

Integrated Navigation System

Basic Course Specification								
Course Title		Course Code		Program on which the course is given				
Integrated Navigation System		NS436		Bachelor				
Academic Year		Specialization (units of study)		Pre-Requisites				
2020/2021		Theoretical (2hrs /week)		• BS235				
		Application (2hrs /week)		• BS262				
		Credit 3 Cr		• BS263				
Overall Course Objectives								
<ul style="list-style-type: none">• Understand the proper use of the ECDIS, its role as anti-grounding tool, and as a navigational tool in voyage execution• Understand the proper use of the Radar and its role as anti-collision tool• Understand and demonstrate the integrated bridge systems and voyage planning (Coastal and Ocean), as per the requirement of the STCW 78 convention as amended• Apply proper overlaying between EDIS, Radar & ARPA and AIS								
Course Learning Outcomes. By successful completion of the course each student will be able to:								
Topic				Linking to PLOs	Midterm Assessment	12 th Week Assessment	Class Activities	Final Exam
1. Compare between vector data and raster data in ECDIS.				a,b,d,	√		√	√
2. Differentiate between radar target and AIS target				a, ,d,e	√		√	√
3. Use different types of radar display modes.				a,b, ,e		√	√	√
4. Apply advanced manual plotting to avoid collision.				a,b,d,e		√	√	√
5. Execute sailing watch using radar independently, radar - ECDIS overlay.				a,d,e,j		√	√	√
6. Perform various interactive sailing tasks using integrated equipment.				a,d, j		√	√	√
Course Content								
Lec./ Week #	Topic			Hrs. #	Theoretical	Application		
1	<ul style="list-style-type: none">• <u>Electronic Chart Display& Information System (ECDIS)</u>• Legal aspect and requirements – Principle types of Electronic Charts.• Presentation of ECDIS data – Basic navigational functions- Updating-Errors of display data			4	2	2		
2	<ul style="list-style-type: none">• <u>Electronic Chart Display& Information System (ECDIS)</u>• Sensors - Specific navigational functions			4	2	2		

	<ul style="list-style-type: none"> Integrity Monitoring- Back-up- Risk of over-reliance on ECDIS 			
3	<ul style="list-style-type: none"> <u>Electronic Chart Display& Information System (ECDIS)</u> ECDIS Familiarization and passage plan execution Different types of sensors-Chart organization, Chart information and Chart scaling- Information layers and display categories. Setup and Maintain Radar Display and AIS, Operate Radar Controls - identify different types of display modes (presentation and orientation) –Measure Ranges and Bearings (familiarization) 	4	2	2
4	<ul style="list-style-type: none"> <u>Electronic Chart Display& Information System (ECDIS)</u> Perform passage planning, Passage planning by table and by chart including safety setting, route check and route monitoring Solo ECDIS Navigation in open sea, maintain safe navigation with an AIS overlay option 	4	2	2
5	<ul style="list-style-type: none"> <u>Electronic Chart Display& Information System (ECDIS)</u> Solo ECDIS Navigation in Coastal Water; maintain safe navigation with Radar overlay option. Solo ECDIS Navigation in Confined Water, maintain safe navigation in confined water by using any means of overlay 	4	2	2
6	<ul style="list-style-type: none"> <u>Electronic Chart Display& Information System (ECDIS)</u> Solo ECDIS Navigation in Confined Water, maintain safe navigation in confined water by using any means of overlay. 	4	2	2
7	<ul style="list-style-type: none"> Apply Updates, Documentation, Integrity Monitoring and Back-up 7th Week Exam 	4	2	2
8	<ul style="list-style-type: none"> <u>Automatic Identification System (AIS)</u> Use of AIS at sea Radar/ARPA – AIS Overlay 	4	2	2
9	<ul style="list-style-type: none"> <u>Use of Radar to maintain safety of navigation</u> Set Up and Operate Radar in accordance with manufacturer's instructions – identify different types of display modes (presentation and orientation) Identify aids to Radar navigation and safety, Use Parallel indexing techniques in Radar navigation - Apply COLREG to avoid collision or close encounter 	4	2	2
10	<ul style="list-style-type: none"> <u>Use of Radar to maintain safety of navigation</u> <i>Describe and operate an ARPA system</i> Fix ship's position by radar – identify aids to navigation - Proper use of radar technique (P.I.) 	4	2	2
11	<ul style="list-style-type: none"> <u>Use of Radar to maintain safety of navigation</u> <i>Determine the threat of collision based on constant bearings and decreasing ranges</i> <i>Perform manual plotting (action taken by own ship)</i> 	4	2	2
12	<ul style="list-style-type: none"> ARPA Tracking Capabilities and Limitations 	4	2	2

	Operate an ARPA system (obtain information from ARPA display) –Acquire targets- Understanding the graphic displays • 12th Week Exam			
13	<ul style="list-style-type: none">• <u>Use of Radar to maintain safety of navigation</u>• <i>Perform manual plotting (action taken by target)</i>• Acquire targets and identifying threat of collision with one target in compliance with COLREGS- Use Trial Maneuvering mode.	4	2	2
14	<ul style="list-style-type: none">• <u>Use of Radar to maintain safety of navigation</u><ul style="list-style-type: none">• Perform manual plotting (true plotting)• Identify threat of collision with different targets and compliance with COLREGS to avoid the risk of collision-Identify errors in display data	4	2	2
15	<ul style="list-style-type: none">• Integrated Bridge System (IBS)• Maintain safe navigation using Integrated Bridge System (IBS)	4	2	2
16	Final Assessment			
Total Hours		60	30	30
Teaching & Learning Methods		Facilities Required for Teaching & Learning Methods		
<ul style="list-style-type: none">• Explaining and demonstrating the lesson contents• Delivery of experience• Discussing and asking questions to interact with students & solving examples.		<ul style="list-style-type: none">• White Board& Data Show• Bridge Simulator		
Students Assessment Methods				
Assessment Schedule				
Assessment#1		Week 7		
Assessment#2		Week 12		
Assessment#3		Week 16		
Grading Method				
Midterm Assessment	Written exam	30%		
12 th week Assessment	Practical Exam	20%		
Class Activities	Participation –Practical Performance	10%		
Final Exam	Written exam	40%		
Total		100 %		
Assessment criteria shall meet the standards of the STCW 78 convention "as amended"; and in the light of the related IMO model courses.				
List of References				
Course Notes		Essential Books		
None		<ul style="list-style-type: none">• Electronic Navigation Systems L. Tetley & D. Calcutt 2011• ECDIS and Positioning Vol 2 Integrated Bridge Systems A. Norris FNI, 2010		

Recommended Books	Periodicals and Publications
<ul style="list-style-type: none"> • Electronic Chart Display and Information System for improving navigation safety • Radar and AIS Vol 1 Integrated Bridge Systems A. Norris FNI, 2010 	<p>The navigation control manual. A. G. Bole, W.O.Dinely, C.E. Nicholis</p> <ul style="list-style-type: none"> • Radar and AIS Vol 1 Integrated Bridge Systems A. Norris FNI, 2010
Others (websites, e-books...etc)	
<ul style="list-style-type: none"> • International Convention on Standards of Training, Certification and Watch keeping for Seafarers (STCW), as amended. • International Convention for the Safety of Life at Sea (SOLAS), (IMO Sales No. IE110E) SOLAS - Consolidated Edition, 2020 • <i>IMO Model Course 1.27, The Operational Use of ECDIS</i>, 2000 • 1974 SOLAS Convention, Regulations V/19, V/20 and V/27, as amended 2009, IMO Res. MSC 282(86) Revised ECDIS Performance Standards, MSC.232(82), IMO, 12/2006 • ECDIS Performance Standards, IMO Resolution A.817(19) as adopted 11/1995, including Appendices 1 – 5, Appendix 6 as adopted 11/1996 Res. MSC.64(67), and Appendix 7 as adopted 12/1998 Res. MSC.86(70) <i>Guidelines for Voyage Planning</i>, IMO Res. A.893(21) 	
Accreditation Bodies	
<p>*Egyptian Authority for Maritime Safety (EAMS)</p> <p>*European Commission (EC)</p> <p>**ISO (9001 – 2015) DNV-GL</p> <p>*Central Evaluation and Accreditation Agency Hanover, Germany (ZEVA)</p> <p>*Ministry of Education (KSA)</p> <p>*Ministry of Higher Education (Greece)</p> <p>*Ministry of Higher Education (Oman)</p> <p>*Commission for Academic Accreditation (CAA), Ministry of higher Education (UAE)</p> <p>*University of Plymouth, United Kingdom (dual degree)</p>	

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Date: November 2020

