

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

Course Code	:	Marcom
Course Descriptive Title	:	Maritime Communications
Course Credits	:	3 units
Lecture Contact Hours per Week	:	2 hours
Laboratory Contact Hours per Week	:	3 hour
Prerequisite	:	None
Reference/s	:	<ol style="list-style-type: none"> 1. Table A-II/1, A-IV/2 of the 1978 STCW Code as amended Function: Navigation and Radiocommunications at the operational level 2. IMO Model Course 7.03 3. Annex A of CMO No. 20, Series of 2015 (Curriculum Mapping for BSMT)

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
Transmit and receive information by visual signalling	Transmit and receive signals by morse light	Signalling by Morse code <ul style="list-style-type: none"> - Identifies Morse symbols for the alphabet and numerals - sends and receives the distress signal SOS by flashing light - states the recommendations on sound signalling 	1

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/PERFORMANCE	APPROX HOURS
		<ul style="list-style-type: none"> - lists the single-letter signals which may be sounded only in compliance with the requirements of the International Regulations for Preventing Collisions at Sea 	
	Use the international code of signals	<p>International Code of Signals</p> <ul style="list-style-type: none"> - recognises all International Code flags and pendants - explains the purpose of the International Code of Signals - correctly uses substitute flags - demonstrates how to call, using flags - demonstrates the use of the answering pendant - explains actions to take when signals are not understood - states that, in flag signalling, the answering pendant is used to indicate the decimal point in numbers - demonstrates how to signal azimuth or bearing, course, date, latitude, longitude, distance, speed, time - describes the arrangement of the Code into: <ul style="list-style-type: none"> -- single-letter signals -- two-letter signals for the General Section -- three-letter signals 	10

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		<p style="text-align: center;">beginning with 'M' for the MedicalSection</p> <ul style="list-style-type: none"> - describes the use of complements and the tables of complements - describes how to signal depths - explains the significance of text in brackets - states that cross-referencing of signals in the right-hand column is used to facilitate coding - describes the meanings of single-letter signals - states that there are single-letter signals for use between an ice-breaker and assisted vessels 	
		<ul style="list-style-type: none"> - states that time of origin may be included codes and decodes messages, using the General Section codes and decodes messages, using the Medical Section and complements - describes the International Code Signal of distress - describes how the end of a signal is indicated - states that names in the text of a signal are to be spelt out in plain language 	

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Transmit and receive information using GMDSS subsystems and equipment and fulfilling the functional requirements of GMDSS	Knowledge and understanding on the background of GMDSS, basic concept of the GMDSS, and its implementation and development scheme.	<ul style="list-style-type: none"> - explains the use of identity signals - describes the historical background of GMDSS <ul style="list-style-type: none"> • dates of implementation • developments that took place or will take place after the final inception of GMDSS in the industry. - explains the basic concept of the GMDSS <ul style="list-style-type: none"> • definition of sea areas (A1, A2, A3 and A4) • description of the communication functions of the GMDSS as required by Chapter IV of the SOLAS Convention. - states the requirements for radio installations in the GMDSS <ul style="list-style-type: none"> • details of carriage requirements • details of the communications equipment used in each area. - identifies various shipboard radio communication equipment. 	4
	Knowledge of Search and Rescue Radiocommunications including procedures in the International Aeronautical and Maritime Search and Rescue (IAMSAR) manual	<ul style="list-style-type: none"> - explains the purpose of carrying the International Aeronautical and Maritime Search and Rescue Manual for Mobile Facilities (IAMSAR Vol III) onboard vessels. - emphasizes the responsibilities and obligations of ship's masters to render assistance to a distressed vessel or aircraft as manifested in the International Convention for the Safety of Life at Sea, 1974 Regulation V/33. <ul style="list-style-type: none"> • discuss that the responsibilities to render assistance to a distressed vessel or aircraft are 	6

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		<p>based on humanitarian considerations and established international practices</p> <ul style="list-style-type: none"> • discuss actions to be taken if the ship receiving a distress alert is unable to render assistance. 	
		<ul style="list-style-type: none"> - explains briefly National and Regional SAR System Organization <ul style="list-style-type: none"> • definition of Search and Rescue Region • description of the three general levels of co-ordination of SAR system - describes the events expected to take place in the conduct of a search and rescue, particularly: <ul style="list-style-type: none"> • Initial action by assisting vessels as referred to Section 2-Rendering Assistance of IAMSAR Volume III • Explanation of the procedures detailed in Figure 2-3 of Section 2- IAMSAR Volume III entitled "Actions by ships upon reception of VHF/MF DSC Distress alert". • Explanation of the procedures detailed in Figure 2-4 of Section 2- IAMSAR Volume III entitled "Actions by ships upon reception of HF DSC alert". • Action by vessels which will not proceed to the scene of distress due to sailing time involved and in the knowledge that a rescue operation is underway. • Brief discussion of the SEARCH FUNCTION as referred to Section 2- IAMSAR Volume III. Clearly emphasizing the On-Scene Radiocommunications and the Visual 	

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		<p>Communications that are essential to the conduct of SEARCH.</p>	
		<ul style="list-style-type: none"> • Brief discussion of the RESCUE FUNCTION as referred to Section 2- IAMSAR Volume III. With importance provided to the following sub-points: <ol style="list-style-type: none"> 1) Rescue Action Plan and Message 2) Developing a Rescue Plan 3) Assistance by SAR Aircraft and the methods to indicate the contents of each container or package. 4) Assistance by Helicopters and the illustrative presentation of various equipment used for evacuating a person by helicopter 	
		<ul style="list-style-type: none"> - critically establishes conclusion on why, in the event of helicopter operation, information exchanges between vessel and the helicopter must be clearly understood. • discussion on how a direct radio link between ship and helicopter could be established. • emphasizing that information and instruction which pertains to the rendezvous position may be established through shore-based radio stations. • emphasizing that unless other arrangements have been made in advance, the ship engaged in helicopter operation shall 	

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		continuously monitor VHF Channel 16 for the arrival of the helicopter.	
		<ul style="list-style-type: none"> - simulates a case scenario of "communication between ship and helicopter" using at least five of the internationally developed phrases listed in page 2-24 to 2-26 of IAMSAR Volume III. - briefly states the criteria on how to designate a landing or pick-up areas for "ship-helicopter operation" onboard. - briefly discuss safety preparations held to ensure a successful ship-helicopter operation. - illustrates appropriate day shape that must be exhibited by a vessel engaged in helicopter operation. - demonstrates hand signals that may be utilized to establish visual communication during helicopter winching operation. 	
	<p>Means to prevent the transmission of false distress alerts and the procedures to mitigate the effects of such alerts</p>	<ul style="list-style-type: none"> - explains that the basis of adoption of Resolution A.814 (19) dated 23 November 1995 were as follows: <ul style="list-style-type: none"> • excessive amount of false distress alerts imposes a considerable and unnecessary burden on Rescue Coordination Center (RCC), may have adverse effect on seafarers' confidence in the GMDSS, and could also have a potential serious impact on real distress situations and on safety of life at sea 	3

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		<ul style="list-style-type: none"> • if a substantive reduction in the number of false distress alerts is not achieved, the quality and efficiency of SAR organizations may be jeopardized. - discusses thoroughly the guidelines set forth in the annex of Resolution A.814 entitled "GUIDELINES FOR AVOIDING FALSE DISTRESS ALERTS". - describes and demonstrates procedures detailed in the appendix of Resolution A.814 entitled "INSTRUCTIONS FOR MARINERS AND OTHERS ON HOW TO CANCEL A FALSE DISTRESS ALERT" 	
	<p>ship reporting systems</p>	<ul style="list-style-type: none"> - differentiates the ship reporting system mentioned in Chapter V, Regulation 11 of SOLAS Convention and the ship reporting system established by Governments for Search and Rescue purposes • states that the ship reporting system mentioned in Chapter V Regulation 11 of SOLAS convention refers to the procedures adopted and implemented by a state or group of states (in case of coordinated ship reporting system) that aim to contribute to safety of life at sea, safety and efficiency of navigation and/or protection of marine environment. • on the other hand, mention that the ship reporting system established by Governments for Search and Rescue purposes are covered by chapter V of SAR Convention, as amended. These types of Ship Reporting System are 	<p>10</p>

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		<p>purposely developed to allow SMC to quickly facilitate search and rescue by designating or directing particular ships or group of ships near the vicinity of distress to proceed to the scene. The designation or direction of these particular ships are made possible because of the fact that their <i>identification, coordinates or positions of these vessels, and contact information</i> are readily available to the Governments administering or managing the said reporting systems.</p>	
		<ul style="list-style-type: none"> - states that GMDSS is playing an important role in the achievement of the objectives of both types of Ship Reporting System: <ul style="list-style-type: none"> • Ship Reporting System as per SOLAS Chapter V • Ship Reporting System as per SAR Convention - explains that Ship Reporting System, may it be prescribed by SOLAS or SAR convention, could be voluntary or mandatory in nature. A careful review of the Ship Reporting System appropriately - demonstrates how to use publications in preparing messages and simulates transmission of messages associated with Ship Reporting System: <ul style="list-style-type: none"> A. SHIP REPORTING SYSTEM AS PER SOLAS CHAPTER V <ul style="list-style-type: none"> • identifies publications such as Admiralty List of Radio Signals Volume 6 and Pilot Books 	

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		<p>(Admiralty Sailing Direction and Coast Pilots) as recommended resource materials to aid officers in preparing messages and establishing communication associated with it.</p> <ul style="list-style-type: none"> identifies other materials that could assist in preparation of a ship report. These include but not limited to, cargo summary, GPS for determination of position, course and speed, ship's particulars for summary of relevant informations that may be asked of. 	
		<ul style="list-style-type: none"> prepares a ship report, based on the information detailed in aforementioned publications, in a sketch paper so as to make the officer well set prior communicating with the concerned shore station performs a simulated "shore/ship to ship or vice versa" communication emphasizing that in transmitting messages over radio: one must clearly speak the word and must not rush/shout in delivering the word as it would only cause distortion. Use of phonetics to spell out a vague word is necessary. Clearly emphasize the correct manner of transmitting numbers, time etc. 	
		<p>B. SHIP REPORTING SYSTEM AS PER SAR CONVENTION</p> <ul style="list-style-type: none"> identifies publications such as Admiralty List of Radio Signals Volume 6 and Pilot Books 	

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		<p>(Admiralty Sailing Direction and Coast Pilots) as recommended resource materials to aid officers in preparing messages and establishing communication associated with it.</p> <ul style="list-style-type: none"> • identifies other materials that could assist in preparation of a ship report. These include but not limited to, cargo summary, GPS for determination of position, course and speed, ship's particulars for summary of relevant informations that may be asked of. 	
		<ul style="list-style-type: none"> • drafts a sample ship report using the format provided in the aforementioned publications. • performs a simulated transmission of a ship reporting system with the aid of INMARSAT-C, NBDP and E-MAIL System. Following ideas shall be incorporated as well: <ol style="list-style-type: none"> 1) Use of Two Digit Code for transmissions by INMARSAT-C 2) Determination of appropriate coast stations that could accommodate Ship Reports via NBDP ex: Shanghai Radio Station 3) Elucidate that Ship Reporting System for SAR such as AMVER, JASREP and AUSREP may also be sent via E-mail. 	
	<p>Knowledge of using Radio Medical Advice</p>	<ul style="list-style-type: none"> - states that the International Radio Medical Centre (CIRM) was founded in 1935 and: <ul style="list-style-type: none"> • gives radio medical advice to ships on any nationality navigating on all seas of the world • headquarters located in Rome 	<p>2</p>

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		<ul style="list-style-type: none"> • medical services are completely free of charge - names services offered by CIRM in connection to Radio Medical Advice - states that the establishment of providing Radio Medical Advice is actually promulgated by Article 7 of ILO Convention No. 164 dated 08 October 1987. - explains that Radio Medical Advice shall be sought with guidance from the Medical First Aid Guide - states that contact details of CIRM could be found in Admiralty List of Radio Signals - states that a standard form containing the information which may be required by the CIRM is available. Emphasize that correctly filling up the form will enable the CIRM to easily diagnose the ailment of the seafarer and therefore, will allow them to provide better solution to the ship. 	
	<p>Knowledge on the practical use of the International Code of Signals and the IMO Standard Marine Communication Phrases</p>	<ul style="list-style-type: none"> - shows the appearance of the publications International Code of Signal and the IMO Standard Marine Communication Phrases to enhance the students' familiarity on these two publications so that they could easily locate that on a shipboard library set-up - emphasizes that the carriage of the International Code of Signals for visual communication and the IMO Standard Marine Communication Phrases for communications over the radio are mandatory as per relevant conventions 	1.5

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		<ul style="list-style-type: none"> - emphasizes that the use of these publications will facilitate easier understanding of what is being communicated. 	
	<p>Knowledge on the use of English language, both written and spoken, for the communication of information relevant to safety of life at sea</p>	<ul style="list-style-type: none"> - states and emphasizes that English language is the official language, claimed internationally, for communications involving maritime-related operations particularly communications relevant to safety of life at sea 	0.5
<p>Provide radio services in emergencies</p>	<p>Principles of Maritime Radio communications</p>	<ul style="list-style-type: none"> - states the types of communications in the maritime mobile service <ul style="list-style-type: none"> • Distress, Urgency and Safety communications (Describe the use of MAYDAY, PANPAN and SECURITE as indicator for communicating above mentioned ty • Public correspondence • Port operation service • Ship movement service • Intership communications • On-board communications - states types of station in maritime mobile service <ul style="list-style-type: none"> • ship stations • coast stations • pilot stations, port stations etc • aircraft stations • Rescue Coordination Centers - describes the concept of frequency 	11

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		<ul style="list-style-type: none"> - differentiates frequency from wavelength - identifies the units used for measuring frequency - states that radio frequency spectrum is significantly subdivided into: <ul style="list-style-type: none"> • Medium Frequency • High Frequency • Very High Frequency • Ultra High Frequency • Super High Frequency - describes basic propagation mechanism - describes maximum usable frequency (MUF) - describes optimum traffic frequency and calculation 	
		<ul style="list-style-type: none"> - describes how to select the correct frequency bands for short, medium and long range communications by day and night - describes purpose and action of automatic gain control - states frequencies used for satellite communication - states classes of emission - states the bandwidth of different emissions - states the official designations of emissions (F1B, J3E, F3E, A3E, A1A etc.) <ul style="list-style-type: none"> states the unofficial designations of emissions (TLX, SSB, AM, CW etc.) 	
		<ul style="list-style-type: none"> - describes the uses of and restrictions for different emissions according to frequency and purpose in the maritime bands 	

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		<ul style="list-style-type: none"> - describes the role of the various modes of communication mentioned below: <ul style="list-style-type: none"> • Digital Selective Calling • Radiotelephony • Narrow Band Direct Printing • Data Services - explains the concept of radio channel, simplex, duplex, semi-duplex, paired and unpaired frequencies and ITU channels 	
	<p>Knowledge of the Sub-systems of Global Maritime Distress and Safety System (GMDSS)</p>	<ul style="list-style-type: none"> - states that the Global Maritime Distress and Safety System (GMDSS) is composed of several "sub-systems" which are coordinated through Rescue Coordination Centers (RCC) to provide all the required functions needed to ensure safety at sea. - describes the following main sub-systems of GMDSS: <ul style="list-style-type: none"> • Digital Selective Calling <ol style="list-style-type: none"> 1) Definition of Digital Selective Calling (DSC) 2) Emphasis on the fact that dedicated radio frequencies have been allocated for DSC in VHF, MF and HF. 3) Description on how DSC actually works. • Satellite Communication System <ol style="list-style-type: none"> 1) Brief Introduction to INMARSAT 2) State the purpose of establishing INMARSAT 3) States and Describes the three major components of INMARSAT 4) State the location of the nerve center of the system and describe its function 	17

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		5) Defines ADE (Above Deck Equipment) and BDE (Below Deck Equipment) 6) Describes INMARSAT B MES, INMARSAT C MES, INMARSAT FLEET F77 MES 7) States that INMARSAT is capable to perform different modes of communication namely; Telex Services, Telephone Services, Data and Facsimile Communication, and State and Forward operation	
		8) Describes the four major services offered by INMARSAT namely: a) Ship-to-Shore Distress Alerting b) Shore-to-Ship Distress Alerting through the INMARSAT SafetyNET System c) Search and Rescue (SAR) Coordinating Communications d) On-Scene SAR Communication 9) Describes the function of Enhanced Group Call (EGC) <ul style="list-style-type: none"> • The Maritime Safety Information (MSI) System <ul style="list-style-type: none"> a) Definition of Maritime Safety Information b) Describe two ways of broadcasting Maritime Safety Information • The COSPAS SARSAT and the EPIRB (Emergency Position Indicating Radio Beacon) System <ul style="list-style-type: none"> a) Brief introduction of the COSPAS-SARSAT satellite system b) Describes the basic concept of the COSPAS-SARSAT satellite systems 	

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		<ul style="list-style-type: none"> c) Introduction to the concept of EPIRB including the satellite float-free EPIRB d) State the carriage requirement of EPIRB as per SOLAS Convention e) Describes the basic characteristics of operation on 406 Mhz beacon including its registration and coding characteristics f) Describes the information contained in the emitted signal from 406 Mhz EPIRB 	
		<ul style="list-style-type: none"> g) Describes the two methods of releasing EPIRB namely, manual release and hydrostatic or float free function. h) States the typical operational characteristic of the battery for 406 Mhz EPIRB specifically when the equipment is placed on transmission mode i) Emphasize the importance of knowing the content of the ship's station bills as to who shall carry the satellite EPIRB in case, abandoning ship becomes imminent. • The Search and Rescue Transponder (SART) System <ul style="list-style-type: none"> a) Describes the "locating" function of Search and Rescue Transponder b) State the carriage requirement of SART as per SOLAS Convention c) Describe the operational and technical characteristics of Search and Rescue Transponder 	

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		<p>d) Discuss the three main factors that affect the range at which a SART will be detected on a ship's radar screen</p> <p>e) Describe the basic concept of the Search and Rescue radar Transponder (SART)</p>	
	<p>The provision of radio services in emergencies</p>	<p>Radio Service during abandon ship</p> <ul style="list-style-type: none"> - demonstrate, by simulation, use of VHF, MF and HF Digital Selective Calling function <ol style="list-style-type: none"> 1) locating the DSC button of VHF, MF and HF 2) explaining why does the DSC button of VHF, MF and HF is covered by fiber glass - demonstrate, without actual transmission, manual preparation of distress message (Abandonship) using INMARSAT-C or MF/HF - demonstrate, without actual transmission, broadcast of ABANDONSHIP over the VHF - demonstrate operation of Search and Rescue radar Transponder with emphasis that SART signal can only be intercepted by X-band Radar thus, operate SART only when there is a ship or aircraft within its vicinity - demonstrate operation of 406 Mhz Satellite EPIRB - shows how to respond to a distress (Abandonship) call when received in MF/HF and when received through VHF. Explain that it is imperative to call the Master prior responding to any distress call as his judgment to proceed or not to proceed to the scene is a matter of safety for own ship. 	<p>8</p>

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		<p>Radio Service during fire onboard ship</p> <ul style="list-style-type: none"> - demonstrate, without actual transmission, manual preparation of distress message (FIRE) using INMARSAT-C or MF/HF - demonstrate, without actual transmission, broadcast of FIRE over the VHF - shows how to respond to a distress (FIRE) call when received in MF/HF and when received through VHF. Explain that it is imperative to call the Master prior responding to any distress call as his judgment to proceed or not to proceed to the scene is a matter of safety for own ship. <p>Partial or full breakdown of radio installations</p> <ul style="list-style-type: none"> - explains that Resolution A.702 (17) was promulgated by the Maritime Safety Committee of the IMO to provide guidelines for ensuring the availability of Radio Equipment for ships engaged on voyages in Sea Area A3 and A4. <ul style="list-style-type: none"> • Basic requirements for ensuring availability • Duplication of equipment for ensuring availability • Shore-based maintenance for ensuring availability • At-sea electronic maintenance capability for ensuring availability - explains that if a breakdown of radio installation occurs at sea, officers shall consult technical documentation such as equipment manuals for possible trouble shooting. 	

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		<ul style="list-style-type: none"> - explains that it is important for the officers to perform periodic functional tests of GMDSS Equipment in order to ensure that each equipment will serve its purpose especially in times of emergency. 	
		<ul style="list-style-type: none"> - explains that the procedures for the conduct of functional tests shall be consulted from the user's manual of each equipment. Emphasize that failure to understand or comply the procedures given in the manual may possibly cause untoward effect to the equipment in question. 	
	<p>Preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical and non-ionizing radiation hazards</p>	<p>Describes the contents of SOLAS Chapter IV Regulation 13 with emphasis to be drawn to the following points:</p> <ul style="list-style-type: none"> • Explains that a supply of electrical energy sufficient to operate the radio installations and to charge any batteries used as part of a reserve source or sources of energy for the radio installation shall be made available at all times while the ship is at sea. • Explains that a reserve source or sources of energy shall be provided on every ship, to supply radio installations, for the purpose of conducting <u>distress and safety radiocommunications</u>, in the event of failure of ship's main and emergency sources of electrical power. 	3

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		<ul style="list-style-type: none"> • States the criteria specified for GMDSS Reserve source or sources of energy as detailed in SOLAS Chapter IV, Regulation 13- paragraphs 2 to 7. • Briefly states the provision of paragraph 8 or SOLAS Chapter IV Regulation 13. 	
		<ul style="list-style-type: none"> - Describes measures to prevent accidents involving electrical hazards of radio installation such as: <ul style="list-style-type: none"> • Use of circuit breakers and fuses including the purpose of having overload trips • Use of approved or certified electrical safety matting • Use of appropriately installed personal protective equipment inside the battery room such as eye goggles, apron, rubber gloves and eye wash • Use of safety signs for "electrical hazards" to be installed near each electrical distribution boards for GMDSS equipment • Installation of "radiation hazard radius" on the corresponding ADE of each GMDSS installation. Taking note relevant information as regards to the radiation hazard radius is mentioned in the user or installation manual of each equipment. • Use of warning posters such as those signaling the necessity of asking permission form the Bridge prior performing maintenance or inspection of the Above Deck Equipment (ADE) 	

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		of any navigational or GMDSS installations on the compass deck. Use of relevant checklist or permit to work for any maintenance or inspection involving the electrical component of the GMDSS installations	
		TOTAL	77