

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

Course Code	:	Nav 5
Course Descriptive Title	:	Operational Use of RADAR/ARPA
Course Credits	:	3 units
Lecture Contact Hours per Week	:	2 hours
Laboratory Contact Hours per Week	:	3 hours
Prerequisite	:	D-Watch 1
Reference/s	:	<ol style="list-style-type: none"> 1. Table A-II/1 of the 1978 STCW Code as amended Function: Navigation at the operational level 2. IMO Model Course 7.03 3. IMO Model Course 1.07 4. Annex A of CMO No. 20, Series of 2015 (Curriculum Mapping for BSMT)

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/ PERFORMANCE	APPROX HOURS
Use of <i>RADAR</i> and ARPA to maintain safety of navigation <i>For detailed performances see IMO MC 1.07</i>	<i>RADAR Navigation</i> Knowledge of the fundamentals of radar and automatic radar plotting aids (ARPA) Ability to operate and interpret and analyse information obtained from radar, including the following:	<ol style="list-style-type: none"> 1. <u>Basic theory and operation of a marine radar system</u> Demonstrates a knowledge and understanding of: <ul style="list-style-type: none"> – Fundamental principles of radar – Safe distances – Radiation hazards and precautions – Characteristics of radar sets and factors affecting performance and accuracy with reference to detection of targets 	13

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/ PERFORMANCE	APPROX HOURS
Use of radar and ARPA to maintain safety of navigation (Cont)	Performance, including: .1 factors affecting performance and accuracy	<ul style="list-style-type: none"> – Factors external to the radar set affecting detection – Factors which might cause faulty interpretation of the radar picture – Performance standards for radar equipment according Resolution A.477(XII) 	
	.2 setting up and maintaining displays	2.	
	.3 detection of misrepresentation, false echoes, sea return, etc, racons and SARTs Use, including: .1 range and bearing; course and speed of other ships; time and distance of closest approach of crossing, meeting overtaking ships	3. <u>Set up and operate radar in accordance with manufacturer's instructions</u> Demonstrates a knowledge and understanding of: <ul style="list-style-type: none"> – Set up and maintain optimum radar display – Measure ranges and bearings accurately 	8
	.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	4. <u>Perform manual RADAR plotting</u> Demonstrates a knowledge and understanding of: <ul style="list-style-type: none"> – Construct the relative motion triangle – Determine course, speed and aspect of other ships – Determine the closest point of approach (CPA) and time to closest approach (TCPA) – Determine the effect of course and speed changes – Report radar plot data 	11
	.3 application of the International Regulations for Prevention Collisions at Sea 1972, as amended	5. <u>Use radar to ensure safe navigation</u> Demonstrates a knowledge and understanding of: <ul style="list-style-type: none"> – Fix vessel's position by radar – Identify aids to radar navigation and safety – Use parallel indexing technique in radar navigation 	5
	.4 plotting techniques and relative- and true-motion concepts .5 parallel indexing	6. <u>Use radar to avoid collision or close encounters</u> Demonstrates a knowledge and understanding of:	6

COMPETENCE	KNOWLEDGE, UNDERSTANDING AND PROFICIENCY	TOPICS/ PERFORMANCE	APPROX HOURS
Use of radar and ARPA to maintain safety of navigation (Cont)	Principal types of ARPA, their display characteristics, performance standards and the dangers of over-reliance on ARPA	<ul style="list-style-type: none"> – Application of COLREGS to avoid collision or close encounters 	
	<p>Ability to operate and to interpret and analyse information obtained from ARPA, including:</p> <p>.1 system performance and accuracy, tracking, capabilities and limitations, and processing delays</p>	<p>7. <u>Describe an ARPA system</u></p> <p>Demonstrates a knowledge and understanding of:</p> <ul style="list-style-type: none"> – ARPA system display characteristics – IMO performance standards for ARPA – Criteria for acquisition of targets – Tracking capabilities and limitations – Processing delays 	4
	<p>.2 use of operational warnings and system tests</p> <p>.3 methods of target acquisition and their limitations</p> <p>.4 true and relative vectors, graphic representation of target information and danger areas</p> <p>.5 deriving and analyzing information, critical echoes, exclusion areas and trial manoeuvres</p>	<p>8. <u>Operate an ARPA system</u></p> <p>Demonstrates a knowledge and understanding of:</p> <ul style="list-style-type: none"> – Set up and maintain an ARPA display correctly – Operate ARPA to obtain target information – Outline possible errors of interpretation of target data – Factors which might cause errors in displayed data identified and explained – Use system operational tests to determine data accuracy – Risks of over-reliance on ARPA – Obtain information from ARPA displays – Application of COLREGS to vessels in sight of each other and in restricted visibility 	20
		<u>total</u>	67