

COURSE PACKAGE

Part A: Course Specifications

Course Code	: NAV 2			
Course Descriptive Title	: Terrestrial and Coastal Navigation 2			
Prerequisite	: NAV 1	Corequisite	: None	
Year Level	: First Year	Semester Offered	: Second Semester	
Course Credits	4 units	Theoretical Contact Hours Per Week	: 3 hours	Demonstration/Practical Work Contact Hours Per Week : 3 hours
Course Description	: Terrestrial and Coastal Navigation 2 enables a prospective marine deck officer to plan and conduct a passage and determine the ship's position. The course includes topics on sailings, position lines and positions. Students are expected to undergo chartwork exercises including the creation of a passage plan for a short voyage in application of the learned concepts.			
STCW Reference	STCW Table	Function	Competence	Knowledge, Understanding and Proficiency
	A-II/1	F1. Navigation at the operational level	C1. Plan and conduct a passage and determine position	<i>KUP2.</i> 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
				<i>KUP3.</i> 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' routing information



Course Outcomes	:	PO-B.3 PO-D.1	<p>CO1. Apply the different “sailing” methods in order to determine the required course, distance and position</p> <p>CO2. Plot the ship’s position by dead reckoning, running fix, bow and beam bearing and lines of position taking into account the effects of wind and current</p> <p>CO3. Calculate the estimated time of arrival (ETA) given the ship’s speed and distance</p> <p>CO4. Create a passage plan for a short voyage taking into consideration the information from nautical charts and publications</p> <p>CO5. Fill up deck logbook based on provided navigational information</p>
Course Intake Limitations	:	The number of students that can be accommodated shall not exceed 40 for lecture and 20 for laboratory.	
Faculty Requirement	:	<p>Instructor The faculty that will be assigned to handle the course must possess the following qualifications:</p> <ul style="list-style-type: none"> • graduate of Bachelor of Science in Marine Transportation; • with at least 12 months of seagoing experience as Officer-in-charge of a Navigational Watch on seagoing ships of 500 GRT or more; • completed Training Course for Instructors (IMO Model Course 6.09); • completed Train the Simulator Trainer and Assessor Course (IMO Model Course 6.10); • completed Training Course on Assessment, Examination and Certification of Seafarers (IMO Model Course 3.12); and • preferably with teaching experience. <p>Assessor The assigned assessor to conduct the assessment for this course shall have the same qualification for the instructor as outlined above.</p>	
Teaching Facilities and Equipment	:	<p>CLASSROOM The standard classroom size shall be a minimum of 48 square meters, no side shall be less than 6 meters for a class of 40 students. Classroom must be well-lighted and well-ventilated. It should contain the following:</p> <ul style="list-style-type: none"> • Tables and chairs or armed chairs • Whiteboards or chalkboards • Multimedia equipment <p>CHARTROOM The chartroom shall be capable of holding a proportionate number of students under the following conditions:</p> <ul style="list-style-type: none"> • Chart table dimensions: at least L = 1.0 m, W = 0.7 m • Chart table ratio: 1 table is to 2 students • Each chart table shall have the following: <ul style="list-style-type: none"> ○ Harbour chart, coastal chart, general chart and sailing chart ○ Plotting sheets 	



	<ul style="list-style-type: none"> ○ Parallel rulers, navigational triangles, compass dividers ○ Pencil and eraser <p>EQUIPMENT FOR DEMONSTRATION/PRACTICAL WORK</p> <ul style="list-style-type: none"> ● Ship Bridge Simulator <p><i>Note:</i></p> <ol style="list-style-type: none"> 1. The MHEIs may use additional teaching facilities and equipment as deemed necessary to meet the learning outcomes of this course. 2. The MHEIs may use the Ship Bridge Simulator for the learning outcomes related to plotting. 3. If the ship bridge simulator is used, IMO Model Course 6.10 is a required qualification for the instructor and assessor of this course.
<p>Teaching Aids</p>	<p>: A1 PowerPoint Presentation (PPT) A2 Whiteboard, marker and handouts A3 Calculator A4 Plotting tools A5 Nautical charts A6 US Chart No. 1 or BA Chart 5011 (INT 1) A7 Nautical Publications A8 Bridge Logbook (or Form) A9 Time Zone Map</p> <p><i>Note: The MHEIs may use additional teaching aids as deemed necessary to meet the learning outcomes of this course.</i></p>
<p>References / Bibliographies</p>	<p>References:</p> <p>R1 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended R2 Officer in Charge of a Navigational Watch (IMO Model Course 7.03) R3 International Chamber of Shipping. (2016). <i>Bridge Procedures Guide</i> (Fifth ed.). London: Marisec Publications. R4 International Convention for the Safety of Life at Sea, 1974, as amended</p> <p>Textbook:</p> <p>T1 National Geospatial-Intelligence Agency, <i>American Practical Navigator</i> (H.O Pub No. 9) 2017 Edition (Originally by Nathaniel Bowditch)</p> <p>Bibliography:</p> <p>B1 Frost, A. (2016). <i>Practical Navigation for Officers of the Watch</i> (2nd ed.). Glasgow, UK: Brown, Son and Ferguson Ltd. Retrieved from https://www.skipper.co.uk/catalogue/item/practical-navigation-for-officers-of-the-watch</p> <p>Websites:</p> <p>W1 Willemsen, D. (2020, October 23). Plotting and piloting. Retrieved from SailingIssues: https://www.sailingissues.com/navcourse4.html</p>



	<p>W2 Willemssen, D. (2020, October 28). Plotting and piloting - Advanced. Retrieved from SailingIssues: https://www.sailingissues.com/navcourse5.html</p>
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Note: The MHEIs may use additional references/bibliographies as deemed necessary to meet the learning outcomes of this course.



Part B: Course Outline and Timetable

Term	Week	Topic	Time Allotment (in hours)	
			Theoretical	Demonstration / Practical Work
<p><i>Note:</i> MHEIs shall determine the number of periods or terms the semester is divided based on their school calendar of activities such as Prelim, Midterm, and Final.</p>	1	1. Course Overview	0.5	
		2. The Sailings	0.5	0
		3. Parallel Sailing	2	3
	2	4. Plane Sailing	3	3
	3	5. Mid Latitude Sailing	3	3
	4	6. Mercator Sailing	3	3
	5 – 6	7. Great Circle Sailing	6	6
	7	8. Composite Great Circle Sailing	3	3
	8	9. Plotting Positions, Direction and Distance	3	3
	9	10. Plotting a DR Position	1.5	1.5
		11. Plotting an Estimated Position	1.5	1.5
	10	12. Plotting a Running Fix	3	3
	11 – 12	13. Plotting a Position Fix	6	6



Term	Week	Topic	Time Allotment (in hours)	
			Theoretical	Demonstration / Practical Work
	13	14. Bow and Beam Bearing	3	3
	14	15. Estimated Time of Arrival	3	3
	15 – 16	16. Voyage Plan	6	6
	17	17. Logbooks (or forms) and Records	3	3
Sub-total (Contact Hours)			51	51
Total Contact Hours			102	
Examination and Assessment				

Note:

1. *The MHEIs are to develop their respective timetable according to their resources but meets with the minimum time allocation for the contact hours.*
2. *The MHEIs shall determine the time allotment for the conduct of summative assessments.*



Part C: Course Syllabus

COs	Topics Learning Outcomes	References/ Bibliographies	Teaching Aids
	1. Course Overview 1.1. Outline of the course and other requirements	R1, T1	A1, A2, A3, A5, A6
CO1	2. The Sailings 2.1. Explain the significance of sailing methods in navigation 2.2. Identify the different measurements used in navigational “sailings” triangles	T1, B1	A1, A2, A5
CO1	3. Parallel Sailing 3.1. Describe the appropriate use of “parallel sailing” method in navigation 3.2. Apply “parallel sailing” method in order to determine the required course, distance and/or position	T1, B1	A1, A2, A3, A5
CO1	4. Plane Sailing 4.1. Describe the appropriate use of “plane sailing” method in navigation 4.2. Apply “plane sailing” method in order to determine the required course, distance and/or position	T1, B1	A1, A2, A3, A5
CO1	5. Mid Latitude Sailing 5.1. Describe the appropriate use of “mid latitude sailing” method in navigation 5.2. Apply “mid latitude sailing” method in order to determine the required course, distance and/or position	T1, B1	A1, A2, A3, A5
CO1	6. Mercator Sailing 6.1. Describe the appropriate use of “Mercator sailing” method in navigation 6.2. Compute the meridional parts of a given latitude 6.3. Apply “Mercator sailing” method in order to determine the required course, distance and/or position	T1, B1	A1, A2, A3, A5
CO1	7. Great Circle Sailing 7.1. Describe the appropriate use of “great circle sailing” method in navigation 7.2. Apply “great circle sailing” method in order to determine the required course, point of vertex, great circle distance and the points along the great circle track 7.3. Apply “Mercator sailing” method in order to determine the required course and distance between points along the great circle track	T1, B1	A1, A2, A3, A5
CO1	8. Composite Great Circle Sailing 8.1. Describe the appropriate use of “composite great circle sailing” method in navigation 8.2. Apply “composite great circle sailing” method in order to determine the initial course, total distance, points along the composite great circle track and final course 8.3. Apply “Mercator sailing” and “parallel sailing” methods in order to determine the required course and distance between points along the great circle track	T1, B1	A1, A2, A3, A5
CO2	9. Plotting Position, Direction and Distance 9.1. Plot the given latitude and longitude, course and/or bearing on the chart properly and accurately	T1, B1	A1, A2, A3, A5



COs	Topics Learning Outcomes	References/ Bibliographies	Teaching Aids
	9.2. Measure the bearing, course and distance on the chart		
CO2	10. Plotting a DR Position 10.1. Describe the appropriate use of dead reckoning method in planning and conducting a voyage 10.2. Plot a DR position from a given last known position, average speed and course	T1, B1, W1, W2	A1, A2, A3, A4, A5
CO2	11. Plotting an Estimated Position 11.1. Determine the set and drift given the course steered, speed through the water, track made good and speed made good 11.2. Plot the estimated position given the set and drift 11.3. Determine the course to steer given the “set and drift” and “course and speed to make good”	T1, B1, W1, W2	A1, A2, A3, A4, A5
CO2	12. Plotting a Running Fix 12.1. Apply running fix method in order to determine the ship’s position 12.2. Apply set and drift to the running fix	T1, B1, W1, W2	A1, A2, A3, A4, A5
CO2	13. Plotting a Position Fix 13.1. Plot the ship’s position by cross bearing, transit bearing, range circles and/or the combination of these methods	T1, B1, W1, W2	A1, A2, A3, A4, A5
CO2	14. Bow and Beam Bearing 14.1. Determine the dipping range from the ship to the lighthouse 14.2. Determine the range of the lighthouse based on the given vertical sextant angle 14.3. Apply “bow and beam bearing” method in plotting a running fix to determine the ship’s position	T1, B1	A1, A2, A3, A4, A5
CO3	15. Estimated Time of Arrival 15.1. Apply the Distance, Speed, Time (DST) equation in solving the distance, speed and time 15.2. Determine the local time of a given position and zone description from the Greenwich Mean Time (GMT) and vice versa 15.3. Calculate the estimated time of arrival given the ship’s speed and distance in local time and in GMT	T1, B1	A1, A2, A3, A5, A10
CO4	16. Voyage Plan 16.1. Describe the proper conduct of voyage planning 16.2. Determine the nautical charts and publications to be used for the intended voyage Create a voyage plan taking into account the information from the nautical charts and publications using rhumb lines	T1	A1, A2, A3, A4, A5, A6, A7
CO5	17. Logbooks (or Forms) and Records 17.1. Identify the information to be included in the bridge logbook and other records 17.2. Explain the importance of keeping a bridge logbook 17.3. Record navigational information in the bridge logbook based on given information	T1, R3, R4	A1, A2, A8

Note: The MHEIs are to develop Part D: Detailed Teaching Syllabus and Instructional Materials (IMs), and Part E: Course Assessment and Assessment Tools (ATs) which satisfactorily meets with the requirements of the course as prescribed in the course outcomes and learning outcomes.

