ballast tanks are found
Reference/s	 Table A-II/1 Function 3: Controlling the operation of the ship and care for persons on board at the operational level Table A-II/1 Function 2: Cargo handling and stowage at the operational level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS

CARGO HANDLING AND STOWAGE (DANGEROUS GOODS AND INSPECTIONS)

Annex C of CMO No. 67, S. 2017

Course Code	:	Seam 4						
Course Descriptive Title	: Cargo Handling and Stowage (Dangerous Goods and Inspections)		Title		Prerequisite	:	Seam 2	
Course Credits	:	3 units	Lecture Contact Hours per Week	:	2 hours	Laboratory Contact Hours per Week	:	2 hours
Competence/s	:	cargoes A-II/1 F2.C2; Inspect and r A-II/2 F2.C1: Plan and ens cargoes	A-II/1 F2.C2: Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks A-II/2 F2.C1: Plan and ensure safe loading, stowage, securing, care during the voyage and unloading cargoes					
KUP/s	:	A-II/1 F2.C1.KUP1.2: Know haza A-II/1 F2.C1.KUP1.3: Abilit unloa A-II/1 F2.C2.KUP7: Unders A-II/2 F2.C1.KUP6: Genera A-II/2 F2.C3.KUP1: Internation of dany (IMDG) A-II/2 F2.C3.KUP2: Carria	A-II/2 F2.C3: Carriage of dangerous goods A-II/1 F2.C1.KUP1: Cargo Handling, Stowage and securing A-II/1 F2.C1.KUP1.2: Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship A-II/1 F2.C1.KUP1.3: Ability to establish and maintain effective communications during loading and unloading A-II/1 F2.C2.KUP7: Understanding of the purpose of the "enhanced survey programme" A-II/2 F2.C1.KUP6: General knowledge of tankers and tanker operations A-II/2 F2.C3.KUP1: International regulations, standards, codes and recommendations on the carriage of dangerous cargoes, including the International Maritime Dangerous Goods (IMDG) Code and the Code of Safe Practice for Solid Bulk Cargoes (BC Code). A-II/2 F2.C3.KUP2: Carriage of dangerous, hazardous and harmful cargoes; precautions during loading and unloading and care during the voyage					





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS CARGO HANDLING AND STOWAGE (DANGEROUS GOODS AND INSPECTIONS)

Annex C of CMO No. 67, S. 2017

Course Outcome/s	 CO1: Discuss the purpose of International regulations, standards, codes and recommendations on the carriage of dangerous cargoes, including the International Maritime Dangerous Goods (IMDG) Code and the Code of Safe Practice for Solid Bulk Cargoes (BC Code). CO2: Interpret a cargo plan for loading and unloading dangerous cargo in accordance with established safety rules / regulations, equipment operating instructions and shipboard stowage limitations CO3: Determine the significance of monitoring the cargo during the voyage CO4: Explain the importance when defects and damage to cargo spaces, hatch covers and ballast tanks are found
Reference/s	 Table A-II/1 Function 2: Cargo handling and stowage at the operational level Table A-II/1 Function 3: Controlling the operation of the ship and care for persons on board at the operational level Table A-II/2 Function 2: Cargo handling and stowage at the management level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs





Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS SHIP HANDLING AND MANEUVERING

Annex C of CMO No. 67, S. 2017 Issued Date : Dec. 12, 2017

Course Code	:	Seam 5						
Course Descriptive Title	:	Ship Handling and Maneuver	ring			Prerequisite	:	Dwatch 1
Course Credits		3 units	Lecture Contact Hours per Week	:	2 hours	Laboratory Contact Hours per Week	:	3 hours
Competence/s	:	A-II/1 F1.C5: Respond to Em A-II/1 F1.C9: Maneuver the s	A-II/1 F1.C5: Respond to Emergencies A-II/1 F1.C9: Maneuver the ship					
KUP/s		A-II/1 F1.C5.KUP1: Emergency procedures .1 precautions for the protection and safety of passengers in emergency situations .2 initial action to be taken following a collision .3 initial action to be taken following a grounding .4 initial assessment of damage and damage control A-II/1 F1.C9.KUP1: Ship maneuvering and handling .1 Knowledge of: .a the effects of wind and the effects of deadweight, draught, trim, speed and under-keed clearance on turning circles and stopping distances current on ship handling .b the effects of wind and current on ship handling .c manoeuvres and procedures for the rescue of person overboard .d squat, shallow-water and similar effects .e proper procedures for anchoring and mooring						
Course Outcome/s	:	CO1: Discuss the principles of ship handling, the effects of deadweight, draught, trim, speed and under keel clearance on turning circles and stopping distances, effects of wind and current on ship handling while maintaining safety of navigation CO2: Perform appropriate maneuvers and procedures to rescue persons overboard using simulator			ship			
Reference/s	:		able A-II/1 Function 1: Navigation at the Operational level MO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering					



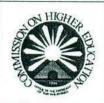


Bachelor of Science in Marine Transportation COURSE SPECIFICATIONS ADVANCED TRIM, STABILITY AND STRESS

Annex C of CMO No. 67, S. 2017

Course Code	:	Seam 6						
Course Descriptive Title	:	Advanced Trim, Sta	ability and Stress			Prerequisite	:	Seam 2
Course Credits	•	6 units	Lecture Contact Hours per Week	:	6 hours	Laboratory Contact Hours per Week	:	0 hours
Competence/s	F1.	A-II/2 F3.C1: Contr	a-II/2 F3.C1: Control trim, stability and stress					
KUP	:	A-II/2 F3.C1.KUP2:	A-II/2 F3.C1.KUP1: Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability A-II/2 F3.C1.KUP2: Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and countermeasures to be taken A-II/2 F3.C1.KUP3: Knowledge of IMO recommendations concerning ship stability				reserve trim f damage to	
Course Outcome		CO1: Explain the ir various condit CO2: Calculate the	CO1: Explain the importance of maintaining stability during loading, unloading and in-transit in various conditions CO2: Calculate the effect on trim and stability of a ship in the event of damage to and consequent					
Reference/s	•	 Table A-II/2 Fur the management CMO No.67 ser 	flooding of a compartment and countermeasures to be taken Table A-II/2 Function 3: Controlling the operation of the ship and care for persons on board at the management level CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs					





Bachelor of Science in Marine Transportation

Minimum Required Equipment

Annex DCMO No. 67, S.
2017

Revision No: 00 Revision Date: 00

RECOMMENDED MINIMUM EQUIPMENT, MATERIALS, CHEMICALS AND TEACHING AIDS GOVERNING THE OPERATION OF THE BACHELOR OF SCIENCE IN MARINE TRANSPORTATION PROGRAM. HOWEVER, THE EXACT NUMBER SHOULD CONFORM TO THE CARRYING CAPACITY OF THE INSTITUTION. THE TASK MAINTENANCE REPAIR COLUMN ARE USED FOR HANDS ON EXERCIS ES AND FAMILIARIZATION OF EQUIPMENT, WHEREAS THE SYSTEM INTEGRATION, OPERATION AND FAULT FINDING COLUMN ARE EQUIPMENT NECESSARY TO ADDRESS THE DEFINED INTENDED LEARNING OUTCOMES OF COURSES.

DEC	CK
1.	Lecture Room
2.	Chart Room
3.	Navigational Equipment
4.	Ship's Bridge Simulator Room
5.	MARCOM Room
6.	Seamanship Room

	ITEMS	QUANTITY REQUIRED
"The	TURE ROOM standard classroom shall be a minimum of 1.2 squarooms must be well-lighted and well-ventilated. ing:	
1.2 V 1.3 M	Fables and Chairs or Armed chairs Whiteboards/Chalkboards Multimedia Equipment Feacher's Table	
the to	ROOM atio of the minimum requirements herein listed sh tal number of maritime students enrolled for the p llowing:	nall be proportionate to particular course under
	nart tables (Dimension: at least 1.0m L x 0.7m W)	Chart tables ratio: 1 table is to 2 students (1:2)
2.2 Na	Avigational charts Harbor charts – not necessarily of the same chart no. but should be adequate to create one passage plan (scale: larger than 1:50,000)	1 chart per table
	Coastal charts – not necessarily of the same chart no. but should be adequate to create one passage plan (scale: 1:50,000 to 1:150,000)	1 chart per table
•	General charts – not necessarily of the same chart no. but should be adequate to create one	1 chart per table



ITEMS	QUANTITY REQUIRED
passage plan (scale:from 1:150,000 to 1:600,000)	10 11 11 11 11 11 11 11 11 11 11 11 11 1
 Sailing charts – not necessarily of the same chart no. but should be adequate to create one passage plan (scale: smaller than 1:600,000) 	1 chart per table
 Chart projections 	
 Gnomonic Mercator plotting sheet from equator to 90 degrees latitude Routeing chart 	1 set 1 set 1 set (Jan – Dec)
2.3 Parallel rulers Navigational triangles Compass Dividers	10 pcs 3 pairs 3 pairs
2.4 IALA Maritime Bouyage System (Drawing/ Illustration)	2 pcs
2.5 Publications (photocopy acceptable) • Pilot Book / Sailing Directions	3 books of different publications
 Weekly notice to Mariners 	6 pcs
 Radio Signals, Radio Time Signal Aids, Radio Navigational Warnings 	Vol 1-6
 Nautical Tables (e.g. HO publications) or Useful tables 	1 pc
■ Nautical Almanac	1 pc (at least within the last 5 years edition)
■ Tide Tables	1 pc (at least within the last 5 years edition)
■ Sight Reduction Tables	1 set
2.6 Maneuvering Board	20 pcs

3.0 LIST OF NAVIGATIONAL EQUIPMENT

- Equipment shall be fully operational
- Equipment may be live stand alone or integrated to a bridge simulator room
- Some equipment may be found in the ship's bridge simulator room and/or in a separate dedicated room



ITEMS	QUANTITY REQUIRED
3.1 Global Positioning System (GPS)	1 unit
3.2 Gyro compass with at least one repeater	1 set
3.3 Pelorus/ Azimuth Circle	1 pc
3.4 Echo sounder	1 unit
3.5 RPM/Speed Indicator	1 unit
3.6 Steering equipment with automatic pilot	1 unit
3.7 Bridge/ engine room telegraph	1 unit
3.8 Hygrometer (dry and wet bulb thermometer)	2 pcs
3.9 Anemometer (marine type)	11
3.10 Aneroid Barometer (marine type)	† i
3.11 Weather Facsimile receiver or any equipment capable	and the contract of the contra
of giving weather report	
3.12 Marine chronometer	1
3.13 Marine Sextant	2
3.14 Magnetic compass	1
3.15 Signaling lamp	1
3.16 International signal flags	1 set
3.17 Clinometer	1
3.18 Automatic Identification System (AIS)	1 unit
3.19 Appropriate equipment for giving light and sound	1 set
signals (e.g. bell, gong, ship's whistle, morse light, etc.)	1 300
3.20 Equipment for display signals (lights and shapes):	
3.20.1 Anchor ball	2 pcs
3.20.2 Diamond shape	2 pcs
3.20.3 Cylindrical shape 3.20.4 Anchor light	2 pcs
	1 pc
3.20.5 Not under command light 3.20.6 Light to indicate "vessel restricted in her ability	1 pc
to manoeuvre"	1 pc
to mandeuvie	
· ·	

ITEMS

4.0 SHIP'S BRIDGE SIMULATOR ROOM 4.1 GENERAL REQUIREMENT

Instruction and assessment in RADAR-ARPA and ECDIS shall be conducted with the use of simulator equipment.

- 4.1.1 The design, features and capabilities of the simulators used shall be in compliance with Regulation I/12 and guidelines under Section A-I/12 and B-I/12 of the 1978 STCW as amended.
- 4.1.2 The installation must be capable of covering all the competences and KUPs as stated in the Table of Competence A-II/1 of the STCW Code related to RADAR-ARPA and/or ECDIS.
- 4.1.3 The number of student stations shall be adequate in order for each student to undergo the minimum required exposure to the equipment
- 4.1.4 There must be an INSTRUCTOR STATION where exercises are generated and are able to monitor each student station during an exercise or assessment
- 4.1.5 All other simulators which can be used by the MHEIs for other competences shall follow the same guidelines as in item number 4.1.1.

RADAR/ARPA AND GMDSS COMMUNICATION SIMULATOR MAY BE LOCATED IN DEDICATED SIMULATOR ROOM OR THEY MAY BE INTEGRATED TO A BRIDGE SIMULATOR.

The ratio of the minimum requirement for simulator equipment to student shall be as follows:

Academic Year 2015-2016 - 1:5

Academic Year 2016-2017 - 1:5

Academic Year 2017-2018 - 1:4

Academic Year 2018-2019 - 1:4

Academic Year 2019-2020 - 1:3

4.2 OTHER REQUIREMENTS

4.2.1 Navigational charts corresponding to particular coast or harbor must be available in the simulator room

1 set for each work station

- 4.2.2 Parallel rulers / Navigational triangles
- 4.2.3 Compass divider

5.0 MARCOM ROOM - GMDSS / COMMUNICATION SIMULATOR

- 5.1 GMDSS simulator capable of simulating the following: DSC, NAVTEX, EPIRB, Satellite communication for a particular GMDSS area.
 - 5.1.1 Instructor/Student and GMDSS station ratio
 - 5.1.2 GMDSS operation able to meet the training objectives to include the determination of limitations and possible errors of the equipment.
 - 5.1.3 Able to provide controlled operating environment capable of producing various conditions such as,

As per performance standards adopted by the IMO



	ITEMS	QUANTITY REQUIRED
	emergency, hazardous or unusual situations	
	relevant to the training objective.	
	5.1.4 Provide an interface through which a trainee can	
	interact with the equipment, and the simulated	
	environment.	
	5.1.5 Allow an instructor to control and monitor	
	exercises.	
5.2	International Radio Laws (ITU) Part I and Part II	1 set
5.3	Admiralty List of Radio Signals (Vol. I & II) [may be found in the Chart Room]	1 set
5.4	INMARSAT Maritime Communication Handbook	1 pc
5.5	International Code of Signals	1 pc
5.6	Morse Signaling Apparatus	1 set
5.7	Semaphore Flags	2 sets
5.8	Single Letter Flags	1 set
	A 1 ' 1/ 00/E 00/O / E	
	Academic Year 2015-2016 – 1:5 Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3	-
.0 SEA	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4	
.0 SEA	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM	6
6.1	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches	6 12
6.1	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing	
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following:	
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing	12
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: ■ Derrick (single or married fall system)	12
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: ■ Derrick (single or married fall system) ■ Deck crane	12 1 1
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass	12 1 1 1
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan	12 1 1 1 1
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan Hatch cover (any type, complete parts)	12 1 1 1 1 1
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan Hatch cover (any type, complete parts) Head and heel blocks Types of vessels Various hatch covers	12 1 1 1 1 1 1 each
6.1 6.2	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan Hatch cover (any type, complete parts) Head and heel blocks Types of vessels	12 1 1 1 1 1 1 each
6.1 6.2 6.3	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan Hatch cover (any type, complete parts) Head and heel blocks Types of vessels Various hatch covers	12 1 1 1 1 1 1 1each 1
6.1 6.2 6.3	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan Hatch cover (any type, complete parts) Head and heel blocks Types of vessels Various hatch covers Samples of cargo plans of at least 4 types of ships	12 1 1 1 1 1 1 1each 1 1 each
6.1 6.2 6.3 6.4 6.5	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan Hatch cover (any type, complete parts) Head and heel blocks Types of vessels Various hatch covers Samples of cargo plans of at least 4 types of ships Bollard	12 1 1 1 1 1 1each 1 1 each 2
6.1 6.2 6.3 6.4 6.5 6.6	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan Hatch cover (any type, complete parts) Head and heel blocks Types of vessels Various hatch covers Samples of cargo plans of at least 4 types of ships Bollard Bitts Cleats	12 1 1 1 1 1 1each 1 1each 2
6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9	Academic Year 2016-2017 – 1:5 Academic Year 2017-2018 – 1:4 Academic Year 2018-2019 – 1:4 Academic Year 2019-2020 – 1:3 MANSHIP ROOM Work benches Vises attached to work benches for splicing Models/Drawings/Video of the following: Derrick (single or married fall system) Deck crane Anchor windlass Mooring winch/capstan Hatch cover (any type, complete parts) Head and heel blocks Types of vessels Various hatch covers Samples of cargo plans of at least 4 types of ships Bollard Bitts Cleats Anchor with chain	12 1 1 1 1 1 1 1each 1 1 each 2 2



ITEMS	QUANTITY
6.11 Long handled scraper	10
6.12 Wire brush	10
6.13 Fid	10
6.14 Marlinspike (6-10 inches)	10
o. 14 Marin Spine (o To mores)	10
6.15 Rope, at least 12mm in diameter (nylon or Manila rope)	100 mtr
6.16 Wire rope for splicing, at least 8mm in diameter	30 mtr
6.17 Seaman's knife	10
6.18 Sewing palms and kit for canvass works	1 set
 Sewing needle 	
■ Eyelet	
Canvass or tarpaulin Thimble (for appring)	
Thimble (for sewing)Punch and Dye	
6.19 Serving mallet	1
6.20 Pilot ladder	1
6.21 Jacob's ladder	1
6.22 Wire cutter	1
6.23 Painting stage w/rigging	1
6.24 Bosun's chair	1
6.25 Cargo net	1
6.26 Safety net	1
6.27 Gun tackle	1
6.28 Two-fold purchase rigged preferably on wooden blocks	1
6.29 Three-fold purchase rigged preferably on wooden blocks	1
6.30 Metal cargo swivel block	1
6.31 Cargo hook SWL at least 5 tons	1
6.32 Chain block, at least 1 ton	1
6.33 Snatch block, size at least 160mm	1
6.34 Safety helmet	25
6.35 Safety goggle	25
6.36 Safety Belt / Safety Harness	3
6.37 Working gloves	25
6.38 Thimble	6
6.39 Shackle (various sizes)	6
6.40 Turnbuckle	6
6.41 Ships Certificates e.g. SOLAS, etc.	At least 5
6.42 Ships Organizational Chart	1
6.43 Tabular Chart for the strength of ropes and wires	1
6.44 Various types of blocks	1



ITEMS	QUANTITY REQUIRED
6.45 IMDG Code: Labels, marks and signs (SN: IMO-220E)	1
6.46 Drawings of various tanker ships showing tanks, pipes and pumping arrangement (oil, chemical & gas)	1
6.47 Drawings/illustration/actual equipment of measuring device and oxygen device	1
6.48 Copy of actual Ship Capacity Plan/Dead Weight Plan	1
6.49 Trim and Stability Table	1
6.50 International Loadline Chart (seasonal Chart)	. 1
6.51 Computer based software on Trim and Stability [may be found in a separate room]	1
6.52 Diagram of a Ship's Manoeuvring Characteristics	1
6.53 Posters/pictures of River, Bends, Locks, Port Facilities, Navigable canals, rivers, etc.	1
6.54 Posters/pictures of various types of propellers and bow-thruster	1

Summary of Courses that may need Bridge Simulator

Courses	Simulator
Navigation 1, 3, 7	Any of categories 1, 2, and 4
Navigation 5, 6	Any of categories 1, 2, 3 and 4
D-Watch 2 - Deck Watchkeeping	Any of categories 1, 2, and 4
Seam 5 – Ship Handling and Manoeuvring	Any of categories 1, 2, 3 and 4

Standard Classification of Ship's Bridge Simulator

CATEGORY 1	Full Mission Simulator	A full mission simulator capable of simulating a total shipboard bridge operation situation including the capability for advanced manoeuvring in restricted areas.
CATEGORY 2	Multi Task Simulator	A multi task simulator capable of simulating a total shipboard bridge operation situation but excluding the capability for advanced manoeuvring in restricted waterways.
CATEGORY 3	Limited Task Simulator	A limited task simulator capable of simulating a shipboard bridge operation situation for limited (instrumentation or blind) navigation and collision avoidance.
CATEGORY 4	Special Task Simulator	A special task simulator capable of simulating operation and/or maintenance of particular bridge instruments and/or defined navigation/manoeuvring scenarios.

Competences addressed by the Ship's Bridge Simulator

STCW Reference	Commission	Category							
STOW Reference	Competence	1	2	3	4				
Table A-II/1.1	Plan and conduct a passage and determine position	1	1		1				
Table A-II/1.2	Maintain safe navigational watch	V	✓		1				
Table A-II/1.3	Use of RADAR and ARPA to maintain safety of navigation	~	1	1	1				
Table A-II/1.4	Use of ECDIS to maintain the safety of navigation	~	1	1	~				
Table A-II/1.5	Respond to emergencies	V	1	/	1				
Table A-II/1.6	Respond to distress signal at sea	V	V	/	~				
Table A-II/1.8	Transmit and receive information by visual signaling	1	~	~	1				
Table A-II/1.9	Manoeuvre the ship	1	1	/	1				



Annex A of CMO No. 67, s. 2017

Competence Index	COMPETENCE	KUP Index	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Maci
A-III/1	Function 1 Marine enginee										
C1	Maintain a safe engineering watch	KUP1	Thorough knowledge of principles to be observed in keeping a marine engineering watch including:	·							
		.1	duties associated with taking over and accepting a watch								
		.2	routine duties undertaken during a watch	11							
		.3	maintenance of the machinery space logs and the significance of the readings taken			_					
		.4	duties associated with handing over a watch					_			
		KUP2	Safety and emergency procedures, change over of remote/automatic to local control systems								
		KUP3	Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil systems								
		KUP4	Knowledge of engine-room resource management principles including:								
			allocation, assignment and prioritization of resources								_
		.2	effective communication								
			assertiveness and leadership								
			obtaining and maintaining situational awareness								
		.5	consideration of team experience								
C2	Use English in written and oral form	KUP1	Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties								
C3	Use internal communication systems	KUP1	Operation of all internal communication systems on board			_					
C4	Operate main and auxiliary machinery and associated	KUP1	Basic construction and operation principles of machinery systems, including:							×	х
	control systems	.1	main diesel engine		-		A	Ar	-		
		.2	marine steam turbine								
		.3	marine gas turbine								
			marine steam boiler			A service in the service					
			shafting installations and propeller								
			other auxiliaries							X	X
			various pumps					7500		×	o-over my
			air compressor							×	
			purifier								×
			fresh water generator							x	
			heat exchanger							х	
		.6.1	refrigeration	[L	L				L	X





Annex A of CMO No. 67, s. 2017

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Macl 2
		.6.0	air-conditioning and								×
		.6.h	ventilations system	3 /6/3							Х
		.7	steering gear		24.0.5.0						X
		.8	automatic control systems		1505		V2 10 10 1				
		.9	fluid flow and characteristics of of lubricating oil, fuel oil and cooling oil		<u> </u>					ļ	
		.10	deck machinery			_				X	
		KUP2	Safety and emergency procedures for operation of propulsion plant machinery including control systems								
		KUP3	Preparation, operation, fault detection and necessary measures to prevent damage for the following machinery items and control systems:							×	х
		.1	Main engine and associated auxiliaries							x	
		.2	Steam boilers and associated auxiliaries and steam systems							х	
		.3	Auxiliary prime movers and associated systems							X	
		.4	Other auxiliaries, including refrigeration, air-conditioning and ventilation systems								x
C5	Operate fuel, lubrication, ballast and other pumping	KUP1	Operational characteristics of pumps and piping systems, including control systems							x	
	systems and associated control systems	KUP2	Operation of the following pumping systems:							х	
		.1	Routine pumping operations					<u> </u>		x_	= 8000
		.2	Operation of bilge, ballast and cargo pumping systems							X	200000
		KUP3	Oily-water separators (or similar equipment) requirements and operation							X	
A-III/2	Function 1 Marine engine				No.						
C1	Manage the operation of propulsion plant machinery	KUP1	Design features and operative mechanism of the following machinery and associated auxiliaries:								
		.1	marine diesel engine		100		-		Janes and the second		
		.2	marine steam turbine*								
		.3	marine gas turbine*								
		.4	marine steam boiler								
C2	Plan and schedule operations	KUP1	Theoretical knowledge						K 1556	TANAL STATE	
		.1	Thermodynamics and heat transmission								
		.2	Mechanics and hydromechanics								
		.3	Propulsive characteristics of:			74					
		.3.a	diesel engines including speed, output and fuel consumption							1	





Annex A of CMO No. 67, s. 2017

Competence Index	COMPETENCE	KUP Index	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Mach 2
		.3.b			T						
			steam boiler including speed (pressure), output (temperature) and fuel consumption							ļ	
		.3.c	gas turbines including speed, output and fuel consumption								
		.4	Heat cycle, thermal efficiency and heat balance of the following:								
		.4.a	marine diesel engine								
			marine steam turbine		-1-1-1-0-0-0-1						
			marine gas turbine								
			marine steam boiler								
			Refrigerators and refrigeration cycle								X
			Physical and chemical properties of fuets and lubricants						_		
			Technology of materials								
		.8	Naval Architecture and ship construction, including damage control								
			2000 2000 300								
			Practical knowledge								X
			Start up and shut down main propulsion and auxiliary machinery, including associated systems								
		.2	Operating limits of propulsion plant			177,0					
		.3	The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery								
		.4	Functions and mechanism of automatic control for main engine		 					··	
		.5	Functions and mechanism of automatic control for auxiliary machinery including but not limited to:							х	Х
		.5.a	generator distribution systems			P = 11		-	x		-
			steam boilers					-			t
			oil purifier			100000	-	7		- W 5 255-	X
		The second secon	refrigeration system		1000						X
			pumping and piping systems		 	_					
			steering gear system								×
			cargo handling equipment and deck machinery	<u> </u>]			- "	Х	
C3	Operation, surveillance, performance assessment and	KUP1	Theoretical knowledge								Х
		1	Thermodynamics and heat transmission								
	maintaining safety of	.2	Mechanics and hydromechanics								
	propulsion plant and auxiliary machinery	.3	Propulsive characteristics of:								
	macrimery		diesel engines including speed, output and fuel consumption								
		.3.b	steam boiler including speed (pressure), output (temperature) and fuel consumption								





Annex A of CMO No. 67, s. 2017

Index	COMPETENCE	KUP Index	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Macl 2
AND DE		.3.0	gas turbines including speed, output and fuel consumption								
		.4	Heat cycle, thermal efficiency and heat balance of the following:		5000	.05					
		.4.a	marine diesel engine			AL COUNTY					
			marine steam turbine								
		.4.0	marine gas turbine						Name and the same		
		.4.d	marine steam boiler								
		.5	Refrigerators and refrigeration cycle								Х
		.6	Physical and chemical properties of fuels and lubricants								
		.7	Technology of materials	_							
		.8	Naval Architecture and ship constrcution, including damage control								
		KUP2	Practical knowledge				III		-	Γ	T X
			Start up and shut down main propulsion and auxiliary machinery, including associated systems								
		.2	Operating limits of propulsion plant								
		.3	The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery								
		.4	Functions and mechanism of automatic control for main engine								
		.5	Functions and mechanism of automatic control for auxiliary machinery including but not limited to:							×	x
		.5.a	generator distribution systems						х		
		.5.b	steam boilers								T
			oil purifier								х
			refrigeration system					A			X
		.5.e	pumping and giping systems							×	
			steering gear system								X
		.5.g	cargo handling equipment and deck machinery					<u> </u>		X	
C4	Manage fuel, lubrication and ballast operations	KUP1	Operation and maintenance of machinery, including pumps and piping systems							х	
A-III/1	Function 2 Electrical, elect	tronic an	d control engineering at the operational level	INC. WH			1-7/4				
C1	Electrical, electronic and control engineering at the	KUP1	Basic configuration and operation principles of the following electrical, electronic and control equipment:						×		
	operational level	.1	Electrical equipment:	_					Х	<u>-</u>	
			generator and distribution systems	1000000					x		\top
			preparing, starting, paralleling and changing over generators			· · · ·	-		×		
		.1.c	electrical motors including starting methodologies						x	-	
			high-voltage installations						X		_





Annex A of CMO No. 67, s. 2017

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Mach 2
		.1.e	sequential control circuits and associated system devices		-4.10	Jan Harris			×		
		.2	Electronic equipment:								
			characteristics of basic electronic circuit elements					X			
			flowchart for automatic and control systems								
		.2,0	functions, characteristics and features of control systems for machinery items, including main propulsion plant operation control and steam boiler automatic controls							_	
		.3	Control systems			_	_				
		.3.a	various automatic control methodologies and characteristics								
		.3.b	Proportional-Integral-Derivative (PID) control characteristics and associated system devices for process control								
C2	Maintenance and repair of electrical and electronic equipment		Safety requirements for working on shipboard electrical systems, including the safe isolation of electrical equipment required before personnel are permitted to work on such equipment				x		x		
			Maintenance and repair of electrical system equipment, switchboards, electric motors, generators and DC electrical systems and equipment						×		
		KUP3	Detection of electric malfunction, location of faults and measures to prevent damage						Х		
		KUP4	Construction and operation of electrical testing and measuring equipment				X		1-77		
		KUP5	Function and performance tests of the following equipment and their configuration:								
		.1	Monitoring systems								
			Automatic control devices								
			Protective devices				X		X		
		KUP6	The interpretation of electrical and simple electronic diagrams				<u> </u>	x			
A-III/2	Function 2 Electrical, ele	ctronic an	d control engineering at the management level			A DESCRIPTION	Constitution of				
C1	Manage operation of electric		Theoretical knowledge		and the second			- June David			
	and electronic control	.1.a	Marine electrotechnology						X		
	equipment	.1.b	Electronics and power electronics					X			
		.1.c	Automatic control engineering								
			Safety devices					Х	X		
		.2	Design features and system configurations of automatic control equipment and safety devices for the following:						Х		
		.2.a	main engine								
		.2.b	generator and distribution system						X		
		,2,0	steam boiler								T





Annex A of CMO No. 67, s. 2017

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Macl 2
		.3	Design features and system configurations of operational control equipment for electrical motors						Х		
		.4	Design features of high-voltage installations	_		-			X		
		.5	Features of hydraulic and pneumatic control equipment					_	~		
C2	Manage troubleshooting	KUP1	Practical knowledge				No.	X	Х		i consti
	restoration of electrical and	.1	Troubleshooting of electrical and electronic control equipment					X	X		
	electronic control equipment to		Function test of electrical, electronic control equipment and safety devices								
	operating condition	.3	Troubleshooting of monitoring systems								
		.4	Software version control					L			
A-III/6	Function 1 Electrical, elect	ronic an	nd control engineering at the operational level						-		
C5	Operate computers and	KUP1	Understanding of:								
	computer networks on ships	.1.2	main features of data processing								
		.1.3	construction and use of computer networks on ships								
		.1.4	bridge-based, engine-room based and commercial computer use								
A-III/1	Function 3 Maintenance an										
C1	Appropriate use of hand tools, machine tools and measuring	KUP1	Characteristics and limitations of materials used in construction and repair of ships and equipment								
	instruments for fabrication and repair on board	KUP2	Characteristics and limitations of processes used for fabrication and repair		×				Will the San		
		KUP3	Properties and parameters considered in the fabrication and repair of systems and components		х						
		KUP4	Methods for carrying out safe emergency/temporary repairs			Х					
		KUP5	Safety measures to be taken to ensure a safe working environment and for using hand tools, machine tools and measuring instruments	х	х	Х					
		KUP6	Use of hand tools, machine tools and measuring instruments	X	X	X					
		KUP7	Use of various types of sealants and packings								
C2	Maintenance and repair of	KUP1	Safety measures to be taken for repair and maintenance including the safe isolation								T
OZ.	shipboard machinery and	1011	of shipboard machinery and equipment required before personnel are permitted to								
	equipment		work on such machinery or equipment								
		KUP2	Appropriate basic mechanical knowledge and skills	-				-			
		-	Maintenance and repair, such as dismantling, adjustment and reassembling of								
		KUP3			1	1	I	I	I		I
		KUP3							l		I
		KUP3	machinery and equipment	X							
				X							





Annex A of CMO No. 67, s. 2017

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Maci 2
		KUP7	The interpretation of piping, hydraulic and pneumatic diagrams								
A-III/2	Function 3 Maintenance an	nd repair	at the management level	DE MANAGE				I SALE			
C1			Theoretical knowledge: Marine engineering practice								
	maintenance and repair		Practical knowledge			-				_	
	procedures	.1	Manage safe and effective maintenance and repair procedures								
		.2	Planning maintenance, including statutory and class verifications								
		.3	Planning repairs	L						_	
C2	Detect and identify the cause	KUP1	Practical knowledge							_	
	of machinery malfunctions and correct faults	.1	Detection of machinery malfunction, location of faults and action to prevent damage								
		.2	Inspection and adjustment of equipment		-		_		Appropriate	_	
		.3	Non-destructive examination						-		
C3	Ensure safe working practices	KUP1	Practical knowledge: Safe working practices								
			<u></u>	<u></u>							
A-111/5	Function 3 Maintenance an		at the operational level (able seafarer)								
A-III/5 C1	Function 3 Maintenance an Contribute to the operation of equipment and machinery		Safe operation of equipment, including: - hoists and lifting equipment								
	Contribute to the operation of equipment and machinery		Safe operation of equipment, including:								
C1	Contribute to the operation of equipment and machinery	KUP1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand besic crane, winch and hoist signals								
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the	KUP1 KUP2 operation	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand besic crane, winch and hoist signals on of the ship and care for persons on board at the operational level								
C1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with	KUP1 KUP2 operation	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand besic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment								
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention	KUP1 KUP2 operation	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand besic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine								
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with	KUP1 KUP2 operation KUP1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment								
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention	KUP1 KUP2 operation KUP1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment								
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention	KUP1 KUP2 operation KUP1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment								
A-III/1 C1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention requirements	KUP1 KUP2 operation KUP1 .1 .2 .3	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand besic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35)								
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention	KUP1 KUP2 operation KUP1 .1 .2 .3	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand besic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35) Ship stability Working knowledge and application of stability, trim and stress tables, diagrams and								
A-III/1 C1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention requirements Maintain seaworthiness of the	KUP1 KUP2 operatio KUP1 .1 .2 .3 KUP 1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand besic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35) Ship stability Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment								
A-III/1 C1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention requirements Maintain seaworthiness of the	VUP1 KUP2 operatio KUP1 .1 .2 .3 KUP 1 .1 .2	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand besic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35) Ship stability Working knowledge and application of stability, trim and stress tables, diagrams and								





Annex A of CMO No. 67, s. 2017

Competence Index	COMPETENCE	KUP Index	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Mach 2
C3	Prevent, control and fight fires on board (model course 2.03)	W. 1 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7									
C4	Operate life-saving appliances (model course 1.23)										
C5	Apply medical first aid on board ship (model course 1.14)										
C6	Monitor compliance with legislative requirements	KUP1	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment								
C7	teamworking skills (model course 1.39)	KUP1 .1 .2 .3 .4 .5 KUP2 .1 .2 .3 .4	Knowledge and ability to apply effective resource management: allocation, assignment and prioritization of resources effective communication on board and ashore decisions reflect consideration of team experiences assertiveness and leadership, including motivation obtaining and maintaining situational awareness Knowledge and ability to apply decision-making techniques: situation and risk management identify and consider generated options selecting course of action evaluation of outcome effectiveness								
A-III/2	Function 4 Controlling the	operatio	on of the ship and care for persons on board at the management level								
C1	Control trim, stability and stress	KUP1	Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability Knowledge of the effect on trim and stability of a ship in the event of damage to and								
		KUP3	consequent flooding of a compartment and counter measures to be taken Knowledge of IMO recommendations concerning ship stability								<u> </u>
C2	Monitor and control compliance with legislative	KUP1	Knowledge of relevant international maritime law embodied in international agreements and conventions								





Annex A of CMO No. 67, s. 2017

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Macl
	measures to ensure safety of	KUP 2	Regard shall be paid especially to the following:								
	life at sea and protection of the marine environment	.1	certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and their period of validity								
		.2	responsibilities under the relevant requirements of the International Convention on Load Lines								
		.5	maritime declarations of health and the requirements of the International Health Regulations				_				
	operational condition of life- saving, fire-fighting and other	.6	responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo								
		.8	national legislation for implementing international agreements and conventions							_	
C3		KUP1	Thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea)								
	passengers and the		Organization of fire and abandon ship drills								
	operational condition of life- saving, fire-fighting and other	KUP3	Maintenance of operational condition of life-saving, fire-fighting and other safety systems								
	safety systems	KUP4	Actions to be taken to protect and safeguard all persons on board in emergencies								
		KUP5	Actions to fimit damage and salve the ship following a fire, explosion, collision or grounding								
C4	Develop emergency and damage control plans and	KUP 1	Ship construction, including damage control	_							
C5	Use of leadership and	KUP1	Knowledge of shipboard personnel management training								
	managerial skill	KUP2	A knowledge of related international maritime conventions and recommendations, and national legislation							_	
		KUP3	Ability to apply task and workload management inluding:								
		.1	planning aand coordination								
		.2	personnel assignment	,							
		.3	time and resource constraints							-	
		No. of Concession, Name of Street, or other Designation, Name of Street, or other Designation, Name of Street,		_							
		KUP4	Knowledge and ability to apply effective resource management								↓
		.1	allocation, assignment, and prioritization of resources effective communication on board and ashore							ł	
	四日 日本 日本 日本 日本	.3	decisions reflect consideration of team experience	-							
		.4	assertiveness and leadership inlouding motivation						Carried September 1		
		.5	obtaining and maintaining situation awareness								
		KUP5	Knowledge and ability to apply decision-making techniques								





Annex A of CMO No. 67, s. 2017

Competence	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Mach 1	Mach 2	Mach 3	Electro 1	Electro 2	Electro 3	Aux Mach 1	Aux Mach 2
	THE RESIDENCE OF	.1	situation and risk assessment					20.00			
		.2	identify and generate options								
		.3	select course of action								
		.4	evaluation of outcome effectiveness				Sale				
		KUP6	Development, implementation, and oversight of standard operating procedures	1			1			_	

Competences from Table A-III/1 OIC Engineering Watch	
Competences from Table A-III/2 Management Level Engine	
Competences from Table A-III/5 Able Seafarer Engine	
Reinforces the theories discussed in Thermodynamics	





Annex A of CMO No. 67, s.

ompetence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1 Auto 2	Maint	EWK 1 E	WK 2 Nav Arch	E Má
A-IIV1	Function 1 Marine enginee	ring at t									
C1	Maintain a safe engineering watch	KUP1	Thorough knowledge of principles to be observed in keeping a marine engineering watch including:						Х		
		.1	duties associated with taking over and accepting a watch						X		\top
		.2	routine duties undertaken during a watch						Х		T
		.3	maintenance of the machinery space logs and the significance of the readings taken						x	_	
		.4	duties associated with handing over a watch						×		士
		KUP2	Safety and emergency procedures, change over of remote/automatic to local control systems						X		\prod_{i}
		KUP3	Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil systems						х		
		-	Knowledge of engine-room resource management principles including:							Χ	Ţ
		.1	alfocation, assignment and prioritization of resources	_				-	-	X	+
		.2	effective communication				 			X	-
		.3	assertiveness and leadership				+	 		X	-
		.4	obtaining and maintaining situational awareness				 			X	+
		.5	consideration of team experience							X	
C2	Use English in written and oral form	KUP1	Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties		×	х					floor
C3	Use internal communication systems	KUP1	Operation of all internal communication systems on board		_				х		
C4	Operate main and auxiliary machinery and associated	KUP1	Basic construction and operation principles of machinery systems, including:	Х	х	X	×				\Box
	control systems	,1	main diesel engine	x							
		.2	marine steam turbine		Х						
		.3	marine gas turbine			X					
			marine steam boiler		X						\mathbb{I}
		.5	shafting installations and propeller			Х					
			other auxiliaries	_						Usa series	L
			various pumps								
			air compressor		-		1				_
			purifier								
			fresh water generator								-
		6.0	heat exchanger			1					





Annex A of CMO No. 67, s.

Revision No: 00

Revision Date: 00

ompetence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1	Auto 2	Maint	EWK 1 E	WK 2 Nav Arch	E Ma
			air-conditioning and									
			ventilations system									
			steering gear		100					\perp		
		.8	automatic control systems	A	Para Unit		×	X		ļ.,		8
			fluid flow and characteristics of of lubricating oil, fuel oil and cooling oil					\square				+
		,10	deck machinery									
		KUP2	Safety and emergency procedures for operation of propulsion plant machinery including control systems	Х	Х	Х						
			Preparation, operation, fault detection and necessary measures to prevent damage for the following machinery items and control systems:	X	×	х						
			Main engine and associated auxiliaries	X		X						
			Steam boilers and associated auxiliaries and steam systems		х			l <u>-</u>				
			Auxiliary prime movers and associated systems	Х	X	X			_	<u> </u>		
		.4	Other auxiliaries, including refrigeration, air-conditioning and ventilation systems									
C5	Operate fuel, lubrication, ballast and other pumping	KUP1	Operational characteristics of pumps and piping systems, including control systems									
	systems and associated control systems	KUP2	Operation of the following pumping systems:						_			
	Control systems	.1	Routine pumping operations									
			Operation of bilge, ballast and cargo pumping systems									<u> </u>
		KUP3	Oily-water separators (or similar equipment) requirements and operation									工
A-III/2	Function 1 Marine enginee	ring at th	ne management ievel									
C1	Manage the operation of propulsion plant machinery	KUP1	Design features and operative mechanism of the following machinery and associated auxiliaries:	X	X	X						
		.1	marine diesel engine	Х								
			marine steam turbine*		X							
		.3	marine gas turbine"			x					1.10	
		.4	marine steam boiler		х		Ì					
C2	Plan and schedule operations	KUP1	Theoretical knowledge	Х	X	Х		T -T	_	T -		7.7
		.1	Thermodynamics and heat transmission				1	М				
	TENNE SERVICE		Mechanics and hydromechanics					М				
	THE REPORT OF THE PERSON OF TH		Propulsive characteristics of:	X	X	X						
	THE RESIDENCE OF THE PARTY OF T		diesel engines including speed, output and fuel consumption	x				_			100000	





Bachelor of Science in Marine Engineering Annex A of GMO No. 67, s. 2017 **CURRICULUM MAPPING**

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1	Auto 2	Maint	EWK 1	EWK 2	Nav Arch	E Mai
		.3.b			×		T						
			steam boiler including speed (pressure), output (temperature) and fuel consumption		_ ~		-	ļ <u>-</u>			74111		
		.3.0	gas turbines including speed, output and fuel consumption			Х	1						
		.4	Heat cycle, thermal efficiency and heat balance of the following:	Х	X	X							
		.4.a	marine diesel engine	X									
		.4.b	marine steam turbine		X			100			1-621-1-1		
		.4.0	marine gas turbine	Ĭ		X		<u> </u>					ļ. <u> </u>
		.4.d	marine steam boiler		х			L					↓
		.5	Refrigerators and refrigeration cycle										
		.6	Physical and chemical properties of fuels and lubricants										
		.7	Technology of materials										,
		.8	Naval Architecture and ship construction, including damage control						×			X	
		KUP2	Practical knowledge	Х			X	Х			Х		
		.1	Start up and shut down main propulsion and auxiliary machinery, including associated systems	х	х	X					x		
		.2	Operating limits of propulsion plant	Х	X	Х							Г
		.3	The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery	х	Х	X	-				×		
		.4	Functions and mechanism of automatic control for main engine				 	×					\vdash
			Functions and mechanism of automatic control for auxiliary machinery including but not limited to:				×						Г
		.5.a	generator distribution systems										\Box
			steam boilers			1200100	х			-			
			oil purifier				×						
			refrigeration system				×	 					\vdash
			pumping and piping systems			1 —	×	\vdash	_				П
		.5.f	steering gear system		2 2 2		X					-	
			cargo handling equipment and deck machinery				х						
C3	Operation, surveillance, performance assessment and	KUP1	Theoretical knowledge	Х	Х	Х							
	maintaining safety of	1	Thermodynamics and heat transmission										1
		.2	Mechanics and hydromechanics										
	propulsion plant and auxiliary machinery	.3	Propulsive characteristics of:	Х	Χ_	Х							
	Inachinety		diesel engines including speed, output and fuel consumption	x									ļ
		.3.b	steam boiler including speed (pressure), output (temperature) and fuel consumption		×								





Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1	Auto 2	Maint	EWK 1	EWK 2	Nav Arch	E Ma
		.3.0	gas turbines including speed, output and fuel consumption	Ber Z HENNE		×	T						
		.4	Heat cycle, thermal efficiency and heat balance of the following:	X	X	X		U 0					
			marine diesel engine	Х									
		.4.b	marine steam turbine		X								
			marine gas turbine	Silisa	_	х		-			52==		
		.4.d	marine steam boiler		х _		_ · _						
		.5	Refrigerators and refrigeration cycle										
			Physical and chemical properties of fuels and lubricants								8		
		.7	Technology of materials										X
		.8	Naval Architecture and ship constrcution, including damage control									X	
		KUP2	Practicel knowledge	Х		Т		Х		П	×	_	Г
		.1	Start up and shut down main propulsion and auxiliary machinery, including associated systems	Х	×	Х					х		
		.2	Operating limits of propulsion plant	X	X -	X				\vdash			
			The efficient operation, surveillance, performance assessment and maintaining	 ``-	<u> </u>	<u> </u>		-					
			safety of propulsion plant and auxiliary machinery	Х	X	X					х		
		.4	Functions and mechanism of autometic control for main engine					· x				<u>'</u>	
			Functions and mechanism of automatic control for auxiliary machinery including but not limited to:					х					
		.5.a	generator distribution systems										
		-	steam boilers		×				-	\vdash			\vdash
		.5.c	oil purifier							1			\Box
		.5.d	refrigeration system										
		.5.e	pumping and piping systems										
			steering gear system					ľ					
		.5.0	cargo handling equipment and deck machinery										<u></u>
C4	Manage fuel, lubrication and ballast operations	KUP1	Operation and maintenance of machinery, including pumps and piping systems										
A-IIV1	Function 2 Electrical, elec	tronic an	d control engineering at the operational level										de la constant
C1	Electrical, electronic and control engineering at the	KUP1	Basic configuration and operation principles of the following electrical, electronic and control equipment:				×	х					
	operational level		Electrical equipment:	†		1					-		\vdash
			generator and distribution systems				†					-	
			preparing, starting, paralleling and changing over generators			1 -							
		.1.0	electrical motors including starting methodologies										
		1.1	high-voltage installations				-	_					





Bachelor of Science in Marine Engineering CURRICULUM MAPPING Annex A of CMO No. 67, s. 2017 Revision No: 00 **CURRICULUM MAPPING**

Revision Date: 00

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1	Auto 2	Maint	EWK 1 EWK 2	Nav Arch	E Ma
		.1,6	sequential control circuits and associated system devices			I	Ι					
		.2	Electronic equipment:				X	X				
			characteristics of basic electronic circuit elements					1793				
		.2.8	flowchart for automatic and control systems				Х					
		.2.0	: functions, characteristics and features of control systems for machinery items, including main propulsion plant operation control and steam boiler automatic controls					х				
		.3	Control systems				X	Γ	"-"			\Box
		.3.8	various automatic control methodologies and characteristics				х	_	_			
		.3.6	Proportional-Integral-Derivative (PID) control characteristics and associated system devices for process control				×					
C2	Maintenance and repair of electrical and electronic equipment	KUP1	Safety requirements for working on shipboard electrical systems, including the safe isolation of electrical equipment required before personnel are permitted to work on such equipment									
		KUP2	Maintenance and repair of electrical system equipment, switchboards, electric motors, generators and DC electrical systems and equipment									
		KUP3	Detection of electric malfunction, location of faults and measures to prevent damage									
		KUP4	Construction and operation of electrical testing and measuring equipment						_			\top
		KUP5	Function and performance tests of the following equipment and their configuration:			_	×					
		.1	Monitoring systems				×					
		.2	Automatic control devices			2000	х					
		.3	Protective devices				х					
		KUP6	The interpretation of electrical and simple electronic diagrams				X					
A-III/2	Function 2 Electrical, elec	tronic ar	d control engineering at the management level	DESCRIPTION OF THE PERSON OF T	THE PARTY OF		NAME OF			THE REAL PROPERTY.	THE RESERVE	1.5
C1	Manage operation of electrical		Theoretical knowledge	X	X	X	X	_				
	and electronic control		Marine electrotechnology					$\overline{}$		————		\top
	equipment		Electronics and power electronics			-						\top
		.1.c	Automatic control engineering				X	X				\top
			Safety devices									1-
		.2	Design features and system configurations of automatic control equipment and safety devices for the following:		×			х				
		2.8	main engine	×	9	X				 		+-
			generator and distribution system	^		^	-				_	+





Competence	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1	Auto 2	Maint	EWK 1	EWK 2	Nav Arch	E Ma
		.3	Design features and system configurations of operational control equipment for electrical motors	THE PROPERTY.									
		.4	Design features of high-voltage installations Features of hydraulic and pneumatic control equipment				×				- A		
							^						_
C2	Manage troubleshooting	KUP1	Practical knowledge				X						
	restoration of electrical and	.1	Troubleshooting of electrical and electronic control equipment				X	X			·		
	electronic control equipment to		Function lest of electrical, electronic control equipment and safety devices	ļ			х						
	operating condition	.3	Troubleshooting of monitoring systems				X		_				
		.4	Software version control			<u> </u>		X					
A-III/6	Function 1 Electrical, elect	ronic ar	d control engineering at the operational level										
C5		KUP1	Understanding of:			Total State State							
	computer networks on ships	.1.2	main features of data processing]					
		.1.3	construction and use of computer networks on ships										
		.1.4	bridge-based, engine-room based and commercial computer use										
A-IIV1	Function 3 Maintenance an	d renai	at the operational level					44L69/9					
C1	Appropriate use of hand tools, machine tools and measuring		Characteristics and limitations of materials used in construction and repair of ships and equipment						_				х
	instruments for fabrication and repair on board	KUP2	Characteristics and limitations of processes used for fabrication and repair						•				×
		KUP3	Properties and parameters considered in the fabrication and repair of systems and components										х
		KUP4	Methods for carrying out safe emergency/temporary repairs						×				
		KUP5	Safety measures to be taken to ensure a safe working environment and for using hand tools, machine tools and measuring instruments										
		KUP6	Use of hand tools, machine tools and measuring instruments										
			Use of various types of sealants and packings						X				
		KUP7	Too or remove types of beatering and poorings				-						
C2		KUP7									-		
C2			Safety measures to be taken for repair and maintenance including the safe isolation of shipboard machinery and equipment required before personnel are permitted to work on such machinery or equipment						×				
C2	Maintenance and repair of shipboard machinery and	KUP1	Safety measures to be taken for repair and maintenance including the safe isolation of shipboard machinery and equipment required before personnel are permitted to work on such machinery or equipment						X				
C2	Maintenance and repair of shipboard machinery and	KUP1	Safety measures to be taken for repair and maintenance including the safe isolation of shipboard machinery and equipment required before personnel are permitted to work on such machinery or equipment Appropriate basic mechanical knowledge and skills Maintenance and repair, such as dismantling, adjustment and reassembling of		_				·				
C2	Maintenance and repair of shipboard machinery and equipment	KUP1	Safety measures to be taken for repair and maintenance including the safe isolation of shipboard machinery and equipment required before personnel are permitted to work on such machinery or equipment Appropriate basic mechanical knowledge and skills Maintenance and repair, such as dismantling, adjustment and reassembling of machinery and equipment		_				X				
C2	Maintenance and repair of shipboard machinery and equipment	KUP1 KUP2 KUP3	Safety measures to be taken for repair and maintenance including the safe isolation of shipboard machinery and equipment required before personnel are permitted to work on such machinery or equipment Appropriate basic mechanical knowledge and skills Maintenance and repair, such as dismantling, adjustment and reassembling of		_				X				x





Bachelor of Science in Marine Engineering CURRICULUM MAPPING Annex A of CMO No. 67, s. Revision No: 00

Revision Date: 00

Competence Index	COMPETENCE	KUP Index	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1 A	Auto 2	Maint	EWK 1	EWK 2	Nav Arch	E Mai
		KUP7	The interpretation of piping, hydraulic and pneumatic diagrams	-	_								
A-III/2	Function 3 Maintenance ar	id repair	at the management level	I SECOND				3.1		11 33			
C1	Manage safe and effective		Theoretical knowledge: Marine engineering practice						X			200	-
	maintenance and repair	KUP2	Practical knowledge						х				
	procedures	.1	Manage safe and effective maintenance and repair procedures						×				2007000
		.2	Planning maintenance, including statutory and class verifications				I		х				-
		.3	Planning repairs						X				
C2	Detect and identify the cause	KUP1	Practical knowledge						X	X	· —		X
	of machinery malfunctions and correct faults	The second secon	Detection of machinery malfunction, location of faults and action to prevent damage						х	×			II.
		.2	Inspection and adjustment of equipment					· · · · -	х		553W		
		.3	Non-destructive examination		_				x		100000		×
C3	Ensure safe working practices	KUP1	Practical knowledge: Safe working practices						x				
A-III/5		nd repair	at the operational level (able seafarer)					120.5				nu Palse	
04													
C1	Contribute to the operation of equipment and machinery	KUP1	Safe operation of equipment, including: - hoists and lifting equipment						x				
C1									X				
	equipment and machinery	KUP2	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals						X				
A-III/1	equipment and machinery Function 4 Controlling the	KUP2	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level						X				
	Function 4 Controlling the Ensure compliance with	KUP2 operation	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment						×				
A-III/1	equipment and machinery Function 4 Controlling the	KUP2 operation KUP1 .1	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment						X				
A-III/1	Function 4 Controlling the Ensure compliance with pollution prevention	KUP2 operation KUP1 .1	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment						x				
A-III/1	Function 4 Controlling the Ensure compliance with pollution prevention	KUP2 operation KUP1 .1	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment						x				
A-III/1	Function 4 Controlling the Ensure compliance with pollution prevention	KUP2 operation KUP1 .1 .2 .3	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO)						X			x	
A-III/1 C1	Function 4 Controlling the Ensure compliance with pollution prevention requirements	KUP2 operation KUP1 .1 .2 .3	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35)						x			×	
A-III/1 C1	Function 4 Controlling the Ensure compliance with pollution prevention requirements Maintain seaworthiness of the	KUP2 operation KUP1 .1 .2 .3 KUP 1 .1	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35) Ship stability Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment Understanding of the fundamentals of watertight integrity						x				
A-III/1 C1	Function 4 Controlling the Ensure compliance with pollution prevention requirements Maintain seaworthiness of the	KUP2 operation KUP1 .1 .2 .3 KUP 1 .1	- hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35) Ship stability Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment						x			×	





Bachelor of Science in Marine Engineering 2017 CURRICULUM MAPPING Annex A of CMO No. 67, s. 2017 Revision No. 00

Competence	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1	Auto 2	Maint	EWK 1	EWK 2	Nav Arch	Е Ма
C3	Prevent, control and fight fires on board (model course 2,03)												
C4	Operate life-saving appliances (model course 1.23)			_	_				_				
C5	Apply medical first aid on board ship (model course 1.14)			_								_	
C6	Monitor compliance with legislative requirements	KUP1	Basic working knowledge of the relevant IMO conventions concerning safety of tife at sea, security and protection of the marine environment										
C7	Application of leadership and teamworking skills (model course 1.39)	.3 .4 .5 KUP2	Knowledge and ability to apply effective resource management: allocation, assignment and prioritization of resources effective communication on board and ashore decisions reflect consideration of team experiences assertiveness and leadership, including motivation obtaining and maintaining situational awareness Knowledge and ability to apply decision-making techniques: situation and risk management							×	x x x x x x x x x x x x x x x x x x x		
		.2	identify and consider generated options selecting course of action evaluation of outcome effectiveness								x x x		
C8	Contribute to the safety of personnel and ship (model courses 1.39)											_	
A-111/2	Function 4 Controlling the	operatio	on of the ship and care for persons on board at the management level		V C TO	23 E20		1					Total Control
C1	Control trim, stability and stress	KUP1	Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability									х	
			Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and counter measures to be taken									×	
00	IV-site results	KUP3	Knowledge of IMO recommendations concerning ship stability								<u> </u>	x	<u></u>
C2	Monitor and control compliance with legislative	KUP1	Knowledge of relevant international maritime law embodied in international agreements and conventions					1 1		I	1		1





Bachelor of Science in Marine Engineering CURRICULUM MAPPING Annex A of CMO No. 67, s. 2017 Revision No: 00

Revision Date: 00

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1	Auto 2	Maint	EWK 1	EWK 2	Nav Arch	E Ma
	measures to ensure safety of	KUP 2	Regard shall be paid especially to the following:							ned	2000	mile areas and	NOTE OF
	life at sea and protection of the marine environment	.1	certificates and other documents required to be carried on board ships by International conventions, how they may be obtained and their period of validity										
		.2	responsibilities under the relevant requirements of the International Convention on Load Lines					[_				
		.5	maritime declarations of health and the requirements of the International Health Regulations										
		.6	responsibilities under International instruments affecting the safety of the ship, passengers, craw and cargo		•							Se - 17 1 1 1	
		.8	national legislation for implementing international agreements and conventions										
C3	operational condition of life- saving, fire-fighting and other	KUP1	Thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea)							\Box	T		
			Organization of fire and abandon ship drills										
			Maintenance of operational condition of life-saving, fire-fighting and other safety systems										
		KUP4	Actions to be taken to protect and safeguard all persons on board in emergencies										
		KUP5	Actions to limit damage and salve the ship following a fire, explosion, collision or grounding										
C4	Develop emergency and damage control plans and	KUP 1	Ship construction, including damage control									×	
C5	managerial skill	KUP1	Knowledge of shipboard personnel management training										
		KUP2	A knowledge of related international maritime conventions and recommendations, and national legislation										
		KUP3	Ability to apply task and workload management inluding:				 	$\overline{}_{T}$			$\overline{}$		_
		.1	planning aand coordination										
		.2	personnel assignment										
		.3	time and resource constraints								_	_	-
		.4	prioritization		_					<u></u>			
			Knowledge and ability to apply effective resource management				[
			allocation, assignment, and prioritization of resources										
		.2	effective communication on board and ashore							-	-		_
		.3	decisions reflect consideration of team experience assertiveness and leadership inlouding motivation				 	∤		├	\rightarrow		
			obtaining and maintaining situation awareness	-						+		-	-
	Marine Section Section 1997 And Section 1997 And	10	The state of the s										





Bachelor of Science In Marine Engineering CURRICULUM MAPPING Annex A of CMO No. 67, s. 2017 Revision No: 00

Compatence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	PPD	PPS	PASGT	Auto 1	Auto 2	Maint	EWK 1	EWK 2	Nav Arch	E Mat
		.1	situation and risk assessment		-					1 1			
		.2	identify and generate options		====								
		.3	select course of action		25-10								
		.4	evaluation of outcome effectiveness		-								
		KUP6	Development, implementation, and oversight of standard operating procedures				Π					_	

Competences from Table A-III/1 OIC Engineering Watch
Competences from Table A-III/2 Management Level Engine
Competences from Table A-III/5 Able Seafarer Engine
Reinforces the theories discussed in Thermodynamics





Bachelor of Science in Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 00 **CURRICULUM MAPPING**

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	Ind Chem	Mech	вт	ICT	Mar Env Ma	ar Law Mgmi	Mgmt 2
A-III/1	Function 1 Marine engines	ering at ti	he operational level									
C1	Maintain a safe engineering watch	KUP1	Thorough knowledge of principles to be observed in keeping a marine engineering watch including:									
		.1	duties associated with taking over and accepting a watch			1 — —						
		.2	routine duties undertaken during a watch									
		.3	maintenance of the machinery space logs and the significance of the readings taken									
		.4	duties associated with handing over a watch									
			Safety and emergency procedures, change over of remote/automatic to local control systems									
		KUP3	Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil systems									
			Knowledge of engine-room resource management principles including:									
			allocation, assignment and prioritization of resources									
			effective communication									1
			assertiveness and leadership									
			obtaining and maintaining situational awareness									
		.5	consideration of team experience			 		<u> </u>	ļ			
C2	Use English in written and oral form	KUP1	Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties									
C3	Use internal communication systems	KUP1	Operation of all internal communication systems on board					-				
C4	Use internal communication systems	KUP1	Basic construction and operation principles of machinery systems, including:									
	control systems	.1	main diesel engine					_				
		.2	marine steam turbine									empet to the
		.3	marine gas turbine									
			marine steam boiler		VICE CH							
			shafting installations and propeller									
			other auxiliaries							1		
			various pumps				Parameter States					
			air compressor							- V		
			purifier							-		
			fresh water generator					0000				_
			heat exchanger									
		.6.f	refrigeration			V200-V2518-2178-2			11 112		11111	3-1-1-1-1





Bachelor of Science in Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 80 Revision Date: 00

Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	Ind Chem	Mech	8T	ICT	Mar Env	Mar Law	Mgmt 1	Mgmt
			air-conditioning and					-			The state of the s		
			ventilations system									1	
			steering gear										
		.8	automatic control systems										
			fluid flow and characteristics of of lubricating oil, fuel oil and cooling oil			х							
		.10	deck machinery								·		
			Safety and emergency procedures for operation of propulsion plant machinery including control systems		_		·						
			Preparation, operation, fault detection and necessary measures to prevent damage for the following machinery items and control systems:										
			Main engine and associated auxiliaries	.32						100	144		L_{-}
			Steam bollers and associated auxiliaries and steam systems										
			Auxiliary prime movers and associated systems	1000				22					
		.4	Other auxiliaries, including refrigeration, air-conditioning and ventilation systems										
C5	Operate fuel, lubrication, ballast and other pumping	KUP1	Operational characteristics of pumps and piping systems, including control systems									-	
	systems and associated control systems	KUP2	Operation of the following pumping systems:						\vdash	-			
	Control systems	.1	Routine pumping operations										-
		.2	Operation of bilge, ballast and cargo pumping systems										_
		KUP3	Oily-water separators (or similar equipment) requirements and operation						$\overline{}$				\equiv
A-111/2	Function 1 Marine enginee	ning at th	e management level		CELLII.		H		46.7		mint see		7
C1	Manage the operation of propulsion plant machinery	KUP1	Design features and operative mechanism of the following machinery and associated auxiliaries:										
		.1	marine diesel engine	2						000	-12		
			marine steam turbine*									_	
		.3	marine gas turbine*						1				
		.4	marine steam boiler			-	-						
102	Plan and schedule operations	KUP1	Theoretical knowledge	X			X						
			Thermodynamics and heal transmission			 							\vdash
			Mechanics and hydromechanics		-		X	1.00	\vdash			-	+-
			Propulsive characteristics of:			-	- ^		-	Name of Street			-
	No. of the last of		diesel engines including speed, output and fuel consumption						\vdash			manage 1. A	4-





Bachelor of Science in Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 00 **CURRICULUM MAPPING**

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	Ind Chem	Mech	вт	ICT	Mar Env	Mar Law	Mgmt 1	Mgmt 2
		.3.b		x									
			steam boiler including speed (pressure), output (temperature) and fuel consumption					_	\vdash				
		.3.0	gas turbines including speed, output and fuel consumption	Х		 							
			Heat cycle, thermal efficiency and heat balance of the following:	X	 	 							
			marine diesel engine	×					_				
	왜 별되면서 제공들로 받을 것		marine steam turbine	X		 			╃				_
	유민들은 사람들은 다른 그들은 그래?		marine gas turbine	×	Garden Company								
			marine steam boiler	X				200					\vdash
		.5	Refrigerators and refrigeration cycle	ļ		 		<u> </u>	↓_ _		ļ		\vdash
		.6	Physical and chemical properties of fuels and lubricants			X			—		├ ——		
		.7	Technology of materials	ļ	_	-			 				\vdash
		.8	Naval Architecture and ship construction, including damage control	Name of the last					\vdash			_	<u> </u>
		KUP2	Practical knowledge		Τ	т		Γ	+-				Г.
		.1	Start up and shut down main propulsion and auxiliary machinery, including associated systems										
		.2	Operating limits of propulsion plant										
		.3	The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery				j						
			Functions and mechanism of automatic control for main engine				×						
		.5	Functions and mechanism of automatic control for auxiliary machinery including but not limited to:										
		.5.a	generator distribution systems	Zerri e digene	_	1							
			steam boilers	77.2	_								
			oil purifier		- 300	200 M							
		.5.d	refrigeration system	Ï	11975							<u>'</u>	
	세 선생님은 [미국] 전상을 보였다.		pumping and piping systems					T	T				
		.5.f	steering gear system					730					
			cargo handling equipment and deck machinery										
C3	Operation, surveillance,	KUP1	The environt turn do do	T x	_	Т-	X		Т	I	Τ — —		
	performance assessment and		Theoretical knowledge			 			-	<u> </u>	 		-
	maintaining safety of	-1	Thermodynamics and heat transmission	X	ļ. <u> </u>				 				├
	propulsion plant and auxillary	.2	Mechanics and hydromechanics	ļ		 	<u>x</u>		-	<u> </u>			—
	machinery	.0	Propulsive characteristics of:	×	 -				+				—
		.3.a	diesel engines including speed, output and fuel consumption	x					 - -				
		.3.0	steam boiler including speed (pressure), output (temperature) and fuel consumption	×									





Bachelor of Science in Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 00 **CURRICULUM MAPPING**

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	Ind Chem	Mech	вт	ICT	Mar Env	Mar Law	Mgmt 1	Mgmt
		.3.6	gas turbines including speed, output and fuel consumption	x									
		.4	Heat cycle, thermal efficiency and heat balance of the following:	X									
		.4.a	marine diesel engine	X				_					
		.4.b	marine steam turbine	x									-
		.4.c	marine gas turbine	×									
			marine steam boiler	X	_			Ļ					
		.5	Refrigerators and refrigeration cycle										
		.6	Physical and chemical properties of fuels and lubricants			х	- 1	ESSE					
		.7	Technology of materials	182 110									\Box
		.8	Naval Architecture and ship constrcution, including damage control										
		KUIDO	Practical knowledge		_				├	 			
		.1	Start up and shut down main propulsion and auxiliary machinery, including associated systems										
			Operating limits of propulsion plant	-		$\overline{}$							
		.3	The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery									_	
		.4	Functions and mechanism of automatic control for main engine	 						 			
			Functions and mechanism of automatic control for auxiliary machinery including but not limited to:										
		.5.a	generator distribution systems	_		1 1							
		,5,b	steam boilers	-	_	 			-				
			oil purifler						1				
		.5.d	refrigeration system										
		.5.e	pumping and piping systems										
		.5.f	steering gear system			$ldsymbol{ldsymbol{\sqcup}}$							
			cargo handling equipment and deck machinery						<u> </u>				<u> </u>
	lanage fuel, lubrication and allast operations	KUP1	Operation and maintenance of machinery, including pumps and piping systems										
		tronic an	d control engineering at the operational level					30 - 30 - 40 11 11					
c	lectrical, electronic and ontrol engineering at the		Basic configuration and operation principles of the following electrical, electronic and control equipment:										
0	perational level		Electrical equipment: generator and distribution systems	ļ						-			
N - R - A		1 1 1	preparing, starting, paralleling and changing over generators						-	-		<u> </u>	
		1.0	electrical motors including starting methodologies	 				-		 			-
		.1.0	high-voltage installations	190.00								L	





Bachelor of Science in Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 00 **CURRICULUM MAPPING**

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	Ind Chem	Mech	ВТ	ICT	Mar Env	Mar Law	Mgmt 1	Mgmt
		.1.e	sequential control circuits and associated system devices										
	The state of the s	.2	Electronic equipment:		-	3500 310 300		- 55	2.00	100			-
			characteristics of basic electronic circuit elements										
			flowchart for automatic and control systems						<u></u>				
		.2.0	functions, characteristics and features of control systems for machinery items, including main propulsion plant operation control and steam boiler automatic controls										
		.3	Control systems					Γ –					
			various automatic control methodologies and characteristics										
		.3.b	Proportional-integral-Derivative (PID) control characteristics and associated system devices for process control										
C2	Maintenance and repair of electrical and electronic equipment		Safety requirements for working on shipboard electrical systems, including the safe isolation of electrical equipment required before personnel are permitted to work on such equipment										
		KUP2	Maintenance and repair of electrical system equipment, switchboards, electric motors, generators and DC electrical systems and equipment										
		KUP3	Detection of electric malfunction, location of faults and measures to prevent damage				_					[
		KUP4	Construction and operation of electrical testing and measuring equipment			-		$\overline{}$	 	100			\vdash
		the second secon	Function and performance tests of the following equipment and their configuration:										
		.1	Monitoring systems		50.00	1.							
			Automatic control devices										
			Protective devices										
		KUP6	The interpretation of electrical and simple electronic diagrams			ليسا			1	<u> </u>			
A-III/2	Function 2 Electrical, elec-	tronic an	d control engineering at the management level			E DI DI DI				2000			4
C1	Manage operation of electrical		Theoretical knowledge										
	and electronic control		Marine electrotechnology								_		
	equipment		Electronics and power electronics						\top			Γ	
		.1.c	Automatic control engineering			1		= ====					
			Safety devices										
			Design features and system configurations of automatic control equipment and safety devices for the following:		_			_					
			main engine	100									
		.2.b	generator and distribution system							-			
		-	steam boiler			 		1	+-	+		 	





Bachelor of Science in Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 00 **CURRICULUM MAPPING**

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	Ind Chem	Mech	ВТ	ICT	Mar Env	Mar Law	Mgmt 1	Mgmt :
		.3	Design features and system configurations of operational control equipment for										
	: [2] [25일] (22일 1572) (5.2		electrical motors							_			<u> </u>
		.4	Design features of high-voltage installations	_									
		.5	Features of hydraulic and pneumatic control equipment				Х						
C2	Manage troubleshooting	KUP1	Practical knowledge			T							
	restoration of electrical and	.1	Troubleshooting of electrical and electronic control equipment										
	electronic control equipment to	.2	Function test of electrical, electronic control equipment and safety devices										
	operating condition	.3	Troubleshooting of monitoring systems										
		.4	Software version control				_						
A-111/6	Function 1 Electrical, elect	ronic ar	nd control engineering at the operational level										
C5		KUP1	Understanding of:	_		П			х				
3.5	computer networks on ships	.1.2	main features of data processing				_	_	х				
		,1,3	construction and use of computer networks on ships						х				
		.1,4	bridge-based, engine-room based and commercial computer use						х				
A 101/4	Constitut 2 Maintenance of				_					-		-	4
A-111/1	Function 3 Maintenance an												
C 1	Appropriate use of hand tools, machine tools and measuring	KUPI	Characteristics and limitations of materials used in construction and repair of ships and equipment										
	instruments for fabrication and repair on board	KUP2	Characteristics and limitations of processes used for fabrication and repair			3							
		KUP3	Properties and parameters considered in the fabrication and repair of systems and components										
		KUP4	Methods for carrying out safe emergency/temporary repairs										
		KUP5	Safety measures to be taken to ensure a safe working environment and for using hand tools, machine tools and measuring instruments										
		KUP6	Use of hand tools, machine tools and measuring instruments	 		+				_	 	_	
		KUP7	Use of various types of sealants and packings				_						
C2	Maintenance and repair of	KUP1	Safety measures to be taken for repair and maintenance including the safe isolation		-								
	shipboard machinery and		of shipboard machinery and equipment required before personnel are permitted to										
	equipment		work on such machinery or equipment			1 1							
		KUP2	Appropriate basic mechanical knowledge and skills	100000000000000000000000000000000000000		\vdash	_				· · ·		
		KUP3	Maintenance and repair, such as dismantling, adjustment and reassembling of machinery and equipment										
			machinery and editionient										
		KUP4				 							
		KUP4 KUP5	The use of appropriate specialized tools and measuring instruments Design characteristics and selection of materials in construction of equipment										





Bachelor of Science In Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 00 Revision Date: 00

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	Ind Chem	Mech	вт	ICT	Mar Env	Mar Law	Mgmt 1	Mgmt 2
		KUP7	The interpretation of piping, hydraulic and pneumatic diagrams		X								
A-III/2	Function 3 Maintenance ar	nd repair	at the management level							THE REAL PROPERTY.			
C1	Manage safe and effective	KUP1	Theoretical knowledge: Marine engineering practice										
		KUP2	Practical knowledge	-									
	procedures	.1	Manage safe and effective maintenance and repair procedures		J	T —							
		.2	Planning maintenance, including statutory and class verifications		y				2				
		.3_	Planning repairs										
C2	Detect and identify the cause	KUP1	Practical knowledge							The state of the s			
	of machinery malfunctions and correct faults	.1	Detection of machinery malfunction, location of faults and action to prevent damage										
		.2	Inspection and adjustment of equipment										
		.3	Non-destructive examination										
C3	Ensure safe working practices	KUP1	Practical knowledge: Safe working practices										
A-III/5			at the operational level (able seafarer)									領地画	
A-III/5 C1	Contribute to the operation of		Safe operation of equipment, including:										
	Contribute to the operation of equipment and machinery	KUP1	Safe operation of equipment, including: - hoists and lifting equipment										
	Contribute to the operation of equipment and machinery	KUP1	Safe operation of equipment, including:										
	Contribute to the operation of equipment and machinery	KUP1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals										
C1	Contribute to the operation of equipment and machinery	KUP1 KUP2 operation	Safe operation of equipment, including: - hoists and lifting equipment							X			
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the	KUP1 COPERATE KUP1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment							×			
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention	KUP1 KUP2 operation KUP1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment										
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention	KUP1 COPERATE KUP1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment							Х			
C1 A-III/1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention	KUP1 KUP2 operation KUP1 .1 .2 .3	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO)							X			
A-HI/1 C1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention requirements	KUP1 KUP2 operation KUP1 .1 .2 .3	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35) Ship stability Working knowledge and application of stability, trim and stress tables, diagrams and							X			
A-HI/1 C1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention requirements Maintain seaworthiness of the	KUP1 KUP2 operatio KUP1 .1 .2 .3 KUP 1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35)							X			
A-HI/1 C1	Contribute to the operation of equipment and machinery Function 4 Controlling the Ensure compliance with pollution prevention requirements Maintain seaworthiness of the	KUP1 KUP2 operatio KUP1 .1 .2 .3 KUP 1 .1	Safe operation of equipment, including: - hoists and lifting equipment Ability to use and understand basic crane, winch and hoist signals on of the ship and care for persons on board at the operational level Prevention of pollution of the marine environment Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment Importance of proactive measurers to protect the marine environment (Including IMO Model course 1KUP35) Ship stability Working knowledge and application of stability, frim and stress tables, diagrams and stress-calculating equipment							X			





Bachelor of Science in Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 00 **CURRICULUM MAPPING**

Competence Index	COMPETENCE	KUP	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	Ind Chem	Mech	вт	ICT	Mar Env	Mar Law	Mgmt 1	Mgmt 2
C3	Prevent, control and fight fires on board (model course 2.03)							×					
C4	Operate life-saving appliances (model course 1.23)				_			х					
C5	Apply medical first aid on board ship (model course 1.14)							х					
C6	Monitor compliance with legislative requirements	KUP1	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment								Х		х
C7	Application of leadership and teamworking skills (model course 1.39)	.1 .2 .3 .4 .5 KUP2 .1 .2	Knowledge and ability to apply effective resource management; allocation, assignment and prioritization of resources effective communication on board and ashore decisions reflect consideration of team experiences assertiveness and leadership, including motivation obtaining and maintaining situational awareness Knowledge and ability to apply decision-making techniques: situation and risk management identify and consider generated options selecting course of action									X	
C8	Contribute to the safety of personnel and ship (model courses 1.39)	.4	evaluation of outcome effectiveness				-	x				<u> </u>	
A-III/2	Function 4 Controlling the	operatio	on of the ship and care for persons on board at the management level					1000				BI ST	
C1		KUP1	Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability										
		KUP2	Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and counter measures to be taken				_						
		KUP3	Knowledge of IMO recommendations concerning ship stability										
C2	Monitor and control compliance with legislative	KUP1	Knowledge of relevant international maritime law embodied in international agreements and conventions							х	Х		





Bachelor of Science in Marine Engineering Annex A of CMO No. 67, s. 2017 Revision No: 00 **CURRICULUM MAPPING**

Competence Index	COMPETENCE	KUP Index	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw	ind Chem	Mech	ВТ	ICT	Mar Env M	Mar Law	Mgmt 1	Mgmt
	measures to ensure safety of	KUP 2	Regard shall be paid especially to the following:								X		
	life at sea and protection of the marine environment	.1	certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and their period of validity					S. S.			x		
		.2	responsibilities under the relevant requirements of the International Convention on Load Lines								x		
		.5	maritime declarations of health and the requirements of the International Health Regulations								x		
		.6	responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo								x		
		.B	national legislation for implementing international agreements and conventions						!		×	<u> </u>	<u>L.</u>
C3	Maintain safety and security of the ship's crew and	KUP1	Thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea)									х	
	passengers and the		Organization of fire and abandon ship drills					Χ					
	operational condition of life- saving, fire-fighting and other		Maintenance of operational condition of life-saving, fire-lighting and other safety systems										<u> </u>
	safety systems	KUP4	Actions to be taken to protect and safeguard all persons on board in emergencies			8							
		KUP5	Actions to limit damage and salve the ship following a fire, explosion, collision or grounding										
C4	Develop emergency and damage control plans and	KUP 1	Ship construction, including damage control							·]			
C5		KUP1	Knowledge of shipboard personnel management training									Х	
	managerial skill	KUP2	A knowledge of related international maritime conventions and recommendations, and national legislation	0.								X	
		KUP3	Ability to apply task and workload management inluding:									X	
		.1	planning aand coordination						_	1		X	
		.2	personnel assignment time and resource constraints			-			+			X	
		.4	prioritization									x	<u> </u>
		KUP4	Knowledge and ability to apply effective resource management						1	 		Х	Г
		.1	allocation, assignment, and prioritization of resources									х	
		.2	effective communication on board and ashore									×	Ļ _
		.3	decisions reflect consideration of team experience					-	1			X	
		.5	assertiveness and leadership inlouding motivation obtaining and maintaining situation awareness		-			_	-	+		x	-
	THE RESERVE OF THE PARTY OF THE	10	obtaining and manifeming struction awareness							+			=





Bachelor of Science in Marine Engineering CURRICULUM MAPPING Annex A of CMO No. 67, s. 2017 Revision No: 00 Revision Date: 00

Competence Index	COMPETENCE	KUP Index	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	Thermo	Draw In	d Chem	Mech	ВТ	ICT Mar E	v Mar Law	Mgmt Mgmt
	Real Real Base II	.1	situation and risk assessment								×
		.2	identify and generate options								×
		.3	select course of action								x
		.4	evaluation of outcome effectiveness								x
		KUP6	Development, implementation, and oversight of standard operating procedures	T							×

Competences from Table A-III/1 OIC Engineering Watch	
Competences from Table A-III/2 Management Level Engine	
Competences from Table A-III/5 Able Seafarer Engine	
Reinforces the theories discussed in Thermodynamics	





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS BASIC CONTROL ENGINEERING

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	1	Auto 1	Auto 1						
Course Descriptive Title	ā	Basic Co	ntrol Engineering		Prerequisite	1	Electro 2 Mech		
Course Credit	12	4 Units	Lecture Contact Hours per Week	:	3 Hours	Laboratory Contact Hours per Week	15	3 Hours	
Competence/s		A-III/2.F1 A-III/1.F2 A-III/1.F2 A-III/2.F2	.C2: Plan and schedule of .C1: Operate electrical, ef .C2: Maintenance and re .C1: Manage operation of .C1: Manage operat	peration lectroric pair of f electi	ons nic and contr electrical an rical and elec			nent to	
KUP		A-III/2.F1	control systems C2.KUP5: Practical known machinery including: .5.b steam boil .5.c oil purifier .5.d refrigeration .5.e pumping a .5.f steering government.	ers on syst and pip ear sys dling e	of the functi em ing systems stem quipment an on and oper	on principles of machinery systems and mechanism of automated deck machinery ation principles of electronics e	atic cont	rol for auxiliar	





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS BASIC CONTROL ENGINEERING

Annex C of CMO No. 67, S. 2017

	A-III/1.F2.C1.KUP1.3.: Basic configuration and operation principles of control equipment: 3.a various automatic control methodologies and characteristics
	3.b Proportional-Integral-Derivative (PID) control characteristics and associated system devices for process control
	A-III/1.F2.C2.KUP5: Function and performance tests of the following equipment and their configuration:
	.2 automatic control devices
	.3 protective devices
	A-III/1.F2.C2.KUP6: The interpretation of electrical and simple electronic diagrams
	A-III/2.F2.C1.KUP1.1.c: Theoretical knowledge of automatic control engineering
	A-III/2.F2.C1.KUP1.5: Theoretical knowledge of the features of hydraulic and pneumatic control
	equipment
	A-III/2.F2.C2.KUP1: Practical knowledge on:
	.1 Troubleshooting of electrical and electronic control equipment
	.2 Function test of electrical, electronic control equipment and safety devices
	.3 Troubleshooting of monitoring systems
	.4 Software version control
Course Outcome	: CO1: Differentiate basic construction and principles in automation regarding various measuring instruments and automation devices used onboard ships.
	CO2: Interpret process and instrument diagrams of automation system based on the industry standards
	CO3: Demonstrate performance test in accordance with the manufacturers standards for the: Monitoring systems; Automatic control devices; and Protective devices
Reference/s	 Table A-III/1 Function 2: Electrical, electronic and control engineering at the operational level Annex A CMO No.67 series of 2017: Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MARINE AUTOMATION

Annex C of CMO No. 67, S. 2017

Course Code	1	Auto 2	Auto 2							
Course Descriptive Title		Marine A	utomation		Prerequisite	:	Auto 1			
Course Credit		4 Units	Lecture Contact Hours per Week	1	3 Hours	Laboratory Contact Hours per Week	1	3 Hours		
Competence/s A-III/1.F2.C1: Operate electrical, electronic and control systems A-III/1.F1.C4: Operate main and auxiliary machinery and associated control system A-III/2.F1.C2: Plan and schedule operations A-III/2.F1.C3: Operation, surveillance, performance assessment and maintaining s and auxiliary machinery A-III/2.F2.C1: Manage operation of electrical and electronic control equipment A-III/2.F2.C2: Manage troubleshooting, restoration of electrical and electronic control operating condition						ifety of p				
KUP		A-III/2.F2 A-III/I.F1. A-III/2.F1	equipment .C2.KUP1.4: Practical kr C4.KUP1.8: Basic constructions systems on board .C2 and C3.KUP2.4: Pra for main engine .C3.KUP2.5.c: Functions boilers C1.KUP1.2.c: Basic confunctions and fe	nowledg ruction a actical ki and ma figuration	e on software and operation owledge of echanism of and operation of control sys	shooting of electrical and electrical eversion control on principles of automatic control the functions and mechanism automatic control for auxiliary tion principles of the electronic stems for machinery items, incream boiler automatic controls	ol in mad of autom machine	chinery ratic control ry of steam		





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MARINE AUTOMATION

Annex C of CMO No. 67, S. 2017

	A-III/2.F2.C1.KUP1.1.c: Theoretical knowledge on automatic control engineering A-III/2.F2.C1.KUP1.2: Practical knowledge of the design features and system configuration of automatic control equipment and safety devices for main engine, generator and distribution system and steam boiler
Course Outcome	CO1: Construct and operate a pneumatic control circuit for a specific application CO2: Differentiate programmable logic control (PLC) from distributed control system (DCS) and supervisory control and data acquisition (SCADA) based on their design and applications CO3: Design a simple process control system for a heat exchanger using a temperature sensor, a PID controller and a final control valve CO4: Analyze a given diagram of the main engine remote control system, generator and distribution power management system and steam boiler control system in order to develop a simple troubleshooting chart
Reference/s	 Table A-III/1 Function I: Operate Main and Auxiliary Machinery and Associated Control Systems Table A-III/1 Function 2: Maintenance and repair of electrical and electronic equipment Table A-III/2 Function 2: Manage operation of electrical and electronic control equipment Table A-III/1 Function 3: Maintenance and repair of shipboard machinery and equipment Annex A of CMO No. 67, S. 2017: Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS AUXILIARY MACHINERY 1

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	:	Aux Mach 1								
Course Descriptive Title	:	Auxiliary Machinery 1				Prerequisite	:	Thermo Mech		
Course Credits		6 Units	Lecture Contact Hours per Week	:	5 hours	Laboratory Contact Hours per Week	:	3 hours		
Competence/s	3	A-III/1.F1.C5 Operate A-III/2.F1.C2 Plan and A-III/2.F1.C3 Operation and auxil	III/1.F1.C4 Operate main and auxiliary machinery and associated control systems III/1.F1.C5 Operate fuel, lubrication, ballast and other pumping systems and associated control systems III/2.F1.C2 Plan and schedule operations III/2.F1.C3 Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery III/2.F1.C4 Manage fuel, lubrication and ballast operations							
KUP		pumps:(g compress A-III/1.F1.C4.KUP1.10 machiner A-III/1.F1.C4.KUP3: Pr machiner auxiliary A-III/1.F1.C5.KUP1: Of A-III/1.F1.C5.KUP2: Of pumping A-III/1.F1.C5.KUP3: Of A-III/2.F1.C2 and C3. k	Basic construction and oper party cor, (.c) fresh water generated Basic construction and oper Basic construction, fault of the Basic construction, fault of the Basic construction, fault of the Basic construction, operation, fault of the Basic construction of control systems by the Basic construction of continuous for similar than the Basic construction and shut of the Basic construction and operation and	or, va or, (. erati win letect s (as pun ope	ne pump, d) heat ex on principl ch and wir ction and n ssociated a nps and pi rations an	screw pump, reciprocating changer es of machinery systems adlass eccessary measures to preduxiliaries of main engine, pring systems, including cold operation of bilge, ballast requirements and operations.	on deven	mp), (.b) air leck at damage for am boiler, and al systems ad cargo		





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS AUXILIARY MACHINERY 1

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

		A-III/2.F1.C2 and C3. KUP 2.2: Operating limits of propulsion limits A-III/2.F1.C2 and C3. KUP 2.3: The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery. A-III/2.F1.C2 and C3.KUP2.5: Practical knowledge of the functions and mechanism of automatic control cargo-handling equipment and deck machinery A-III/2.F1.C4.KUP1: Operation and maintenance of machinery including pumps and piping systems
Course Outcome	*	CO.1. Operate, maintain and troubleshoot the following auxiliary machineries in accordance with its manufacturer's specification: 1. Various pumps (gear, centrifugal, vane, screw, reciprocating) 2. Air compressor 3. Fresh water generator 4. Heat exchanger 5. Deck machinery such as crane, mooring winch and windlass CO2. Operate ballast and pumping system according to ship's piping system configuration CO3. Operate oily-water separator according to manufacturer's specifications CO4. Troubleshoot the faults on automatic control of cargo-handling equipment and deck machinery such as crane, mooring winch and windlass
Reference/s	·	 Table A-III/1 and Table A-III/2 Function: Marine Engineering STCW'78 as amended Annex A of CMO No. 67, S. 2017: Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS AUXILIARY MACHINERY 2

Annex C of CMO No. 67, S. 2017

Course Code	:	Aux Mach 2								
Course Descriptive Title	:	Auxiliary Machinery 2				Prerequisite	1	Aux Mach 1		
Course Credit	:	5 Units	Lecture Contact Hours per Week	:	4 Hours	Laboratory Contact Hours per Week	3	3 Hours		
Competence/s	:	A-III/2.F1	II/1.F1.C4 Operate main and auxiliary machinery and associated control system II/2.F1.C2 Plan and schedule operation II/2.F1.C3 Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machineries							
KUP	:	A-III/1.F1 A-III/1.F1 A-III/2.F1	purifiers, (.b) refrigerat .C4.KUP1.7: Basic constru .C4.KUP3.4: Preparation, of of purifiers, refrigeratio .C2 and C3.KUP1.5:Theore .C2 and C3.KUP2.5: Practi	tion, ction opera on, a etica cal k	(.c)air-condit and operation ation, fault de ir-conditionin I knowledge anowledge of	on principles of machinery systeming systems and (.d) ventilation principles of steering gear effection and necessary measure grand ventilation systems of refrigerators and refrigeration the functions and mechanismems and (.f) steering gear systemis	res to pon cycles	/stem revent damage s		
Course Outcome	:	CO2: Ope	CO1: Operate and troubleshoot purifier systems using manufacturers manual CO2: Operate and troubleshoot refrigeration systems using manufacturers manual CO3: Operate and troubleshoot steering gear systems using manufacturers manual							
Reference/s	 Table A-III/1 F1- Marine engineering at operational level Table A-III/2 F1- Marine engineering at Management level Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs 									





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MARITIME DRAWING AND DIAGRAMS

Annex C of CMO No. 67, S. 2017

Course Code	:	Draw	Draw								
Course Descriptive Title	:	Maritime Drawing and D	iagrams			Prerequisite	1:	None			
Course Credits	:	1 Unit	1 Unit Lecture Contact : Hours per Week			Laboratory Contact Hours per Week	:	3 hours			
Competence/s	:	A-III/1.F3.C2: Maintenan	3.C2: Maintenance and repair of shipboard machinery and equipment								
KUP			rpretation of Machinery Dra interpretation of piping, hyd								
Course Outcome	:	CO2: Interpret engineeri be requested for n CO3: Interpret the follow a. Seawater coolin b. Freshwater cool c. Fuel oil system d. Lubricating oil se. Exhaust gas syf. Main engine and g. General seawah. Service air systi. Starting air systi. CO4: Interpret the drawin	ng system bling system system stem ad Generator engine fuel oil ter service and ballast syste em	purif em	ication sys	nery manual to identify cortem	mpon	ents that wil			
Reference/s	:	1. Table A-III/1 Functio	n 3: Maintenance and Repa	ir							





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS ENGINEERING MATERIALS

Annex C of CMO No. 67, S. 2017

Course Code	:	E Mat	E Mat						
Course Descriptive Title	:	Engineering Materials				Prerequisite		None	
Course Credit	:	4 Units Lecture Contact : 4 Hours Hours per Week			4 Hours	Laboratory Contact Hours per Week	:	0 Hours	
Competence/s		A-III/2.F1 A-III/1.F3 A-III/1.F3 A-III/2.F3 Table A-II	and auxiliary machi C1: Appropriate use of repair on board C2: Maintenance and re C2: Detect and identify I/1 F3 - Maintenance are oppropriate use of hand to board aintenance and repair of I/2 F1 - Marine engineer and schedule operation.	nce, per nery hand to epair of the cau d repair ools, ma shipbo	ols, machine shipboard m se of machine at the operation at the operation and machine the Managen	and measuring instruments for ry and equipment	ents for f aults fabricat	abrication and	
KUP/s		A-III/I.F3.0 A-III/I.F3.0	and equipment C1.KUP2: Characteristic C1.KUP3: Properties an components	s and li d paran	mitations of patters consid	materials used in construction processes used for fabrications dered in the fabrication and report the technology of materials	3	_	





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS ENGINEERING MATERIALS

Annex C of CMO No. 67, S. 2017 Revision No: 00

	A-III/1.F3.C2.KUP5: Design characteristics and selection of materials in construction of equipment A-III/2.F3.C2.KUP1.3: Practical knowledge of the non-destructive examination
Course Outcome/s	: CO1: Differentiate various metal characteristics, properties and limitations CO2: Select appropriate materials conforming to important parameters for fabrication of typical ship-related components
Reference/s	Table A-III/1 F3 - Maintenance and repair at the operational level Table A-III/2 F1 – Marine engineering at the Management level Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS BASIC ELECTRICITY

Annex C of CMO No. 67, S. 2017

Course Code	:	Electro 1	Electro 1							
Course Descriptive Title		Basic Electricity		Prerequisite	:	None				
Course Credits		4 Units	Lecture Contact Hours per Week	:	3 hours	Laboratory Contact Hours per Week	:	3 hours		
Competence/s	1:	A-III/1.F2.C2: Maint	enance and repair of electrical	and	electronic	equipment		/		
		of elec A-III/1.F2.C2.KUP4: A-III/1.F2.C2.KUP5. protec	: Safety requirements for working ctrical equipment required before the construction and operation of the case of	re p ele ests volta	ersonnel a ctrical test of the folloge age breake	are permitted to work on so ing and measuring equiprowing equipment and their	uch onent	equipment		
Course Outcome/s	:	CO2: Assess the us CO3: Solve electrica	01: Use appropriate measuring instruments in determining electrical parameters 02: Assess the usability of the battery by determining its condition 03: Solve electrical circuit problems using relevant formula applying circuit analysis 04: Troubleshoot different basic circuit faults on various applications onboard ships							
Reference/s	:		 Table A-III/1 Function: Electrical, Electronic and Control Engineering STCW'78 as amended Annex A of CMO No. 67, S. 2017: Revised PSG for BSMT and BSMarE Programs 							





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS BASIC ELECTRONICS

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	:	Electro 2										
Course Descriptive Title	:	Basic Electronics	asic Electronics Prerequisite :									
Course Credits		3 Units	Laboratory Contact Hours per Week	:	3 hours							
Competence/s		A-III/1.F2.C2: Maintenance a A-III/2.F2.C1: Manage opera	II/1.F2.C1: Operate electrical, electronic and control systems II/1.F2.C2: Maintenance and repair of electrical and electronic equipment II/2.F2.C1: Manage operation of electrical and electronic control equipment II/2.F2.C2: Manage troubleshooting restoration of electrical and electronic control equipment to operation									
KUP/s		A-III/1 F2.C1.KUP1.2.a: Bas circuit elements A-III/2.F2.C1.KUP1: Theoret devices A-III/1.F2.C2.KUP6: The inte A-III/2 F2.C2.KUP1.1: Practi	s ical knowledge on (.1 erpretation of simple e	.b) n	narine elec	etronics, power electronics	and	(.1.d) safety				
Course Outcome/s	2	CO1: Differentiate the constructs electronics CO2: Construct a ladder diagence co3: Troubleshoot sequentiate the construct and construct a ladder diagence construct a ladder diagence construct and c	gram for a given sequ	ienc	e control c	ircuit		in power				
Reference/s	:	Table A-III/1 and Table II amended Annex A of CMO No. 67,				nd Control Engineering Si and BSMarE Programs	CW	"78 as				





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MARINE ELECTRICITY AND ELECTRICAL MAINTENANCE

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	:	Electro 3	lectro 3									
Course Descriptive Title	:	Marine Electricity and Electrical Maintenance				Prerequisite	;	Electro 1				
Course Credit	3	5 Units	Lecture Contact Hours per Week		3 Hours	Laboratory Contact Hours per Week		6 Hours				
Competence/s		A-III/1.F2. A-III/2.F1. A-III/2.F1. A-III/2.F2.	 A-III/1.F2.C1: Operate electrical, electronic and control systems A-III/1.F2.C2: Maintenance and repair of electrical and electronic equipment A-III/2.F1.C2: Plan and schedule operations A-III/2.F1.C3: Operation, surveillance, performance assessment and maintaining safety of propulsion plan and auxiliary machinery A-III/2.F2.C1: Manage operation of electrical and electronic control equipment A-III/2.F2.C2: Manage troubleshooting restoration of electrical and electronic control equipment to operating condition 									
KUP/s	٥	A-III/1.F2.	C1.KUP1.1: Basic configu1.a generator a .1.b preparing, .1.c electrical m .1.d high-voltag .1.e sequential C2.KUP1: Safety requirer isolation of electrical edequipment C2.KUP2: Maintenance a generator and DC electrical	and d startinotors e insicontrinents quipment re trical	istribution sying, paralleling including stallations of circuits and for working nent required pair of electricity systems and	g and changing over generator arting methodologies d associated system devices on shipboard electrical system before personnel are permitte ical system equipment, switcht	s, includ d to wor boards, e	k on such				





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MARINE ELECTRICITY AND ELECTRICAL MAINTENANCE

Annex C of CMO No. 67, S. 2017 Revision No: 00

	 A-III/1.F2.C2.KUP5.3: Function and performance tests of protective devices and their configuration: A-III/2.F2.C1.KUP1.1: Theoretical Knowledge on (.a) marine electrotechnology and (.d) safety devices A-III/2.F2.C1.KUP1.2.b: Design features and system configurations of automatic control equipment and safety devices for generator and distribution system A-III/2.F2.C1.KUP1.3: Design features and system configurations of operational control equipment for electrical motors A-III/2.F2.C1.KUP1.4: Design features of high voltage installations A-III/2.F2.C2.KUP1.1: Practical knowledge on troubleshooting of electrical and electronic control equipment A-III/2.F1.C2 and C3.KUP2.5a: Practical knowledge on the functions and mechanism of automatic control for auxiliary machinery of generator distribution systems
Course Outcome/s	CO1: Demonstrate paralleling and changeover of generators according to establish rules and procedures CO2: Wire and Test a direct-on-line (DOL) motor starter using a control circuit CO3: Detect malfunction and rectify fault for a given motor starter CO4: Develop a procedure in the operation of low-voltage electrical equipment and systems in accordance to operating manuals CO5: Develop a safety procedure in the operation of high-voltage installations onboard ships and offshore vessel
Reference/s	 Table A-III/1 F2 - Electrical and Electronic and Control Engineering at the operational level Table A-III/2 F2 - Electrical, Electronic and Control Engineering at the Management Level Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS ENGINE ROOM WATCH KEEPING PRINCIPLES 1

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

Course Code	:	EWK 1									
Course Descriptive Title	;	Engine F	Room Watch Keeping F	rincipl	es 1	Prerequisite	:	None			
Course Credit	:	3Units	Lecture Contact Hours per Week		3 Hours	Laboratory Contact Hours per Week	:				
Competence/s	:	A-III/1.F1 A-III/2.F3	III/1.F1.C1: Maintain a safe engineering watch III/1.F1.C3: Use internal communication systems III/2.F3.C2: Detect and identify the cause of machinery malfunctions and correct faults III/1.F4.C7: Application of leadership and team working skills (model course 1KUP39)								
KUP/s	3	A-III/1.F1 A-III/1.F1 A-III/2.F1 A-III/1.F4	watch: (.1) duties a (.2) routine duties ((.3) maintenance o (.4) duties associal .C1.KUP2: Safety and control of all syster .C1.KUP3: Safety pred be taken in the eve .C3.KUP1: Operation o .C2.KUP1.1: Practical faults and action to .C7.KUP1.2: Knowledg communication on	associal anderta for the med with emergens aution and of find for all in knowled preverse and board	ated with take aken during nachinery sp n handing or ency proced s to be obse re or accide ternal comme edge on dete nt damage ability to ap and ashore	ace logs and significance of t	ch he rea fauton ediate o oil sy on, loc	ading taken natic to local e actions to externs eation of			
Course Outcome/s	:	CO1: Der CO2: Per	monstrate proper engin form immediate actions	eering s taker	watch in the even	at of fire and other emergency	cases	3			
Reference/s	•	Chapt	A-III/1 Function 1: Mar er VIII, Part 4-2, Part 5 c A of CMO No. 67, S.	-2, Pa	rt 5-4	operational level	gram	s			





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS ENGINE WATCH KEEPING WITH ENGINE ROOM RESOURCE MANAGEMENT

Annex C of CMO No. 67, S. 2017

Course Code	:	EWK 2	EWK 2								
Course Descriptive Title	•	Engine W Managem	atch Keeping with Enginent	ne Room Resourc	ce Prerequisite	:	EWK1 MGT1				
Course Credit	1	1 Unit	Lecture Contact Hours per Week	:	Laboratory Contact Hours per Week	:	3 Hours				
Competence/s		A-III/2.F1. A-III/2.F1.	and auxiliary machine	operations nce, performance ery	e assessment and maintaining sa	A 8	propulsion pla				
KUP/s	5	A-III/1.F4. A-III/2.F1.	.1 allocation, .2 effective of .3 decisions .4 assertiven .5 obtaining a C7.KUP2: Knowledge a .1 situation .2 identify a .3 selecting .4 evaluation C2 and C3.KUP2.1: Pra auxiliary machinery, C2 and C3.KUP2.3: Pra	assignment and ommunication on reflect considerates and leadershand maintaining and ability to apply and risk manager and consider gene course of action of outcome effectical knowledge including associal actical knowledge	erated options ectiveness e of the start up and shut down ma	ain propu	erformance				





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS ENGINE WATCH KEEPING WITH ENGINE ROOM RESOURCE MANAGEMENT

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

Course Outcome/s	 CO1: Perform (conduct, Handover and relief) safe engineering watch that conforms with established procedures and standards on boardship. CO2: Monitor engineering equipment and systems according to manufactures recommendations and maintain records in conformity with the principles to be observed in keeping an engineering watch CO3: Act accordingly with safety precautions during safety and emergency procedures, change over of remote/automatic to local control of all systems CO4: Execute a plan for the operation of the main propulsion plant and machinery in conformance with engine room resource management principles
Reference/s	 Table A-III/1 Function 1: Marine engineering at operational level Table A-III/2 Function 1: Marine engineering at management level Chapter VIII, Part 4-2, Part 5-2, Part 5-4?????? Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS INDUSTRIAL CHEMISTRY AND TRIBOLOGY

Annex C of CMO No. 67, S. 2017

Course Code	:	IChem	IChem								
Course Descriptive Title	1	Industria	Industrial Chemistry and Tribology Lecture Contact Hours per Week Prerequisite Laboratory Contact Hours per Week								
Course Credit	13	3Units									
Competence/s	:		III/1.F1.C4: Operate main and auxiliary machinery and associated control systems III/2.F1.C3: Operation, surveillance, performance assessment and maintaining safety of propulsic plant and auxiliary machinery								
KUP/s		AIII/2.F1 AIII/2.F2	AIII/1.F1.C4.KUP9: Basic construction and operation principles of machinery systems, including: fluid flow and characteristics of lubrication oil, fuel oil and cooling system AIII/2.F1.C3.KUP6: Physical and chemical properties of lubricants AIII/2.F2.C3.KUP2.3: The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery								
Course Outcome/s		CO2: Diff spe CO3: Tes	ferentiate physical and ecific applications	chemic	of fuel oil, lu	ter from an engine cooling was of various fuels and lubrica ubricating oil, boiler water and.	nts acco				
Reference/s	**	 Industrial Chemistry IMO Model Course 7.04 Table A-III/2 F1: Marine Engineering at the management level CMO No. 67, Series of 2017 (PSG for AY 2018-2019) 									





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS SOFTWARE APPLICATION AND NETWORK SYSTEM USED IN SEAGOING SHIPS

Annex C of CMO No. 67, S. 2017

Course Code	•	ICT	T						
Course Descriptive Title	:		Application and Netwoing Ships	ork Sy	stem Used	Prerequisite	:		
Course Credit	:	2 Units	2 Units Lecture Contact Hours per Week : 1 hour Laboratory Contact Hours per Week						
Competence/s	:	A-III/6 F	1.C5: Operate compute	ers and	computer	networks on ships			
KUP	٠	A-III/6.F	A-III/6.F1.C5.KUP1: Understanding of: .1 Main features of data processing .2 construction and use of computer networks on ships .3 bridge-based, engine room-based and computer use						
Course Outcome	:	CO 2. Ma		orks us	ed onboard	ocuments used onboard sh ships in terms of modularity er's instructions.		kpandability	
Reference/s	:	for ele 2. Instru	 STCW 1978, as amended – Table A-III/6 - Specification of minimum standard of competer for electro-technical officers Instrument Engineers Handbook: Process Software and Digital Network, Bela G. Liptak Marine Ship manager Technical Software (any brand) 						





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS HAND AND MEASURING TOOLS

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	:	Mach 1									
Course Descriptive Title	:	Hand and Measuring	Tools			Prerequisite	1	None			
Course Credits		2 Units	Inits Lecture Contact Hours per Week : 1 hour Laboratory Contact Hours per Week : 4								
Competence/s	3	repair o	oriate use of hand tools, mach on board nance and repair of shipboard				r fab	rication and			
KUP/s		tools, m A-III/1.F3.C1.KUP6: U	Safety measures to be taken achine tools and measuring in Use of hand tools, machine to The use of appropriate special	nstr ols	uments and meas	uring instruments	d for	using hand			
Course Outcome/s	5	CO2: Demonstrate the CO3: Safely Operate CO4: Demonstrate a	easures in the use of hand to ne appropriate use of hand to power tools. ppropriate use of measuring in in the maintenance, repair ar	ols instr	ruments to	ensure precise and accu		nts			
Reference/s	:		e 1978 STCW Code as amer No. 67, S. 2017 : Revised PS			and BSMarE Programs					





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MACHINING TOOLS

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code		Mach 2	ch 2							
Course Descriptive Title	:	Machining Tools			Prerequisite	:	None Mach 1			
Course Credits	*	2 Units	Units Lecture Contact Hours per Week Co-requisite Laboratory Contact Hours per Week							
Competence/s	:	A-III/1.F3.C1: Appro	opriate use of hand tools, mad r on board	chine	tools and	I measuring instruments for	or fab	prication and		
KUP/s		A-III/1 F3.C1.KUP3 comp A-III/1.F3.C1.KUP5 meas	: Characteristics and limitation Properties and parameters conents : Use of machine tools (late nous instruments) : Use of hand tools, machine	onsio	dered in th ine, drill pr	e fabrication and repair of ress, circular cutter and pi	syst	ems and		
Course Outcome/s	ŀ	CO1: Apply safety m	neasures in the use of machin al work pieces using turning, t	e too	ols and me	easuring instruments side threading methods				
Reference/s	:		. Table A-III/1 of the 1978 STCW Code as amended . Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs							





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS GAS AND ELECTRIC WELDING

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	:	Mach 3	Mach 3							
Course Descriptive Title	ě	Gas and	Electric Welding	Prerequisite	:	Mach 1 E Mat				
Course Credit	:	2 Units	Hours per Week Hours per Week							
Competence/s	:	A-III/1.F3	A-III/1.F3.C1: Appropriate use of hand tools, machine tools and measuring instruments for fabrication and repair on board							
KUP/s	:	A-III/1.F3	A-III/1.F3.C1.KUP4: Methods for carrying out safe emergency/temporary repairs using electric arc and gas welding equipment A-III/1.F3.C1.KUP5: Safety measures to be taken to ensure a safe working environment for using electric arc and gas welding equipment A-III/1.F3.C1.KUP6: Use of hand tools, machine tools and measuring instruments							
Course Outcome/s	•	CO2: Per	 CO1: Demonstrate the appropriate use of safety and protective clothing equipment during fabricati and repairs CO2: Perform cutting, joining metals, etc., of typical ship-related components to designated tolerances and sizes using electric arc and gas welding equipment 							
Reference/s		1. Table 2. Annex	 Table A-III/1 F3 – Maintenance and repair at the operational level Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs 							





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MAINTENANCE AND REPAIR

Annex C of CMO No. 67, S. 2017

Course Code	:	Maint	Maint Maint									
Course Descriptive Title	:	Maintenance and Repair Prerequisite					Maintenance and Repair Pres				:	Aux Mach 2 PPD PPS PASGT Mach 3
Course Credit	: 3 Units Lecture Contact : 2 Hours Laboratory Cor Hours per Week : Laboratory Cor						:	3 Hours				
Competence/s	:	A-III/1.F3. A-III/2.F3. A-III/2.F3. A-III/2.F3.	A-III/2.F1.C2: Plan and schedule operations A-III/1.F3.C1: Appropriate use of hand tools, machine tools and measuring instruments for fabrication an repair on board A-III/1.F3.C2: Maintenance and repair of shipboard machinery and equipment A-III/2.F3.C1: Manage safe and effective maintenance and repair procedure A-III/2.F3.C2: Detect and identify the cause of machinery malfunctions and correct faults A-III/2.F3.C3: Ensure safe working practices A-III/5.F3.C1: Contribute to the operation of equipment and machinery									
KUP	:	A-III/2.F1. A-III/1.F3. A-III/1.F3. A-III/1.F3.	C2.KUP1.8: Theoretica damage control C1.KUP4: Methods for C1.KUP7: Use of variou C2.KUP1: Safety meas of shipboard machiner such machinery or equ C2.KUP2: Appropriate I	carrying is types ures to y and enipment	out safe em of sealants be taken for quipment rec	aval architecture and ship cons lergency/temporary repairs and packings repair and maintenance includi juired before personnel are per	ng the s	safe isolation o work on				





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MAINTENANCE AND REPAIR

Annex C of CMO No. 67, S. 2017 Revision No: 00

	machinery and equipment A-III/2.F3.C1.KUP1: Theoretical knowledge of the marine engineering practice
	A-III/2.F3.C1.KUP2: Practical knowledge on (.1) manage safe and effective maintenance and repair procedures, (.2) planning maintenance, including statutory and class verifications and (.3) planning repairs
* oc	A-III/2.F3.C2.KUP1: Practical knowledge on (.1) detection of machinery malfunction, location of faults and action to prevent damage and (.2) inspection and adjustment of equipment and (.3) non-destructive examination
	A-III/2.F3.C3.KUP1: Practical knowledge of the safe working practices
	A-III/5.F3.C1.KUP1: Safe operation of equipment of hoists and lifting equipment
	A-III/5.F3.C1.KUP2: Ability to use and understand basic crane, winch and hoist signals
Course Outcome	: CO1: Differentiate the various type of maintenance
	CO2: Develop a planned maintenance system for a specific shipboard machinery based on manufacturer manual
	CO3: Disassemble and assemble various pumps based on manufacturers manual
	CO4: Disassemble and assemble a turbo charger of a marine diesel engine based on manufacturers manual
	CO5: Disassemble and assemble a reciprocating air compressor based on manufacturers manual
	CO6: Disassemble and assemble a plate type and tube type hear exchanger based on manufacturers manual
Reference/s	: 1. Table A-III/1 Function 3: Maintenance and Repair at the Operational Level
	2. Table A-III/2 Function 3: Maintenance and Repair at the Management Level
	3. Table A-III/5 Function 1: Marine Engineering at the Support Level
	4. Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS PROTECTION OF THE MARINE ENVIRONMENT

Annex C of CMO No. 67, S. 2017

Course Code	:	: Mar Env								
Course Descriptive Title	:	Protection of the Marine Environment				Prerequisite	1:	None		
Course Credit	:	3 Units	Lecture Contact Hours per Week	:	3 Hours	Laboratory Contact Hours per Week	1	0 Hours		
Competence/s	:	A-III/1.F4.C1 Ensure compliance with pollution-prevention requirements A-III/2.F4.C2 Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and protection of marine environment								
KUP/s	8	A-III/1.F4.C1.KUP1.1: Knowledge of the precaution to prevent pollution to marine environment A-III/1.F4.C1.KUP1.2: Anti-pollution procedures in all associated equipment A-III/1.F4.C1.KUP1.3: Importance of proactive measures to protect the marine environment A-III/2.F4.C2.KUP1.4 Knowledge of relevant international maritime law embodied in international agreements and conventions								
Course Outcome/s	:	 CO1: Evaluate impact of the shipping operations to the environment. CO2: Relate the balance between the 3P's (people, planet and profit) in order to attain sustainable shipping CO3: Apply MARPOL Annex 1-6 legislation to a specific situation by recommending corrective actions 								
Reference/s	5.	 Table A-III/1 Function 4: Controlling the Operation of the Ship and care for persons on board at the Operational Level Table A-III/2 Function 1 Marine Engineering at the Management Level Annex A of CMO No. 67, S. 2017: Revised PSG for BSMT and BSMarE Programs 								





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MARITIME LAW

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	:	Mar Law									
Course Descriptive Title	:	Maritime Law				Prerequisite	:	None			
Course Credits	:	4 units	Lecture Contact Hours per Week	:	4 hours	Laboratory Contact Hours per Week	:	0 hours			
Competence/s	:	A-III/2.F4.C2: Monito	or compliance with legislative re or and control compliance with ion of the marine environment.	equi legis	l irements slative mea	asures to ensure safety o	f life	at sea and			
KUP		sea. A-III/2 F4.C2.KUP1:	Knowledge of international mantions Regard shall be paid especially certificates and other docume conventions, how they may be responsibilities under the relevance maritime declarations of health Regulations responsibilities under international passengers, crew and cargo national legislation for implementations	ritim y to nts e ob vant h an	the following required to tained and trequirement and the requirement of the requirement	ng subjects: be carried on board shipe their period of validity ents of the International Co- irements of the Internation its affecting the safety of	s by onve	ents and international ention on Load dealth ship,			



Course Outcome	 CO1. Evaluate SOLAS Convention as amended in terms of managing seafarer competency towards loss prevention CO2. Evaluate Maritime Labor Convention of 2006 on how it could improve the working environment of seafarers CO3. Analyze the Load Line Convention of 2006 as amended on how it could improve safety of shipping and prevention of pollution at sea CO4. Apply UNCLOS to the West Philippine Sea (South China Sea) dispute and determine the strength of the Philippine position for its claims CO5. Differentiate the given various IMO conventions vis-a-vis national legislation or regulation in terms of content and coverage or scope
Reference/s	 Table A-II/1 of the 1978 STCW Code as amended Function: Navigation at the operational level Table A-II/2 of the 1978 STCW Code as amended Function: Navigation at the management level Table A-III/1 Function 1: Marine engineering at the operational level Table A-III/2 Function 1: Marine engineering at the management level Maritime Labor Convention 2006 United Nations Convention on the Law of the Sea Protection & Indemnity Insurance Safety of Life at Sea (SOLAS) (over view only) International Convention for the Prevention of Pollution from Ships (MARPOL) STCW as amended Admiralty law Maritime Commerce /Shipping Contract/Claims Annex A of CMO No. 67, S. 2017: Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS LEADERSHIP AND TEAMWORK

Annex C of CMO No. 67, S. 2017

Course Code	:	Mgmt 1										
Course Descriptive Title	:	Leadership and Team	iwork			Prerequisite	:	None				
Course Credits	:	3 Units	Lecture Contact Hours per Week	:	3 hours	Laboratory Contact Hours per Week	:	0 hours				
Competence/s	•	A-III/1.F4.C7: Applic A-III/2.F4.C3: Mainta	A-III/2.F4.C5: Use of leadership and managerial skill A-III/1.F4.C7: Application of leadership and teamworking skills (model course 1KUP39) A-III/2.F4.C3: Maintain safety and security of the ship's crew and passengers and the operational condition of life-saving, fire-fighting and other safety systems									
KUP/s	0.00	A-III/2.F4.C5.KUP2: A national I A-III/2.F4.C5.KUP3: A		effe on bratio ship	managements sective resorrioritization coard and a n of team including	e conventions and recomment including: urce management: n of resources ashore experience motivation	men	dations, and				





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS LEADERSHIP AND TEAMWORK

Annex C of CMO No. 67, S. 2017

	A-III/2.F3.C7.KUP5: Knowledge and ability to apply decision-making techniques: .1 situation and risk assessment .2 identify and generate options .3 select course of action .4 evaluation of outcome effectiveness A-III/2.F4.C5.KUP6: Development, implementation, and oversight of standard operating procedures A-III/1.F4.C3.KUP1: Thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea)
Course Outcome/s	CO1: Appraise the content and application of ISM Code, STCW '78 as amended and MLC 2006 pertaining to the Personnel Management CO2: Organize and manage a safe and efficient operation of ship at a given scenario thru role play or other forms of simulation.
Reference/s	Table A-III/1 Function 1: Marine engineering at the operational level Table A-III/2 Function 1: Marine engineering at the management level Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS INTEGRATED MANAGEMENT SYSTEM

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	:	Mgmt 2							
Course Descriptive Title		Integrated	Management System			Prerequisite	1 2	None	
Course Credit	•	2 Units	Lecture Contact Hours per Week	:	2 Hours	Laboratory Contact Hours per Week	1	0 Hours	
Competence/s	1	A-III/1.F4.	C6: Monitor compliance	with le	gislative requ	uirements			
KUP/s		: A-III/1.F4.C6.KUP1: Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment							
Course Outcome/s		CO2: Differ the process of the proce	provisions of STCW 78, a lyze the provisions of the ain the importance of the ations through the deployage the provisions of the commental performance the ermine compliance of a godard provisions to demonagement that is committed duct an impact assessment and quality (SSI)	ireme s ame s ISO S STC yment ISO nrough iven S nstrate ed to h ent on HEQ) i	nts for seafa ended to the 2001:2015 in W 78, as am of competen (4001:2015 to a more efficient MS procedu due diligend ealth and sa a particular in relation to	rers with and without security of ISPS Code relation to the ISM code in terrended in the attainment of the get seafarers hat can help ship operators impoient use of resources and redure to OHSAS 18001, Occupations, good governance, low risk a fety in the workplace ship operation on the safety, setthe attainment of the IMO missi	ns to the goal-base or ove the ction of onal Head come curity, ion state	eir peculiarities sed ships heir waste alth and Safety heelth, ement.	
Reference/s	1	Operat	tional Level A-III/2 Function 1 Marine	Engir	eering at the	of the Ship and care for person Management Level For BSMT and BSMarE Program		oard at the	





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS NAVAL ARCHITECTURE

Annex C of CMO No. 67, S. 2017

Course Code	:	Nav Arch									
Course Descriptive Title	;	Naval Architecture	Prerequisite	:	Co-Req Mechanics						
Course Credits	:	2 units	Lecture Contact Hours per Week	•	2 hours	Laboratory Contact Hours per Week	:	0			
Competence/s	:	*A-III/1 F4.C7: Application of leadership and teamworking skills **A-II/5 F3.C1: Contribute to the safe operation of deck equipment and machinery A-III/2 F1.C2: Plan and schedule operations A-III/2 F1.C3: Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery A-III/1 F4.C2: Maintain seaworthiness of the ship A-III/2 F4.C1: Control trim, stability, and stress A-III/2 F4.C4: Develop emergency and damage control plans and handle emergency situations									
KUP/s	*	A-III/1 F4.C7.KUP1: Working A-III/5 F3.C1.KUP2.3: Knowle skills, including the A-III/2 F1.C2 and C3.KUP1.8 damage control A-III/1 F4. C2.KUP1: Ship stables, diagrams, a watertight integrity of intact buoyancy A-III/1 F4.C2.KUP2: The prin A-III/2 F4.C1.KUP1: Underst factors affecting tri A-III/2 F4.C1.KUP2: Knowled	g knowledge of shipboredge of the following per proper use of knots, as: Theoretical Knowledge of theoretical Knowledge of theoretical Knowledge of the effect on tring of a compartment and ge of IMO recommends	know equing of er of er of er of er of er of er of dati	personnel ledures and ces, and stoon naval and wledge and ipment, (.2) of fundamer f a ship inciples of salies necessad stability countermeatons concer	management and training ability to use marline spike oppers. The chitecture and ship constitution of stability, tried understanding of the fundal actions to be taken in the construction and the training ship in the event of desures to be taken in the same ship in the event of desures to be taken in the same ship stability.	ructi m a dam the	eamanship on, including nd stress nentals of event of loss			





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS NAVAL ARCHITECTURE

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

Course Outcome/s	 CO1: Describe the functions of each member of a ship's organization CO2: Describe the different types of ship in reference to their design and purpose CO3: Describe ship's measurements and dimensions CO4: Describe the functions of basic ship's structural members CO5: Perform marlinespike seamanship skills in accordance with shipboard instructions and safety standards CO6: Prepare bunkering and oil transfer plans in reference to applicable stability concepts, fundamentals, techniques, and IMO guidelines. CO7: Conduct lining of pipe arrangements of various engine systems with reference to the lay-out, design, position of installed equipment and machineries, and current stability condition of ship. CO8: Prepare contingency plans that will help preserve the stability of the ship and control the extent of damage caused by unwanted events such as loss of intact stability, grounding, or collision.
Reference/s	 Table A-II/5 Function 3: Controlling the operation of the ship and care for persons on board at the support level. Table A-III/1 Function 4: Controlling the operation of the ship and care for persons on board at the operational level. Table A-III/2 Function 1: Marine engineering at the management level Table A-III/2 Function 4: Controlling the operation of the ship and care for persons on board at the management level. CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs NOTE: *A-III/1 F4. C7. Application of leadership and teamworking skills – is included to discuss shipboard organization particularly during shipboard emergencies (Same with BSMT Program) **A-III/5 F3.C1. Contribute to the safe operation of deck equipment and machinery – is included to address the marlinspike competency (Same with BSMT Program).





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS PROPULSION ANCILLARY SYSTEMS AND GAS TURBINE

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code		PASGT							
Course Descriptive Title	į	Propulsio	oulsion Ancillary Systems and Gas Turbine			Prerequisite	5	Thermo Aux Mach 1 Mech IChem Auto 1	
Course Credit	:	3 Units	Lecture Contact Hours per Week		2 Hours	Laboratory Contact Hours per Week	:	3 Hours	
Competence/s	:	A-III/2.F1. A-III/2.F1. A-III/2.F1.	C1: Manage the operati C2: Plan and schedule C3: Operation surveillar and auxiliary machin	on coper oper oce, ery	of propulsion rations performance	e, assessment and maintain	ing safe		
KUP/s	3	A-III/1.F1.	 III/2.F2.C1: Manage operation of electrical and electronic control equipment III/1.F1.C4.KUP1: Basic construction and operation principles of (.3) marine gas turbine and (.5) shafting installations including propeller III/1.F1.C4.KUP2: Safety and emergency procedures for operation of propulsion plant machinery, including control systems III/1.F1.C4.KUP3: Preparation, operation, fault detection and necessary measures to prevent damage for (.1) main engine associated auxiliaries, (.3) auxiliary prime movers associated systems III/2.F1.C1.KUP1.3: Design features and operative mechanism of marine gas turbine and associated auxiliaries 						





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS PROPULSION ANCILLARY SYSTEMS AND GAS TURBINE

Annex C of CMO No. 67, S. 2017 Revision No: 00

	A-III/2.F1.C2 and C3.KUP1.3.c: Theoretical knowledge of the propulsive characteristics of gas turbines, including speed, output and fuel consumption A-III/2.F1.C2 and C3.KUP1.4.c: Heat cycle, thermal efficiency and heat balance of marine gas turbine A-III/2.F1.C2 and C3.KUP2.1: Practical knowledge of startup and shut down of main propulsion and auxilia machinery including associated systems A-III/2.F1.C2 and C3.KUP2.2: Practical knowledge of the operating limits of gas turbine propulsion plant A-III/2.F1.C2 and C3.KUP2.3: Practical knowledge of the efficient operations, surveillance, performance assessment and maintaining safety of gas turbine propulsion plant and auxiliary machinery A-III/2.F2.C1.KUP1.2.a: Theoretical knowledge of the design features and system configurations of automatic control equipment and safety devices for main engine
Course Outcome/s	CO1: Differentiate the construction and the operating principles of the different types of gas turbine CO2: Operate gas turbine and its associated machinery to ensure safety of operations and avoid pollution marine environment CO3: Compare the construction, design and operating principles of the different types of stern tube seals and propellers based on their applications
Reference/s	Table A-III/1 Function 1: Marine Engineering at the Operational Level Table A-III/2 Function 1: Marine Engineering at the Management Level Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS POWER PLANT DIESEL

Annex C of CMO No. 67, S. 2017 Revision No: 00

Course Code	1	PPD							
Course Descriptive Title	:	Power Plant Diesel	Prerequisite		Thermo Aux Mach 1 Mech IChem Auto 1				
Course Credit	:	5 Units Lecture Contact : 4 Hours Hours per Week	Laboratory Contact Hours per Week	:	3 Hours				
Competence/s	3	A-III/1.F1.C4: Operate main and auxiliary mach A-III/2.F1.C1: Manage the operation of propulsi A-III/2.F1.C2: Plant and schedule operations A-III/2.F1.C3: Operation surveillance, performar plant and auxiliary machinery A-III/2.F2.C1: Manage operation of electrical and Table A-III/1 Function 1: Marine Engineering at Operate main and auxiliary machinery and III/2 Function 1: Marine Engineering at Manage the operation of propulsion plane Plan and schedule operations (theoretical	on plant machinery nce, assessment and maintain d electronic control equipment the operational level nd associated control systems the management level t (ML)	ing :					



KUP/s	 A-III/1.F1.C4.KUP1.1: Basic construction and operation principles of marine diesel engine A-III/1.F1.C4.KUP2: Safety and emergency procedures, for operation of propulsion plant machinery, including control systems A-III/1.F1.C4.KUP3: Preparation, operation, fault detection and necessary measures to prevent damage of (.1) main diesel engine and associated auxiliaries and (.3) auxiliary prime movers and associated systems A-III/2.F1.C1.KUP1.1: Design features and operative mechanism of marine diesel engines and associated auxiliaries A-III/2.F1.C2 and C3.KUP1.3.a: Theoretical knowledge on the propulsive characteristics of diesel engine including speed, output and fuel consumption A-III/2.F1.C2 and C3.KUP1.4.a: Theoretical knowledge on heat cycle, thermal efficiency and heat balance of marine diesel engine A-III/2.F1.C2 and C3.KUP2.1: Practical knowledge on start up and shut down main propulsion and auxiliary machinery including associated system A-III/2.F1.C2 and C3.KUP2.2: Practical knowledge on operating limits of diesel propulsion plant A-III/2.F1.C2 and C3.KUP2.3: Practical knowledge on the efficient operations, surveillance, performance assessment and maintaining safety of diesel propulsion plant and auxiliary machinery A-III/2.F2.C1.KUP2.2.a: Design features and system configurations of automatic control equipment and safety devices for main engine
Course Outcome/s	CO1: Differentiate the construction and the operating principles of two-stroke from four-stroke marine diesel engines CO2: Prepare and operate the main engine and associated auxiliaries for ship departure from port in accordance with the established rules and procedures to ensure safety of operations and avoid pollution of marine environment CO3: Monitor and record engine performance including fault detection and actions to be taken during operations that consistently meets the requirement
Reference/s	Table A-III/1 Function 1: Marine Engineering at the operational level Table A-III/2 Function 1: Marine Engineering at the management level Annex A of CMO No. 67, S. 2017: Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS POWER PLANT STEAM

Annex C of CMO No. 67, S. 2017

Course Code	:	PPS						
Course Descriptive Title		Power Plant Steam			Prerequisite	:	Thermo Aux Mach 1 Mech IChem Auto 1	
Course Credit	:	6 Units	Lecture Contact Hours per Week		5 Hours	Laboratory Contact Hours per Week	:	3 Hours
Competence/s		A-III/2.F1 A-III/2.F1 A-III/2.F1 A-III/2.F2 Table A-II Op Table A-II Op au Ma Pla	.C1: Manage the operati .C2: Plant and schedule .C3: Operation surveillar and auxiliary machin .C1: Manage operation of ll/1 Function 1: Marine e perate main and auxiliar ll/2 Function 1: Marine e peration, surveillance, per exiliary machinery at the anage the operation of pan and schedule operation	on of poperation of electrongineer of mach engineer of Managoropulsions at the operation of	ropulsion platons formance, a rical and electring at the opinery and asserting at the mace assessment Level on plant mache Managen	extronic control equipment perational level sociated control systems management level ment and maintaining safety of (ML) chinery at the Management Level ment Level (ML)	propulsion	on plant and
KUP	1		steam turbine	emerge		n principles of (.4) marine stea		THE SECRETARY OF THE SECOND





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS POWER PLANT STEAM

Annex C of CMO No. 67, S. 2017 Revision No: 00

	A-III/1.F1.C4.KUP3: Preparation, operation, fault detection and necessary measures to prevent damage for (.2) main steam boiler, steam turbine and associated auxiliaries, (.3) auxiliary prime movers and associated systems
	A-III/2.F1.C1.KUP1: Design features and operative mechanism of (.4) marine steam boiler, (.2) steam turbine and associated auxiliaries
	A-III/2.F1.C2 and C3.KUP1.3.b: Theoretical knowledge on propulsive characteristics of steam boiler including pressure, temperature output and fuel consumption
	A-III/2.F1.C2 and C3.KUP1.4: Theoretical knowledge on heat cycle, thermal efficiency and heat balance of (.b) marine steam boiler and (.d) steam turbine
	A-III/2.F1.C2 and C3.KUP2.1: Practical knowledge on startup and shut down main propulsion and auxiliary machinery including associated system
	A-III/2.F1.C2 and C3.KUP2.2: Practical knowledge on operating limits of steam boiler and steam turbine propulsion plant
	A-III/2.F1.C2 and C3.KUP2.3: Practical knowledge on the efficient operations, surveillance, performance assessment and maintaining safety of steam boiler and steam turbine propulsion plant and auxiliary machinery
	A-III/2.F1.C3.KUP2.5b: Practical knowledge on the functions and mechanism of automatic control for auxiliary machinery including steam boilers
	A-III/2.F2.C1.KUP2.2.c: Practical knowledge on the design features and system configurations of automatic control equipment and safety devices for steam boiler
Course Outcome	CO1: Differentiate the construction and the operating principles of water tube from a fire tube marine boiler CO2: Differentiate the construction and the operating principles of the different types of steam turbine CO3: Safely operate (from cold condition) the steam boiler and associated auxiliaries in accordance with the established rules and procedures to ensure safety of operations and avoid pollution of marine environment
	CO4: Monitor and record operation of steam propulsion plant performance and analyze conditions CO5: Apply the analysis in fault detection and initiate actions to be taken during operations that consistently meets the requirement





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS POWER PLANT STEAM

Annex C of CMO No. 67, S. 2017

Revision No: 00 Revision Date: 00

Reference/s

- 1. Table A-III/1 Function 1: Marine engineering at the operational level
- 2. Table A-III/2 Function 1: Marine engineering at the management level
- 3. Annex A of CMO No. 67, S. 2017 : Revised PSG for BSMT and BSMarE Programs





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS MECHANICS AND HYDROMECHANICS

Annex C of CMO No. 67, S. 2017

Course Code	:	Mech	lech							
Course Descriptive Title	:	Mechanics and Hyd	Mechanics and Hydromechanics			Prerequisite	:	None		
Course Credits		3 Units	Lecture Contact Hours per Week	÷	3 hours	Laboratory Contact Hours per Week	:	0 hour		
Competence/s	:	A-III/2.F1.C3: Mana Propuls	A-III/2.F1.C2: Plan and schedule operations A-III/2.F1.C3: Manage the Operation, Surveillance, Performance Assessment and Maintaining Safety of Propulsion Plant and Auxiliary Machinery A-III/2.F2.C1: Manage operation of electrical and electronic control equipment							
KUP/s		A-III/2.F2.C1.KUP1. A-III/2.F1.C2.KUP2. engine (pr	II/2.F1.C2 and C3.KUP1.2: Theoretical knowledge on mechanics and hydromechanics II/2.F2.C1.KUP1.5: Theoretical knowledge on features of hydraulic and pneumatic control equipment II/2.F1.C2.KUP2.4: Practical knowledge of the functions and mechanism of automatic control for main engine (pneumatic and hydraulic system controllers) II/2.F2.C1.KUP1.5: Theoretical knowledge on features of hydraulic and pneumatic control equipment							
Course Outcome/s	:	CO1. Solve shipboa	Solve shipboard problems involving mechanics and hydromechanics							
Reference/s	:		nction: Marine Engineering O No. 67, S. 2017 : Revised PS	SG 1	for BSMT :	and RSMarF Programs				





Bachelor of Science in Marine Engineering COURSE SPECIFICATIONS THERMODYNAMICS

Annex C of CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

Course Code	:	Thermo								
Course Descriptive Title	:	Thermodynamics	Thermodynamics			Prerequisite	:	None		
Course Credits	1:	4 Units	Lecture Contact Hours per Week	:	3 hours	Laboratory Contact Hours per Week	:	3 hours		
Competence/s		A-III/2 F1.C3: Manage the Propulsion Plant a	-III/2.F1.C2: Plan and schedule operations -III/2 F1.C3: Manage the Operation, Surveillance, Performance Assessment and Maintaining Safety of Propulsion Plant and Auxiliary Machinery							
KUP		A-III/2.F1.C2 and C3.KL 3.a diesel en 3.b steam bo 3.c gas turbir A-III/2.F1.G2 and C3.KL the following: 4.a marine of 4.b marine s	-III/2.F1.C2 and C3.KUP1.1: Theoretical knowledge on thermodynamics and Heat Transmission -III/2.F1.C2 and C3.KUP1.3: Theoretical knowledge on propulsive characteristics of: 3.a diesel engines including speed, output and fuel consumption 3.b steam boiler including pressure and temperature output and fuel consumption 3.c gas turbines including speed, output and fuel consumption -III/2.F1.C2 and C3.KUP1.4: Theoretical knowledge on Heat cycle, thermal efficiency and heat balance of							
		A-III/2.F1.C2 and C3.KL	JP1.5:Refrigerators and re	efrig	eration cyc	ele				
Course Outcome		CO2: Explain how heat a. Main engi b. Marine bo c. Steam tur d. Gas turbir e. Refrigerat	1: Solve the heat balance in the engine room 2: Explain how heat affects the performance of the following machineries: a. Main engine b. Marine boiler c. Steam turbine d. Gas turbine e. Refrigeration system							
Reference/s	:	1. Table A-III/2 Function	n 1: Marine Engineering a b. 67, S. 2017 : Revised PS	t ma	anagement for BSMT a	level nd BSMarE Programs				





Bachelor of Science in Marine Engineering

Minimum Required Equipment

Annex D CMO No. 67, S. 2017 Revision No: 00 Revision Date: 00

RECOMMENDED MINIMUM EQUIPMENT, MATERIALS, CHEMICALS AND TEACHING AIDS GOVERNING THE OPERATION OF THE BACHELOR OF SCIENCE IN MARINE ENGINEERING PROGRAM. HOWEVER, THE EXACT NUMBER SHOULD CONFORM TO THE CARRYING CAPACITY OF THE INSTITUTION. THE TASK MAINTENANCE REPAIR COLUMN ARE USED FOR HANDS ON EXERCIS ES AND FAMILIARIZATION OF EQUIPMENT, WHEREAS THE SYSTEM INTEGRATION, OPERATION AND FAULT FINDING COLUMN ARE EQUIPMENT NECESSARY TO ADDRESS THE DEFINED INTENDED LEARNING OUTCOMES OF COURSES.

	Task Maintenance and Repa	System	
Course	Key Area Equipment	Quantity Required	Integration, Operation and Fault Finding
1. Mach 1	Mechanical Workshop	e output	
Mach 2 Mach 3	Nork benches fitted with vise on each end	6 sets	
	Gas welding equipment accessories and PPE	6 sets 1 torch /cubicle	
	Electric, arc welding equipment, accessories and PPE	6 sets 1 machine /cubicle	
	1.4. Pedestal grinder	3 units	
	 drilling machine (approx. 35 mm min. Diameter drill capacity) 	3 units	
	Electric power hand drill with at least 10 mm diameter drilling capacity	6 units	
	1.7. Electric power hand grinder/cutter	4 units	
	1.8. Metal cutting shear (snip)	6 sets	
	1.9. Anvil	6 pcs	
	1.10. Inside and outside steel vernier caliper	6 pcs	
	1.11. Inside and outside micrometers	6 pcs	
	1.12. Depth gauge caliper	6 pcs	
	1.13. Dial micrometer with magnetic base	4 sets	
	1.14. Steel ruler	6 pcs	
	1.15. Flat Chisel	12 pcs	
	1.16. Cross-out chisel	12 pcs	
	1.17. Diamond point chisel	12 pcs	
	1.18. Round nose chisel	12 pcs	



	Task Maintenance and Rep	System	
Course	Key Area Equipment	Quantity Required	Integration, Operation and Fault Finding
	1.19. Center punch, 60 mm	12 pcs	
	1.20. Center punch, 90mm	12 pcs	
	1.21. Hacksaw	6 pcs	
	1.22. Tap and dies	6 pcs	1
	1.23. Die nuts	6 pcs	1
	1.24. Wrench, socket type, 10mm to 24mm	6 sets	
	1.25. Wrench, open type (metric), 10 mm to 24mm	6 sets	
	1.26. Combination Wrench, open- close type (metric), 10 mm to 24mm	6 sets	- Carrier Control of C
	1.27. Double-cut rough files	12 pcs	
	1.28. Second-cut smooth files	12 pcs	
	1.29. Single-cut smooth files	12 pcs	
	1.30. Second cut files	12 pcs	
	1.31. Machinist's combination set	12 pcs	
	1.32. Try square (steel)	12 pcs	
	1.33. Protractor (steel)	12 pcs	_
	1.34. Dividers (steel)	12 pcs	
	 Sledge hammer (various sizes, steel/wooden) 	6 pcs	_
	1.36. Ball peen hammer	12 pcs	
	1.37. Straight peen hammer (various sizes)	12 pcs	
	1.38. Tongs (various sizes)	12 pcs	
	1.39. Pliers, mechanical (various sizes)	12 pcs	
	1.40. Screw driver, Philips, various sizes	12 pcs	
	1.41. Screw driver, flat, various sizes	12 pcs	
	1.42. Vise grip	6 pcs	
	1.43. Feeler gauge (metric/inches)	6 pcs	
	1.44. Pitch gauge	6 pcs	The state of the s
	1.45. Drill bit, 13-25 mm, tapered shank	6 pcs	
	1.46. Drill bit, 15-30 mm, cylinder shank	3 pcs	11-11-10-11-10-11-10-11-11-10-11-11-11-1
	1.47. Drift punch	6 pcs	
	1.48. Lockers for storing personal belongings	32.40	
	1.49. Washing facility		



	Task Maintenance and Repa	Task Maintenance and Repair			
Course	Key Area Equipment	Quantity Required	System Integration, Operation and Fault Finding		
	1.50. Scrap disposal containers	1 in workshop area			
	1.51. 150 mm swing lathe machine with accessories	6 sets			
	1.52. Shaper (350mm travel) with accessories	1 set			
	Milling machine (horizontal, vertical or universal) with cutting tools and accessories	1 set			
	1.74. Hydraulic pipe bender with accessories	1 set			
	1.75. Pipe wrench various sizes	2 sets			
	1.76. Grease gun	2 sets			
	1.77. Oil applicator	2 sets	·		
	1.78. Wire gauge	2 sets			
	1.79. Surface gauge	2 sets			
	1.80. Blow torch	2 sets			
	1.81. Reamer handset, assorted	2 sets			
	1.82. Torque wrench	2 sets			
	1.83. Pipe cutter and threading tools	2 sets			
2. Marine Diesel	Marine Diesel engine-complete for dismantling with the following components: • Cylinder liner • Fuel valve/injector • Cylinder relief valve • Air-starting valve/starting mechanism (not all have ASV) • Crankcase relief valve • Jerk fuel valve pump • Cylinder head • Turbocharger • Bearing shells • Piston and connecting rod • Engine governor • Starting system • Fuel and lube oil filters	1 set	Marine Diesel Engine (operational) with auxiliaries or ERS Category 3.		
3. Auxiliary Machinery	3.1. Reciprocating displacement pump	1 set	All items in iter 3 should be operational or an ERS Category 3 that can be used for the student to learn and		



	Task Maintenance and Rep	System	
Course	Key Area Equipment	Quantity Required	Integration, Operation an Fault Finding
			demonstrate it operation
	3.2. Gear pump	1 set	
	3.3. Rotary vane pump	1 set	
	3.4. Screw displacement pump	1 set	
	3.5. Centrifugal pump		
	3.6. Reciprocating air driven pump	1 set	
	3.7. Other parts/components: • Gland • Mechanical Seal • Drain Cock • globe valve • gate valve • relief valve • quick closing valve • change-over valve chest • mud box (strainer) • steam trap • shell and tube cooler • plate-type cooler 3.8. Reciprocating air compressor (2 stage or higher) with the following components • Cylinder cover • Piston • relief valve • fusible plug • suction and delivering valve • water-space safety valve • bursting disc	1 set each	
	3.9. Centrifugal separator/Purifier	1 set	
Power Plant 2 - Steam Plant	4.1. Boiler for demonstration only	1 set	Operational Boiler or ERS Category 3
	4.2. Boiler water test kit	1 set	3.7.5
	Boiler safety valves (for dismantling)	1 set	
5. Refrigeration	5.1 Marine Refrigeration with main components	1 set	Working model or training module to demonstrate the refrigeration processes and operation



	Task Maintenance and Re	System	
Course	Key Area Equipment	Quantity Required	Integration, Operation and Fault Finding
	5.2. Expansion Valves	4 sets	
	5.3. Open Type Refrigerating Compressor (Complete)	1 set	
	5.4. Oil Separator	1 set	
	5.5. Thermostat	4 sets	
	5.6. Pressure switch	5 sets	
	5.7. Vacuum pump with service manifold (Gas Analyzer)	1 set	
6. Electrotechnology	6.1. Test Measuring Instruments	5 of each	1.Electrical Training Module for AC circuits - can simulate faults for troubleshooting 2.Electronic Training Module - can connect circuits for diodes, transistors, thyristors and other semiconductor components 3.Motor Control Module - can connect 3- phase ac direct- on-line, reversible and wye-delta motor starters - can produce or insert faults for troubleshooting 4.Operational 3 phase alternator with synchronizing equipment of main switch- board or ERS Category 3
	a. Digital Multi-tester	5 set	
	b. Analog Multi-tester	5 set	
	c. Insulation Tester	5 set	-
	d. Analog Clamp Meter	5 set	
	e. Digital Clamp Meter	5 set	
	f. Live Line Tester	5 set	



	Task Maintenance and Re	System	
Course	Key Area Equipment	Quantity Required	Integration, Operation and Fault Finding
7. Automation	7.1 Sample of sensors and other instruments as defined in the curriculum		Process Simulator that contains process to be controlled, process transmitter/ sensor, controller (PID, PI, PD), correcting elements/ final control elements
	7.2. Differential Pressure Switch	1 set	
	7.3. Pressostat	1 set	
	7.4. Thermistor	1 pc	
	7.5. Thermocouple	1 pc	
J	7.6. 100Ω Resistance Bulb	1 pc	
	7.7. U-Tube Manometer	1 pc	
	7.8. Transmitters (Pneumatic & Electric)	1 set each	

Classification of Machinery Simulators

Category 1	Full Mission Simulator	A full mission simulator capable of simulating all machinery operations in engine control room and machinery spaces, by the use of operational panels in machinery spaces.
Category 2	Multi Task Simulator	A multi task simulator capable of simulating several machinery operations in engine control room and machinery spaces, but with limited use of operational panels in machinery spaces.
Category 3	Limited Task Simulator	A limited task simulator capable of simulating some machinery operations in engine control room for procedural training.
Category 4	Special Task Simulator	A special task simulator capable of simulating operation and/or maintenance of particular machinery equipment, and/or defined engineering scenarios.

Competencies addressed by the Engine Room Simulator



STCW	Competence	X . ()	Category					
Reference	Competence	1 2 3		3	4			
Table A-III/1.1	Maintain safe engineering watch	1	1		1			
Table A-III/1.3	Use internal communications systems	1	1		1			
Table A-III/1.4	e A-III/1.4 Operate main and auxiliary machinery and associated controls		~	1	1			
Table A-III/1.5 Operate fuel, lubrication, ballast and other pumping systems and associated control systems		~	1	~	~			
Table A-III/1.6 Operate electrical, electronic and control systems		1	~	1	1			
Table A-III/1.7	Maintenance and repair of electrical and electronic equipment				~			
Table A-III/1.11	Maintain seaworthiness of the ship	V	1		1			

NOTE:

"The listed equipment is minimal for reference of MHEI's. Additional equipment is required based on the Course Specifications of the courses included in the BSMarE program. MHEI's are required to demonstrate how Course Outcomes are evaluated and assessed."

