

College of Maritime Studies
BACHELOR OF SCIENCE IN MARINE TRANSPORTATION

Syllabus in Nav 1(Navigational Instruments with Compasses)

PART A
COURSE SPECIFICATION

Program Educational Objectives:

1. Produce competent merchant marine deck officers on sea going ships of 500 Gross Tonnage or more
2. Produce graduates who are qualified to pursue a professional career or advanced studies in a related marine field of specialization

Program Description:

The Bachelor of Science in Marine Transportation deals with the study of navigation, cargo handling and stowage, controlling the safe operation and care for person on board the ship at the operational level

Program Outcomes:

The graduates of Bachelor of Science in Marine Transportation should have developed the ability to:

- A. A graduate of BSMT shall be able to demonstrate the ability to perform the competence, at the operational level under Table A-II/1 and some elements of Table A-II/2 of the STCW Code;
- B. Engage in lifelong learning and understanding of the need to keep abreast of the development in Maritime Practice;
- C. Communicate orally and in writing using both English and Filipino;
- D. Work independently and in multi-disciplinary and multi-cultural teams;
- E. Act in recognition and practice of professional, social and ethical accountability and responsibility;
- F. Preserve and promote "Filipino historical and cultural heritage" (RA 7722)
- G. Apply knowledge in Mathematics, Science and Technology in solving problems related to the profession and the workplace;
- H. Evaluate the impact and implications various contemporary issues in the global and social context of the profession;
- I. Engage in lifelong learning and keep abreast with developments in the field of specialization and/or profession;
- J. Use appropriate techniques, skills and modern tools in the practice of the profession in order to remain globally competitive; and
- K. Conduct research using appropriate research methodologies.

CLASSROOM POLICIES ON DATA PRIVACY

What is Data Privacy Act of 2012?

1. Protects the privacy of individuals while ensuring free flow of information to promote innovation and growth.
2. Regulates the collection, recording, organization, retrieval, consultation, use, consolidation, blocking, erasure or destruction of personal data.

3. Ensure that the Philippines complies with international standards set for data protection through National Privacy Commission (NPC)

Why it is important?

- We are on the new normal way of conducting classes.
- To protect or secure the privacy of students, instructors and the school from online hackers.

DO'S (For Students):

- Create a strong password when signing up on LMS or in any e-learning platforms.
- Stay alert during online class.
- Use customized or virtual backgrounds to avoid accidental disclosure of personal information.
- Install and regularly update your gadget's anti-virus program.
- Mute your microphone and camera by default especially when not speaking.
- Turn off your camera and microphone when leaving the station for bathroom and breaks etc.

DON'TS (For Students):

- Connect phones and laptops to free and public WIFI networks. (In unavoidable circumstances, ensure that the public network has a password and is not accessible to everyone)
- Send assignments, projects and other requirements to teachers via social media.
- Spam the chat.
- Take screenshots of the video feed of the instructors and classmates.
- Give out online links and passwords to people who should not be in class.
- Cheating otherwise known as "violations of the rules"

Name of Program	:	Bachelor of Science in Marine Transportation (BSMT)				
Course Code	:	Nav 1				
Course Descriptive Title	:	Navigation Instruments with compasses	Prerequisite	:	None	
			Co-Requisite	:	None	
Course Credits	:	4 units	Lecture Contact Hours per Week	:	3 hours	
			Laboratory Contact Hours per Week	:	3hour	

Course Description	:	The course includes the use of electronic navigational aids and compasses
Competence	:	A-II/1 F1.C1: Plan and conduct a passage and determine position.
KUP	:	A-II/1 F1.C1KUP4: Ability to determine the ship's position by use of electronic navigational aids A-II/1 F1.C1KUP5: Ability to operate the echo-sounder and apply the information correctly A-II/1 F1.C1KUP6: Compass – magnetic and gyro 6.1. Knowledge of the principles of magnetic and gyro-compass 6.2. Ability to determine errors of the gyro and magnetic compasses, using terrestrial means, and to allow for such errors
Course Outcome/s	:	CO1: Operate electronic navigational equipment such as GPS, AIS, echo-sounder, gyro and magnetic compass CO2: Determine errors of magnetic and gyro compass CO3: Determine the errors of magnetic and gyro-compasses and apply corrections in obtaining true course and bearing:
Faculty Requirements	:	CMO 67, S. 2017, Section 24.2
Reference/s	:	1. Table A-II/1 Function 1: Navigation at the Operational level 2. CMO No.67 series of 2017: Revised PSG for BS Marine Transportation and BS Marine Engineering Programs 3. See more references on the column equipment, material, and references.

PROGRAM OUTCOMES ADDRESSED	INTRODUCTORY	ENABLING	DEMONSTRATIVE
Demonstrate the ability to perform the competence, at the operational level under Table A-II/1 and some elements of Table A-II/2 of the STCW		X	
Communicate orally and in writing using English		X	

Apply knowledge in Mathematics, Science and Technology in solving problems related to the profession and the workplace	X		
Use appropriate techniques, skills and modern tools in the practice of the profession in order to remain globally competitive			X

**PART B
COURSE SYLLABUS**

Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
Competence/s:A-II/1 F1.C1: Plan and conduct a passage and determine position					
		CO1: Operate electronic navigational equipment such as GPS, AIS, echo-sounder, gyro and magnetic compass		<p>Performance task: Set, adjust, and operate a GPS, DGPS, AIS, and Echo-sounder equipment. Make use of the information that can be generated or derived from this equipment.</p> <p><i>GPS, DGPS, and AIS → plotting ship's position</i></p> <p><i>Echo Sounder → determine if the ship can safely navigate in a chosen passage (To be performed in School Ships Simulator)</i></p> <p>Summative Assessment: A simulation using the bridge simulator to assess thorough knowledge and understanding of the content, application)</p>	
KUP: A-II/1 F1.C1.KUP4: Ability to determine the ship's position by use of electronic navigational aids					

Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
<p>LO1.1: Illustrate a navigation bridge with correctly-positioned and available electronic navigational aids.</p> <p>LO1.2: Describe the purpose of each electronic navigational aids identified or placed in the above illustration.</p>	<p>Topic 1: Introduction to different electronic navigational aids found inside the wheelhouse or bridge</p> <p>- Electronic Navigational Aids</p>	<p>Introduction: Introduce the coverage of Topic 1</p> <p>Present the lesson's learning outcome and explain how students will be assessed</p> <p>Lesson Proper:</p> <ul style="list-style-type: none"> - Interactive discussion on the definition of Navigation. - Reading on different electronic navigational aids that can be found inside the wheelhouse or bridge. - Interactive discussion on the different electronic navigation including their specific uses - Highlight the equipment that may be used for determining position - Video presentation on Bridge Navigational equipment and Navigational bridge of a Mega Ship - Virtual presentation of the Bridge Simulator Room - Enumerate the different electronic navigational aids that can be found inside the wheelhouse or bridge. 	<p>LMS: e-skUeIA</p> <p>On line Platform:</p> <ul style="list-style-type: none"> - Google Meet - FB/Messenger Group - Kahoot gamification <p>https://www.youtube.com/watch?v=u7h9DFarOtY&t=288s (Bridge Navigation Equipments)</p> <p>https://www.youtube.com/watch?v=Bj3_peT4u9M (Navigational bridge of a mega ship)</p> <ul style="list-style-type: none"> - Ynion, E.J. (2009). Terrestrial Navigation 1: - Bowditch, N. (2019). American Practical Navigator. Vol. 1, 	<p>Formative Written Assessment</p> <p>Student response on LMS about Topic 1 Quiz on different electronic navigational aids found in the bridge</p> <p>Performance Assessment:</p> <p>Illustrate a navigation bridge with correctly-positioned and available electronic navigational aids. (To be submitted in Google Classroom)</p> <p>After which, the students will describe the purpose of each electronic navigational aids</p>	15 hours
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
		<ul style="list-style-type: none"> - Familiarization of navigational aids in the simulator room or mock bridge and various systems related to determining ship's position using Simulator room 	<ul style="list-style-type: none"> - Karan, C. (2020). Marine Navigation: 30 types of navigational equipment 	<p>he placed in the navigation bridge he has drawn.</p>	

		(Actual Video presentation of School Ships Simulator to be presented in Online Class)	- Vocabulary.com (n.d.) Dictionary Definition: Navigation Bridge Simulator Room Virtual images of navigation bridge with correctly-positioned and available electronic navigational aids	Students will identify the Navigational aids/Instruments in the video presentation in checklist form via Google form)	
LO1.3: Determine the fundamental principles, operational characteristics, component configurations, advantages, and limitations of the	Topic 2: Fundamental principles of various systems related to determining ship's position such as: a. Hyperbolic system b. Loran-C system and E-Loran C system c. Global Navigation Satellite System	Introduction: Introduce the coverage of Topic 2 Present the lesson's learning outcome and explain how students will be assessed (Synchronous Online Class) Lesson Proper: - Research assignment on the operational characteristics of various systems related to determining ship's position . (Student activity by creation of reports with rubrics)	LMS: e-skUeIA On line Platform: - Google Meet - FB/Messenger Group -Google Classroom https://www.youtube.com/watch?v=rDNMgEBdvro	Formative Written Assessment: Student response on LMS about Topic 2 Quiz on the Fundamental principles of various systems related to	4 hours
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
different systems related to determining ship's position.	d. Other GNSS e. GLONASS and GALILEO	- Interactive discussion on the operational characteristics of various systems related to determining ship's position. - Video Presentation on Applying Hyperbolas: Navigation - Video Presentation on What is Galileo (Saved in LMS for students viewing)	(Applying Hyperbolas: Navigation) https://www.youtube.com/watch?v=6oEcc58tEiA (What is Galileo) - Bowditch, N. (2019). American Practical Navigator. Vol. 1,	(Collaborative Project) determining ship's position Research output on the operational characteristics of various systems related to determining ship's position with rubrics	

<p>LO1.4: Explain the significance of being knowledgeable on the different systems related to determining ship's position.</p>	<p>Topic 2: Fundamental principles of various systems related to determining ship's position (cont'd)</p>	<p>- Interactive discussion on the significance of being knowledgeable on the different systems related to determining ship's position. (Synchronous Online Class)</p>	<p>- Wikipedia (2020). Hyperbolic navigation - National Maritime PNT Office (n.d.). Loran-C - Stanford University (n.d.). Loran and e-Loran - Yuseong-gu, D. (2017). GNSS Navigation System - Yuseong-gu, D. (2017). Marine Activities: Application of GNSS</p>	<p>(Authentic Assessment)</p> <p>- Essay writing on the significance of being knowledgeable on the different systems related to determining ship's position.</p> <p><i>Title: How does this working knowledge influence the safety</i></p>	<p>4 hours</p>
<p>Learning Outcomes</p>	<p>Topic</p>	<p>Teaching-Learning Activity (TLA)</p>	<p>Equipment, materials and references</p>	<p>Assessment</p>	<p>Indicative Hours</p>
			<p>- Bowditch, N. (2019). American Practical Navigator. Vol. 1,</p>	<p><i>of navigation of the ship?</i></p>	
<p>LO1.5: Operate GPS, DGPS, and AIS equipment according to the settings prescribed or recommended by the maker.</p>	<p>Topic 3: GPS, DGPS, AIS, and the determination of ship's position</p> <p>c. Global Positioning System</p> <p>- Operating/Setting a GPS and DGPS equipment according to maker's instruction</p>	<p>Introduction: Introduce the coverage of Topic 2</p> <p>Present the lesson's learning outcome and explain how students will be assessed (Synchronous Online Class)</p> <p>Lesson Proper: - Interactive discussion on the operational characteristics of GPS and DGPS related to determining ship's position.</p>	<p>LMS: e-skUeIA</p> <p>On line Platform:</p> <p>- Google Meet - FB/Messenger Group</p> <p>https://www.youtube.com/watch?v=BqipQZqykKA (GPS fundamental)</p> <p>https://www.youtube.com/watch?v=Xj3LBNBecnM</p>	<p>Written Assessment:</p> <p>Student response on LMS about Topic 3 Quiz on GPS, DGPS, AIS</p> <p>Performance Assessment:</p> <p>Operating and setting a GPS,</p>	<p>4 hours</p>

	<p>B. Automatic Identification System</p> <p>- Operating/Setting an AIS equipment according to maker's instruction</p>	<p>- Make a table comparing the DGPS and GPS in terms of their operational principles, characteristics, advantages, and limitations</p>	<p>(What is the difference between GPS and DGPS)</p> <p>- Bowditch, N. (2019). American Practical Navigator. Vol. 1,</p>	<p>DGPS, or AIS equipment with rubrics</p> <p>Tabulated comparison output between DGPS and GPS in terms of their operational principles, (Individual output)</p>	
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
				characteristics, advantages, and limitations with rubrics	
<p>LO1.6: Read and Plot the coordinates derived from GPS, DGPS or AIS equipment accurately onto WGS-84 charts and charts with non WGS-84 datum.</p>	<p>Topic 3: GPS, DGPS, AIS, and the determination of ship's position</p> <p>c. Plotting Basics</p> <ul style="list-style-type: none"> • Reading or interpreting scales in latitude and longitude. • Plotting ship's coordinates (latitude and longitude) <p>B. Global Positioning System</p>	<p>- Video presentation on Latitude and Longitude (Saved in LMS for students viewing)</p> <p>- Drills on reading coordinates from the GPS, DGPS, and AIS and plotting them accurately onto WGS-84 charts and charts with non WGS-84 datum</p> <p>- Demonstration and return demonstration on plotting the coordinates derived from GPS, DGPS and AIS equipment.</p>	<p>https://www.youtube.com/watch?v=upqmeigr79c</p> <p>https://www.youtube.com/watch?v=EDCTBwoCFnY (Latitude and Longitude – Sectional Chart)</p> <p>- Elprocus (n.d.). What is GPS: How GPS System Works?</p> <p>- Study (2018). What is DGPS Differential GPS?: How does it works?</p> <p>- GPS.gov (2006). Marine Application: GPS</p>	<p>Performance Assessment:</p> <p>Reading and plotting coordinates derived from a GPS, DGPS, or AIS receivers accurately onto WGS-84 and non WGS-84 charts. (To be performed in School Ships Simulator)</p>	8 hours

	<ul style="list-style-type: none"> • Reading coordinates from the GPS/DGPS • Plotting GPS/DGPS derived positions accurately onto WGS-84 		<ul style="list-style-type: none"> - Icomuk (n.d.). What is AIS & How Does It Works? - Bhattacharjee, S. (2019). Marine Navigation 		
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
	<p>charts and charts with non WGS-84 datum</p> <p>C. Automatic Identification System</p> <ul style="list-style-type: none"> • Reading coordinates from an AIS. • Plotting a AIS derived position accurately onto WGS-84 charts and charts with non WGS-84 datum 		<ul style="list-style-type: none"> - WikiHow (2020). Read Latitude and Longitude on a Map - Bowditch, N. (2019). American Practical Navigator. Vol. 1, 		

KUP: A-II/1 F1.C1.KUP5: Ability to operate the echo-sounder and apply the information correctly

LO1.7: Explain the significance of ensuring that the echo-sounder always provide correct and reliable information.	Topic 4: Principles of Echo-sounder	<p>Introduction: Introduce the coverage of Topic 4</p> <p>Present the lesson's learning outcome and explain how students will be assessed (Synchronous Online Class)</p> <p>Lesson Proper: - Interactive discussion on the principles applied in an echo-sounder</p>	<p>LMS: e-skUeIA</p> <p>On line Platform: - Google Meet - FB/Messenger Group</p> <p>https://www.youtube.com/watch?v=4SprKjgDwAk</p>	Written Assessment Student response on LMS about Topic 4 Quiz on Echo Sounder	3 hours
			Equipment,		Indicative

Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	materials and references	Assessment	Hours
		<ul style="list-style-type: none"> - Illustrate an echo-sounder device (chart and digital). - Label the buttons and describe their functions. 	(Echo-sounder: Principles, Working, and Block Diagram)	Output presentation of the illustration of Echo Sounder with rubrics.	
<p>LO1.8: Apply information derived from the echo sounder.</p>	<p>Topic 4: Echo-sounder basic operations</p>	<ul style="list-style-type: none"> - Demonstration and return-demonstration in the application of information derived from the echo sounder. - Video presentation on Echo sounder: Principles of operation (Saved in LMS for students viewing) 	<p>https://www.youtube.com/watch?v=HoCRBdHt8O4 (Echo sounder on ships – Principle of operation)</p> <ul style="list-style-type: none"> - Bright Hub PM (2020). Echo Sounder. - Cult of Sea (n.d.). Echo Sounder – Principle, Working & Errors - Oways (2019). Echo Sounder on Ships: Components of Echo Sounder 	<p>Performance Assessment Demonstration on the following:</p> <ol style="list-style-type: none"> a. Setting, operating, and adjusting an echo-sounder to acquire optimum reading b. Reading information from echo-sounder c. Applying the information obtained from the echo-sounder correctly 	<p>3 hours</p>
<p>CO2: Determine errors of magnetic and gyro compass</p>				<p>(To be performed in School Ships Simulator)</p> <p>Summative Assessment: A simulation using the bridge simulator to assess thorough knowledge and understanding of the content, application)</p> <p>Performance Assessment: Operate a gyro-compass and magnetic compass.</p>	

	<p>Determine the value of the gyro-error and make adjustment to gyro course or heading.</p> <p>Correct the value of the local variation as to the current year. (To be performed in School Ships Simulator)</p> <p>Summative Assessment: A simulation using the bridge simulator to assess thorough knowledge and understanding of the content, application)</p> <p>Correcting or un-correcting the Compasses (To be performed in School Ships Simulator)</p> <p>Summative Assessment: A simulation using the bridge simulator to assess thorough knowledge and understanding of the content, application)</p>
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A-II/1 F1.C1KUP6: Compass – magnetic and gyro

6.1. Knowledge of the principles of magnetic and gyro-compass

Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
LO2.1: Describe how the Earth's magnetism affects the ship's compass	Topic 5: Theory of Earth's magnetism and its relation to ship's compass	Introduction: Introduce the coverage of Topic 5 Present the lesson's learning outcome and explain how	LMS: e-skUelA On line Platform: - Google Meet	Written Assessment: Student response	3 hours

		<p>students will be assessed</p> <p>Lesson Proper: - Interactive discussion on the Earth's magnetism affecting the ship's compass</p> <p>(Synchronous Online Class)</p>	<ul style="list-style-type: none"> - Phone & e-mails - FB/Messenger Group - Via Zoom - Cult of Sea (n.d.). Magnetic Compass & Ship Magnetism 	<p>on LMS about Topic 5 Quiz on Theory of Earth's magnetism</p> <p>Write a narrative that will describe how the Earth's</p>	
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
		<ul style="list-style-type: none"> - Demonstration and return-demonstration on the use of vector diagrams in finding the field at a point resulting from two given fields. - Differentiate between Deviation and variation 	<ul style="list-style-type: none"> - Bowditch, N. (2019). American Practical Navigator. Vol. 1, 	<p>magnetism affects the ship's deviation.</p>	
<p>LO2.2: Correct the magnetic variation found in the nautical chart or navigational instruments as to the current year.</p>	<p>Topic 6: Magnetic Variation</p>	<p>Introduction: Introduce the coverage of Topic 6</p> <p>Present the lesson's learning outcome and explain how students will be assessed (Synchronous Online Class)</p> <p>Lesson Proper: - Locating the information regarding magnetic variation of certain locality in a Nautical Chart or navigational instrument.</p> <p>- Correcting the value of the magnetic variation that can be found in the nautical chart or navigational instrument</p>	<p>LMS: e-skUelA</p> <p>On line Platform: - Google Meet - Phone & e-mails - FB/Messenger Group - Via Zoom</p> <p>- Bowditch, N. (2019). American Practical Navigator. Vol. 1,</p> <p>- Sailtrain Ltd. (2020). The marine compass</p> <p>- Opensourcegisblog (2015). Adding Magnetic Nautical Chart</p>	<p>Performance Assessment: Given a chart, correct the value of the magnetic variation and make it updated for the current year or the year in question</p>	4 hours
		Midterm Examination			1 hour

Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
LO2.3: Determine the purpose, construction, confirming, marking, care and maintenance related to magnetic compass as per SOLAS requirement.	Topic 7: The Magnetic Compass	Introduction: Introduce the coverage of Topic 7 Present the lesson's learning outcome and explain how students will be assessed Lesson Proper: - Interactive discussion on the purpose, construction, confirming, marking, care and maintenance related to magnetic compass as per SOLAS requirement. (Synchronous Online Class)	LMS: e-skUeIA On line Platform: - Google Meet - Phone & e-mails - FB/Messenger Group - Via Zoom - Bowditch, N. (2019). American Practical Navigator. Vol. 1, - Sternberg (n.d.) SOLAS Requirements - Gard (2016). Maintenance and adjustment of magnetic compasses	Written Assessment: Student response on LMS about Topic 7 Quiz on Magnetic Compass	3hours
LO2.4: Sketch a section through the magnetic compass to show the float chamber, pivot support, and arrangements of magnets.	Topic 7: The Magnetic Compass	- Illustrate the section of magnetic compass. - Video presentation on the Parts of the Magnetic Compass (Saved in LMS for students viewing)	https://www.youtube.com/watch?v=KXJblpis87s&t=72s (Parts of magnetic compass)	Written Assessments: Sketch a section through the magnetic compass showing the float chamber, pivot support, and	3 hours
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
			https://www.youtube.com/watch?v=xgHIPllV3	arrangements of magnets.	

			Ow&t=36s (parts of the magnetic compass)		
LO2.5: Remove the bubbles from the magnetic compass.	Topic 7: The Magnetic Compass	- Demonstration and return-demonstration on the removal of bubbles from the compass bowl.	https://www.youtube.com/watch?v=YHcUUUDD7RE&t=6s (Removing bubble in magnetic compass) - Sharma, A. (2016). How to remove bubbles from Magnetic compass?	Performance Assessment: Removing the bubbles from the magnetic compass.	4 hours
LO2.6: Describe a typical magnetic compass used to take true and relative bearings.	Topic 8: Course and Bearing -Taking bearing with the use of a magnetic compass <i>- The 32-points of a compass card</i>	Introduction: Introduce the coverage of Topic 8 Present the lesson's learning outcome and explain how students will be assessed Lesson Proper: - Interactive discussion on the typical magnetic compass used to take true and relative bearings.	LMS: e-skUeIA On line Platform: - Google Meet - Phone & e-mails - FB/Messenger Group - Via Zoom - Ynion, E.J. (2009). Terrestrial Navigation 1:	Student response on LMS about Topic 8 Quiz on Course and Bearing Written Assessment - Oral recitation on 32 pts. of a	4hours
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
		- Name the 32 pts. in a compass card. - Illustrate a compass card and label its 32-points. - Video presentation on How to Box a Compass (Saved in LMS for students viewing)	https://www.youtube.com/watch?v=UE5NzBAg8pQ (How to Box a Compass)	compass with rubrics. Output presentation of compass card illustration with rubrics.	
LO2.7: Take the	Topic 8:	- Differentiate between true and relative bearing	https://www.youtube.com/	Performance	

bearing (true and relative) of an object with the use of a magnetic compass. and azimuth circle	Course and Bearing - Taking bearing with the use of a magnetic compass <i>- Bearings (True and Relative)</i> <i>- Bearings of an object with the use of magnetic compass</i>	<ul style="list-style-type: none"> - Discussion on azimuth circle and its uses - Video presentation on Compass and True Bearing (Saved in LMS for students viewing) - Demonstration and return-demonstration on taking bearings of an object with the use of a magnetic compass and azimuth circle 	watch?v=tsGIMIn59Wc&t=118s (Compass bearing and true bearing) https://www.youtube.com/watch?v=equqZo0-ggU (Azimuth Circle and Relative bearing of ships) https://www.youtube.com/watch?v=9nDkR-X9dqq (True bearing and relative bearing: Definition and conversion)	Assessment: Demonstration on taking bearings of an object with the use magnetic compass and azimuth circle	5 hours
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
LO2.8: Describe a typical gyro-compass in reference to the characteristics of a free gyroscope and its control and damping arrangements.	Topic 9: Gyro Compass - Principles of a gyroscope	Introduction: Introduce the coverage of Topic 9 Present the lesson's learning outcome and explain how students will be assessed Lesson Proper: <ul style="list-style-type: none"> - Research assignment on the principles governing a gyroscope - Interactive discussion on Gyro Compass – Basic Principle, Operation and Usage on Ships. 	LMS: e-skUeIA On line Platform: <ul style="list-style-type: none"> - Google Meet - Phone & e-mails - FB/Messenger Group - Via Zoom <ul style="list-style-type: none"> - Cult of Sea (n.d.). Bridge Equipment: Gyro Compass – Basic Principle, Operation and Usage on Ships. 	Written assessment Student response on LMS about Topic 9 Quiz on Gyro Compass Research output on the principles governing a gyroscope	2 hours
LO2.9: Describe the typical characteristics	Topic 9: Gyro Compass - The gyro-compass	<ul style="list-style-type: none"> - Interactive discussion of the typical characteristics of gyro-compass in reference to its support assembly, 	<ul style="list-style-type: none"> - Bowditch, N. (2019). American Practical Navigator. Vol. 1, 	Written Assessment:	3 hours

of gyro-compass in reference to its support assembly, methods and its operations of maintaining the heading indication in line with the axis of the gyro, and the process to which the heading is	and repeater system	methods and its operations of maintaining the heading indication in line with the axis of the gyro, and the process to which the heading is transmitted to the repeaters. (Synchronous Online Class) - Research assignment on the different gyro-compass alarms and performance standards required for a gyro-compass - Illustrating, labeling the parts, and describing the function of each part of a typical gyro compass assembly.	- Shiksha, K. (2012). Gyro Compass: Parts of Gyro Compass https://www.youtube.com/watch?v=tmmsOhJ5Z_U&list=TLPQMTkwNzlwMjBy1V55rTBbvg&index=3 (Parts of Gyro Compass)	Essay writing about the typical gyro-compass in reference to its support assembly, methods of maintaining the heading indication in line with the axis of	
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
transmitted to the repeaters.		- Video presentation on the Parts of Gyro Compass (Saved in LMS for students viewing)		the gyro, and the process to which the heading is transmitted to the repeaters with rubrics. Output on Illustrating, labeling the parts, and describing the function of each part of a typical gyro compass assembly	
LO2.10: Adjust and align a gyro-compass repeaters to the gyro compass heading.	Topic 9: Gyro Compass The gyro-compass and repeater system	- Demonstration and return-demonstration of how to adjust and align a gyro-compass repeater to the gyro compass heading. (Synchronous Online Class)	- Bowditch, N. (2019). American Practical Navigator. Vol. 1, https://www.youtube.com/watch?v=w3zTCM2qyE Synchronizing gyro	Performance Assessment Demonstrate performance for adjusting and aligning a gyro-	3 hours

			repeater on the bridge)	compass repeater to the gyro compass heading	
<p>CO3: Determine the errors of magnetic and gyro-compasses and apply corrections in obtaining true course and bearing.</p>				<p>Performance Tasks Determine correctly the errors in magnetic and gyro-compasses. And apply to courses and bearings. (To be performed in School Ships Simulator) Summative Assessment: A simulation using the bridge simulator to assess thorough knowledge and understanding of the content, application)</p>	
<p>KUP: A-II/1 F1.C1.KUP6. Compass –magnetic and gyro A-II/1 F1.C1.KUP 6.1: Knowledge of the principles of magnetic and gyro-compasses A-II/1 F1.C1.KUP 6.2: ability to determine errors of the gyro and magnetic compasses, using terrestrial means, and to allow for such errors</p>					
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
<p>LO3.1: Discuss the different errors of the gyro-compass, their causes, characteristics, and methods for correcting them.</p>	<p>Topic 10: Errors of the gyro compass and their corrections</p>	<p>Introduction: Introduce the coverage of Topic 10</p> <p>Present the lesson’s learning outcome and explain how students will be assessed (Synchronous Online Class)</p> <p>Lesson Proper: - Interactive discussion on the different errors of the gyro compass, the conditions that cause them, and their corrections.</p>	<p>- Bowditch, N. (2019). American Practical Navigator. Vol. 1:</p>	<p>Written Assessment:</p> <p>Make a summary table showing the different errors of the gyro-compass, their causes, characteristics, and correction methods.</p>	<p>2 hours</p>

Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
LO3.2: Determine the values of gyro-errors, total	Topic 11: Compass Course and Bearing Corrections	Introduction: Introduce the coverage of Topic 11	LMS: e-skUeIA On line Platform:	Written assessment	4 hours
appropriate errors, variation, and deviation using appropriate approaches or methods	- by variation and deviation	Present the lesson's learning outcome and explain how students will be assessed (Synchronous Online Class) Lesson Proper: - Interactive discussion on the different types of North and the different types of bearing as to their uses - Demonstration and return-demonstration on obtaining the bearing of an object using the gyro-compass or repeater - Determining the values of the gyro error obtained from terrestrial object, and the true course (Demonstration, return-demonstration, and drills) - Demonstration on the use of azimuth circle Video presentation on azimuth circle and bearing of ships. (Saved in LMS for students viewing)	- Google Meet - FB/Messenger Group - Bowditch, N. (2019). American Practical Navigator. Vol. 1: https://www.youtube.com/watch?v=equqZo0-qgU&t=4s (azimuth circle and bearing of ships) http://www.skysailtraining.co.uk/compass_variation_deviation_magnetic.pdf	Student response on LMS about Topic 11 Quiz on Compass Course and Bearing Corrections Performance Assessment Differentiate the different types of North and the different types of bearing by means of illustration. Demonstrate on how to use the azimuth circle	Indicative Hours
LO3.3: : Solve for the values related to compass' errors using appropriate approaches or methods.	Topic 11: Compass Course and Bearing Corrections	- Interactive discussion on the process for correcting/uncorrecting the compass. - Solve problems on correcting/uncorrecting compasses. - Solve problems on getting the True and relative bearing	- Bowditch, N. (2019). American Practical Navigator. Vol. 1: https://www.youtube.com/watch?v=aM5e1yRUxEo (Correcting compasses)	Performance Assessment Solve word problems relevant to determining the	4 hours

Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
	Topic 11: Compass Course and Bearing Corrections (cont'd)	- Video presentation on True and Relative Bearing: Definition and conversion (Saved in LMS for students viewing)	https://www.youtube.com/watch?v=Kd8YQ4uHF44 (Uncorrecting compasses) - Ynion, E.J. (2009). Terrestrial Navigation 1 - Padilla, A. C. Jr. (2000). Review Notes for Deck Officers https://www.youtube.com/watch?v=9nDkR-X9dgo (True and relative bearing:Definition and conversion)	values of gyro-errors, total errors, variation, and deviation using appropriate approaches or methods. Solve word problems relevant to determining the True and Relative Bearing	3 hours
LO3.4: Construct a deviation table or deviation curve.	Topic 12: The errors of the magnetic compass and their corrections <i>- Importance of keeping a record of observed deviation</i>	Introduction: Introduce the coverage of Topic 12 Present the lesson's learning outcome and explain how students will be assessed (Synchronous Online Class) Lesson Proper:	LMS: e-skUeIA On line Platform: - Google Meet - Phone & e-mails - FB/Messenger Group - Via Zoom	Written Assessment Student response on LMS about Topic 12 Quiz on errors of the	8 hours
Learning Outcomes	Topic	Teaching-Learning Activity (TLA)	Equipment, materials and references	Assessment	Indicative Hours
	- <i>The five approximate coefficients (A, B, C, D, and E)</i>	- Demonstration and return-demonstration on the methods for obtaining a table of deviations.	- Cape Compass (1998).The five approximate coefficients	magnetic compass and their corrections	

	<ul style="list-style-type: none"> - Deviation due to permanent magnetism - Heeling error, its causes and variation and the actions to correct it. - Methods of obtaining a table of deviations - Using a table of deviation for obtaining approximate coefficients - Basic magnetic compass adjustment 	<ul style="list-style-type: none"> - Demonstration and return-demonstration on the use of the deviation table for obtaining the values of the approximate coefficients - Demonstration and return-demonstration on basic magnetic compass adjustment (moving compass corrector and recording residual deviations) (Synchronous Online Class) 	<p>(A, B, C, D, and E): Compass Deviation Analysis Explained.</p> <ul style="list-style-type: none"> - Wikipedia (2020). Deviation due to permanent magnetism: Magnetic deviation - Compassadjuster (2010). Correcting Heeling Error - Navyadministration (n.d.) Typical Deviation Table -National Geospatial-Intelligence Agency (2004). Handbook of Magnetic Compass Adjustment: Chapter III Theory of magnetic compass adjustment 	<p>Essay writing with rubrics: "Reflection activity: Why is keeping a record of observed deviation for different course important?"</p> <p>Performance Assessment: Demonstrate the construction of deviation table or curve in reference to the local variation by swinging the vessel and record the headings of the compasses with checklist-based scoring system.</p>	
		Final Examination			1 hour

GRADING SYSTEM:

Grading Components		General Ed./ Professional Courses (Lecture/Lab)	Research Courses	Skill-based Courses
In-person instruction	LMS-Based/Modular			
PART 1	Access to LMS. Completion of Activities, Assignments, Answers in Chat/Forum/Module (including participation in synchronous sessions, if given)	15 %	15%	15%
Recitation/Participation				
Course Outputs (Written, Performed Projects, Oral Report/Presentation)	Required Major Final Output	20%	25%	30%
PART 2	Quizzes (Synchronously or asynchronously given)	15%	15%	10%
Quizzes				

Long Test (Students Activities)	(Optional or integrated with the term exam)	15%	20%	20%
Midterm/Final Exam	Term Examination	35%	25%	25%
TOTAL		100%	100%	100%

COMPUTATION OF FINAL GRADE

Midterm Grade
Tentative Final Grade
FINAL GRADE

Part 1 + Part 2
Part 1 + Part 2
(50% Midterm + 50% Tentative Final)

Prepared by:

CAPT. REX N. PLAMERAS