

Ship Compasses & Auto pilot

Basic Course Specification		
Course Title	Course Code	Program on which the course is given
Ship Compasses & Auto pilot	BS 261	Bachelor
Academic Year	Specialization (units of study)	Pre-Requisites
2020-2021	Theoretical (2hrs /week) Application (2hrs /week) Credit 3 Cr	BA112N

Overall Course Objectives

- To provide the student with the understanding of the magnetic compass, gyroscopic compass, fluxgate compass, automatic pilot.
- To provide the student with the understanding of the theory of operation, components, and errors. How to use all indicated instruments for safe and efficient navigation in accordance with STCW code table II/1.

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. Describe the shape of the magnetic field produced by the earth's and ship magnetism.	a	√			
2. Demonstrate the principles and components of the magnetic compass.	a, b	√			
3. Determine the errors and corrections of the magnetic compass.	a, b	√	√		
4. Explain the systems and principles under the control of the master-gyro, the operation, care and errors of the main types of gyro compasses used at sea.	a, b			√	
5. Illustrate the importance of the damping system in the gyro compass.	a			√	√
6. Describe the principle and operating of the fluxgate compass	a			√	√
7. Describe the principle and operating of the Auto pilot device			√		√

Course Content

Lec./ Week #	Topic	Hrs. #	Theoretical	Application
1	<ul style="list-style-type: none"> • Theory of magnetism, Laws of magnetism, Magnetic field of a magnet, hard iron; soft iron and intermediate iron. • Magnetism of the earth - magnetic field of the earth, earth magnetic poles, magnetic equator, angle of dip. 	4	2	2

Course Content				
Lec./ Week #	Topic	Hrs. #	Theoretical	Application
2	<ul style="list-style-type: none"> Magnetism of the earth – components of the earth total magnetic field, magnetic variation, directive force (H). The ships deviation- disturbing force, the effect of the horizontal component (H) and the disturbing force vector on the magnetic compass needle. 	4	2	2
3	<ul style="list-style-type: none"> The effect of the permanent magnetism components (p, Q, R) with suitable sketches. The ships deviation- the effect of the induced magnetism rod (-c) & rod (+c) with suitable sketches	4	2	2
4	<ul style="list-style-type: none"> The effect of the induced magnetism rod (-a) & rod (-e) with suitable sketches. The causes of the approximate coefficients. 	4	2	2
5	<ul style="list-style-type: none"> Calculates the deviation by using the coefficients, approximate coefficients table. The magnetic compass – construction, composition of liquid, remove air bubbles, check that the card is turning freely. 	4	2	2
6	The magnetic compass - lubber line, binnacle and its correcting devices, regular check of the error, comparison of (standard, steering and gyro) compass.	4	2	2
7	<ul style="list-style-type: none"> Introduction of gyro compass 7th Week Exam 	4	2	2
8	<ul style="list-style-type: none"> The Gyro Compass - the free gyroscope and its gimbals, rigidity in space (inertia) of free gyroscope. The Gyro Compass – precession property of the free gyroscope, rate of precession, apparent movement (tilt, drift, rate of tilt, rate of drift). 	4	2	2
9	<ul style="list-style-type: none"> The Gyro Compass- different apparent movement of the free gyroscope due to its position and latitude. The Gyro Compass- converts the free gyroscope to north-seeking gyroscope by use of gravity control 	4	2	2
10	<ul style="list-style-type: none"> The Gyro Compass -the use of damping to cause settling of the axis of the free gyroscope to produce a gyrocompass. 	4	2	2
11	<ul style="list-style-type: none"> The Gyro Compass – construction, transmit heading to the repeaters, settling time, aligned the repeaters with the master unit, the interfacing of gyro compass. 	4	2	2
12	<ul style="list-style-type: none"> The correct using of gyro compass 12th Week Exam 	4	2	2

Course Content				
Lec./ Week #	Topic	Hrs. #	Theoretical	Application
13	<ul style="list-style-type: none"> Flux gate compass- single axis and dual axis, principle of operation, components, advantages and uses. 	4	2	2
14	<ul style="list-style-type: none"> Rate of Turn Indicator – principle of operation, components, advantages and uses. 	4	2	2
15	<ul style="list-style-type: none"> The Automatic Pilot – control systems, principle, manual and automatic system. <p>The Automatic Pilot – change over from automatic to manual steering and vice versa, adaptive automatic pilot alarm fitting to the system.</p> <ul style="list-style-type: none"> The Automatic Pilot –regulation, regular checking of auto pilot, changeover. 	4	2	2
16	Final Assessment			
		Total Hours	60	30
Teaching & Learning Methods		Facilities Required for Teaching & Learning Methods		
Explaining and demonstrating the lesson contents – Delivery of experience - discussing and asking questions to interact with students – solving examples.		White Board & Data Show		
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	Written exam		20%	
Class Activities	Participation - Quiz		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.				
Staff Requirements				
Master FG/ Ph.D.				
Course Notes		Essential Books		
Lecturer notes 2019 edition		<ul style="list-style-type: none"> Tetley, L. and Calcutt, D. Electronic Navigation Systems, 3rd ed. ELSEVIER Butterworth, London, 2011. 		

Course Content				
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Recommended Books		Periodicals and Publications		
<ul style="list-style-type: none"> • Lowns borough, R. and Calcutt, D. Electronic Aids to Navigation: Radar and ARPA 1 st ed. London, Edward Arnold, 1993. (ISBN 0-340-59258-3) • JONES, T.G. - Practical navigation for second mates. 2nd ed. Glasgow, Brown, Son & Ferguson Ltd, 1991. (ISBN 0-85174-397-8) <p>Kemp, J.F. and Young, P., Notes on Compass Work, Butterworth-Heinemann, 1990 (ISBN-13: 978-0434910342)</p>		<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) 1974, (IMO Sales No. IE110E) SOLAS - Consolidated Edition, 2020 		
Others (websites, e-books...etc)				
<p>Assembly Resolution A.342 (IX) - Recommendation on Performance Standards for Automatic Pilots Assembly Resolution A.280 (VIII) - Recommendations on Performance Standards for Gyro-Compasses Assembly Resolution A.382 (X) - Magnetic Compasses: Carriage and Performance Standards Assembly Resolution A.424 (XI) - Performance Standards for Gyro-Compasses</p>				

Accreditation Bodies
<ul style="list-style-type: none"> *Egyptian Authority for Maritime Safety (EAMS) *European Commission (EC) *ISO (9001 – 2015) DNV-GL* *Central Evaluation and Accreditation Agency Hanover, Germany (ZEVA) *Ministry of Education (KSA) Ministry of Higher Education (Greece)* *Ministry of Higher Education (Oman) *Commission for Academic Accreditation (CAA), Ministry of higher Education (UAE) *University of Plymouth, United Kingdom (dual degree)

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