



NATIONAL BOARD FOR TECHNICAL EDUCATION, KADUNA

NATIONAL DIPLOMA (ND)

IN

NAUTICAL SCIENCE

CURRICULUM AND COURSE SPECIFICATIONS

MAY 2017

Produced by the National Board for Technical Education (NBTE)

Plot B, Bida Road, P.M.B 2239, Kaduna Nigeria

GENERAL INFORMATION

NATIONAL DIPLOMA IN NAUTICAL SCIENCE

1.0 PROGRAMME GOAL:

The National Diploma (ND) in Nautical Science is aimed at producing technicians with sound theoretical knowledge and practical skills on planning, management, operations and maintenance in maritime industry.

PROGRAMME OBJECTIVES:

On completion of this programme, the ND diplomats should be able to:

- Assist the master in Navigational watch on Boat ship
- Assist the chief officer in cargo works
- Assist the crew in ship mooring operations and ship maintenance
- Prepare students for employment in related works.

2.0 MINIMUM ENTRY REQUIREMENTS

The academic requirements for admission into the ND Nautical Science programme are:

- i. Five (5) G.C.E. (0 level), WASC, NECO or NABTEB subjects passed at not more than two sittings. The subjects must be passed at Credit level and should include English Language, Mathematics, Physics, Geography and any one (1) other subject from the list contained in the most current Directory of Accredited programmes of Polytechnics and similar tertiary technical institutions in Nigeria.
- ii. Passing the Unified Tertiary Matriculation Examination (UTME).

3.0 PROJECT

Every ND student is required to complete successfully in original practical project in any area of specialization during his/her final year on the programme in order to qualify for the award of the diploma.

4.0 CURRICULUM

The curriculum consists of four main components. These are:

- i. General Studies
- ii. Foundation Courses
- iii. Professional Courses

The General Studies component shall include courses in:-Science and Technology related programmes, English Language, Computer/ICT, Entrepreneurship Education and Educational Psychology; Citizenship (the Nigerian constitution), Sociology, and Entrepreneurship, are compulsory. The general Studies component shall account for not more than 10-15% of total contact hours for the programme.

Foundation courses include courses in English, Languages, and Basic Computer Applications. The number of hours will account for about 10-15% of the total contact hours.

Professional Courses are the core Nautical Science courses which give the student the theoretical and practical skills needed to practice as a seafarer. These may account for between 70-80% of the contact hours.

5.0 CURRICULUM STRUCTURE OF ND PROGRAMME IN NAUTICAL SCIENCE

The structure of the ND programme consists of four semesters of classroom, laboratory, workshop and Studio activities in the institution and a semester (3-4 months) of supervised Industrial work experience scheme (SIWES). Each semester shall be of 17 weeks duration made up as follows: 15 contact weeks of teaching, (Lecture and Practical Exercises). Tests, quizzes, examinations and registration take the remaining two weeks.

SIWES shall take place at the end of the second semester of the first year.

6.0 ACCREDITATION

The National Diploma (ND) in Nautical Science shall be accredited by NBTE before the diplomats can be awarded the diploma certificate. Details about the process of accrediting a programme for the award of the ND are available from the Executive Secretary, National Board for Technical Education (NBTE) Plot 'B', Bida Road, P.M.B. 2239, Kaduna, Nigeria.

7.0 CONDITIONS FOR THE AWARD OF THE DIPLOMA

Institutions offering accredited programmes should award the National Diploma (ND) to candidates who have successfully completed the programme after passing prescribed course work, examinations, diploma project and supervised industrial work experience. Such candidates should have completed a minimum of between 90 to 100% semester credit units.

The Diplomas shall be classified as follows:

(a) Grading System

Marked Range%	Letter Grade	Weighting
75– 100	A	4.00
70 – 74	AB	3.50
65 -69	B	3.25
60 – 64	BC	2.50
55 – 59	C	2.75
50 – 54	CD	2.50
45 – 49	D	2.25
40 – 44	E	2.00
Below 40	F	0.00

Classification of Grade

(b) The ND shall be classified as follows on a 4- point grading system: (CGPA)

3.50 and above	Distinction
3.00 – 3.49	Upper Credit
2.50 – 2.99	Lower Credit
2.00 – 2.49	Pass

8.0 GUIDANCE NOTES FOR TEACHERS TEACHING THE PROGRAMME

- 8.1** The new curriculum is drawn in course units. This is in keeping with the provisions of the National Policy on Education which stresses the introduction of the semester credit units, which will enable a student who so wishes to transfer the units already completed in an institution to another of similar standard.
- 8.2** In designing the unit, the principle of the modular system by product has been adopted thus making each of the professional modules, when completed, provide the student with technical operative skills, which can be used for job creation and employment purposes.
- 8.3** As the success of the credit unit system depends on the articulation of programmes between the institutions and industry, the curriculum Content has been written in behavioral objectives, so that the expected performance of the student who successfully completed the courses of the programme is clear to it. There is a slight departure in the presentation of the performance based curriculum which requires the conditions under which the performances are expected to be carried out and the criteria for the acceptable levels of performance to be stated. It is a deliberate attempt to get the staff of the department teaching the programme to write their own curriculum stating the conditions existing in their institution under which the performance can take place and to follow that with the criteria for

determining an acceptable level of performance. The Academic Board of the institution may vet departmental submission on the final curriculum. The aim is to continue to see to it that a solid internal evaluation system exists in each institution for ensuring minimum standards and quality of education in the programmes offered throughout the polytechnic and other specialized institution such as the Maritime sector system.

8.4 The teaching of the theory and practical work should, as much as possible, be integrated. Practical exercises, especially those in professional courses and studio work should not be taught in isolation from the theory. For each course, there should be a balance of theory to practice.

9.0 GUIDELINES ON SIWES PROGRAMMES

9.1 For the smooth operation of the SIWES the following guidelines shall apply.

- a. Institution offering the HND programme shall arrange to place the students in industry. By second semester/second year of the programme, six copies of the master list showing where each student has been placed shall be submitted to the Executive Secretary, NBTE, who shall, in turn authenticate the list and forward it to the Industrial Training Fund, Jos.
- b. The Placement Officer should discuss and agree with industry on the following
 - i. A task inventory of what the student is expected to experience during the period of attachment. It may be wise to adopt the one already approved for each field by the industry based supervisor.
 - ii. The evaluation of the student by the industry based supervisor and the institution-based supervisor.

The final grading of the student during the period of attachment should be weighted more on the evaluation by industry-based supervisor.

9.2 Evaluation of Students during the SIWES

In the evaluation of the student, cognizance should be taken of the following items:

- i. Punctuality
- ii. Attendance
- iii. General Attitude to Work
- iv. Respect for authority
- v. Interest in the field/technical area
- vi. Technical competence as a potential technician in his field.
- vii. Team work

9.3 Grading of SIWES

To ensure uniformity of grading scales, the institution should ensure that the uniform grading of students work which has been agreed to by all polytechnics is adopted.

9.4 The Institution Based Supervisor

The institution-based supervisor should initial the log book during each visit. This will enable him to check and determine to what extent the objectives of the scheme are being met and to assist students having any problems regarding the specific assignments given to them by their industry-based supervisor.

9.5 Frequency of Visit

Institution should ensure that students placed on attachment are visited within one month of their placement. Other visits shall be arranged so that:

1. there is another visit six weeks after the first visits; and
2. final visit in the last month of the attachment.

9.6 Stipend for Students in SIWES

The rate of stipend payable shall be determined from time to time by the Federal Government after due consultation with the Federal Ministry of Education, the Industrial Training Fund and the National Board for Technical Education (NBTE).

9.7 SIWES as a Component of the Curriculum

The completion of SIWES is important in the final determination of whether the student is successful in the programme or not. Failure in the SIWES is an indication that the student has not shown sufficient interest in the field or has no potential to become a skilled technician in field. The SIWES should be graded on a fail or pass basis. Where a student has satisfied all other requirements but failed SIWES he may only be allowed to repeat another four months SIWES at his/her own expense.

**NAUTICAL SCIENCE
NATIONAL DIPLOMA
YEAR I – SEMESTER I**

Course Code	Course Title	L	T	P	CU	CH
NSC 111	SEAMANSHIP I	2	-	2	4	4
NSC 112	INTRODUCTION TO COMPUTER	2	-	2	4	4
NSC 113	INTRODUCTION TO CHART WORK	2	-	2	4	4
MAR 112	TECHNICAL DRAWING/DESCRIPTIVE GEOMETRY	1	-	3	4	4
MTH 112	ALGEBRA AND ELEMENTARY TRIGNOMETRY	1	-	-	1	1
BPH 111	MECHANICS AND PROPERTIES OF MATTER	1	-	1	2	2
STA 111	INTRODUCTION TO STATISTICS	1	-	-	1	1
FRI 111	FRENCH LANGUAGE I	1	-	-	1	1
GNS 101	USE OF ENGLISH	1	-	-	1	1
GNS 111	HIV/AIDS PSYCHOACTIVE SUBSTANCE USE AND CITIZENSHIP EDUCATION I	1	-	-	1	1
	TOTAL	13	-	10	23	23

**NAUTICAL SCIENCE
NATIONAL DIPLOMA
YEAR I – SEMESTER II**

Course Code	Course Title	L	T	P	CU	CH
NSC 122	CELESTIAL NAVIGATION	2	-	2	4	4
NSC 123	SEAMANSHIP II	2	-	2	4	4
NSC 126	PHYSICAL GEOGRAPHY	2	-	-	2	2
BPH 121	OPTICS, WAVES, ELECTRICITY & MAGNETISM	1	-	2	3	3
MAR 111	INTRODUCTION TO MARINE ENGINEERING	1	-	2	3	3
MTH 124	SPHERICAL TRIG. & CALCULUS	1	-	-	1	1
MEE 121	MARINE ELECTRICAL AND ELECTRONICS	1	-	2	3	3
GNS 102	COMMUNICATION IN ENGLISH I	1	-	-	1	1
GNS 121	CITIZENSHIP EDUCATION II	1	-	-	1	1
FRI 121	FRENCH LANGUAGE II	1	-	-	1	1
EED 126	ENTREPRENUESHIP EDUCATIONAL DEVELOPMENT	1	-	-	1	1
	TOTAL	14	-	10	24	24

**NAUTICAL SCIENCE
NATIONAL DIPLOMA
YEAR II – SEMESTER I**

Course Code	Course Title	L	T	P	CU	CH
NSC 211	MARINE METEOROLOGY	2	-	1	3	3
NSC 212	CELESTIAL NAVIGATION II	2	-	2	4	4
NSC 213	COLLISION REGULATIONS	2	-	-	2	2
NSC 214	CHART WORK I	2	-	2	4	4
NSC 216	ELECTRONIC NAVIGATION AIDS	2	-	2	4	4
NSC 215	GENERAL SHIP KNOWLEDGE	2	-	-	2	2
MST 201	MARITIME ECONOMICS	1	-	-	1	1
GNS 201	USE OF ENGLISH	1	-	-	1	1
GNS 202	COMMUNICATION IN ENGLISH II (MARITIME ENGLISH)	1	-	-	1	1
GNS 228	RESEARCH METHODOLOGY	2	-	2	4	4
	TOTAL	17		9	26	26

**NAUTICAL SCIENCE
NATIONAL DIPLOMA
YEAR II – SEMESTER II**

Course Code	Course Title	L	T	P	CU	CH
NSC 221	SHIP MANAGEMENT	2	-	-	2	2
NSC 222	INTRODUCTION TO MARITIME LAW	2	-	-	2	2
NSC 223	PRACTICAL NAVIGATION III	2	-	2	4	4
NSC 224	CARGO OPERATIONS	2	-	-	2	2
NSC 225	MARINE POLLUTION	1	-	-	1	1
MAR 206	SHIPYARD TECHNOLOGY	2	-	2	4	4
NSC226	CHART WORK	2	-	2	4	4
NSC 227	PROJECT	1	-	3	4	4
	TOTAL	14	-	9	22	22

ND I FIRST SEMESTER

Programme: ND Nautical Science	Course Code: NSC 111	Contact Hours/Credit unit: 2/2
Course: Seamanship I	Semester: ONE	Theoretical: hours/week 2
Year: One	Pre-requisite: SSC/NECO Certificate	Practical: hours /week2
GOAL: At the end of the course the student should be able to demonstrate a knowledge and understanding of seamanship as a Navigating Officer onboard.		
GENERAL OBJECTIVES		
1.0 Know different types of ships. 2.0 Comprehend the General maintenance of vessels. 3.0 Know different types onboard ship. 4.0 Know Deck Gears machines and rigging of Derricks. 5.0 Know Mooring/Unmooring Operations.		

PROGRAMME: NATIONAL DIPLOMA NAUTICAL SCIENCE						
COURSE: SEAMANSHIP 1		SEMESTER I		CODE: NSC111	CONTACT HRS: 30HOURS	
COURSE UNIT: 2.0						
GOAL: TO ENABLE STUDENTS ACQUIRE THE BASIC KNOWLEDGE OF SEAMANSHIP AS A FUTURE CAPTAINS OF SHIPS						
GENERAL OBJECTIVES 1.0: Know Different Types of Ship						
THEORETICAL CONTENT			PRACTICAL CONTENT			
Week	Specific learning outcomes for students	Teachers activity	Resources	Specific learning outcome	Teachers activity	Evaluation
1–3	1.1. Define a vessel. 1.2. List and explain different parts of a vessel. 1.3. Sketch different types of vessel. 1.4. Explain the terms defining position and direction in a ship. 1.5. Explain the terms defining the movements of a ship. 1.6. Define the various unit of nautical measured seamanship activities.	<ul style="list-style-type: none"> Define a vessel. Identify different parts of vessels from models. Explain various positions and direction in a vessel. Explain the terms involve in the movement of a ship. Define the various sea measures in seamanship activities. 	Recommended textbooks, whiteboard, lecture notes, vessel models, multimedia projector and computer. Logbook- Practical Activities.	Identify different types of vessel. Explain the concept of vessels. Draw out a vessel profiles. Point out different parts of a vessel. Demonstrate the various positions and direction in a vessel. Explain the terms used in the movement of a ship. Explain various term under the nautical measures.	Correct any errors in the students demonstration/Explanation. Observes, instructs and guides the students in the exercises. Supervise the students work.	Class work, assignment, test, etc. Group work. Tutorial.
GENERAL OBJECTIVE 2.0: Comprehend General Maintenance of Vessels						
	2.1 Explain ways and Means of protecting	Describe ways and means of	Recommended textbooks,	<ul style="list-style-type: none"> Explain the concept of corrosion on the hull of 	Correct any errors in the	Class work, assignment,

4-6	<p>ship against corrosion. 2.2 Describe the general maintenance and cleaning. 2.3 Explain the way to carry out surface preparation for painting of Steel, Wood, Aluminium and Fibreglass. 2.4 Explain in detail the care/maintenance of brushes. 2.5 Identify safety precautions to use during ship maintenance. 2.6 Identify measures to protect the environment during ship maintenance.</p>	<p>protecting ship against corrosion. Explain the consequences of non maintenance of ship and how it affects on the ship and crew. Identify causes of corrosion on vessel. Enumerate the procedures for maintaining various types of surfaces preparations mentioned in 2.3. Demonstrate code of safe working practices to use during ship maintenance. Explain the measures to protect the environment during ship maintenance.</p>	<p>whiteboard, lecture notes, vessel models, multimedia projector and laptop computer.</p>	<p>a ship and the ways and means to protect the ship.</p> <ul style="list-style-type: none"> • Explain care/maintenance of ship and equipment and how it affects ship performance. • State and explain the causes of corrosion on vessel. • Explain the procedures for maintaining various types of surfaces prepared for painting. • Explain the care and maintenance of brushes. • State and demonstrate safety precautions to use during ship maintenance. • Explain the measures to protect the environment during ship maintenance. 	<p>students definitions and concepts. Observes, instructs and guides the students in the exercises. Supervise the students work.</p>	<p>test, etc</p>
GENERAL OBJECTIVE 3.0: Know The Types of Ropes on Ships						
	3.1 Explain the types of	• List and explain	Recommended	• Explain the types of	• Correct any	Class work,

7-9	<p>Ropes used on ships such as fiber and Wire ropes.</p> <p>3.2 Describe the orders and terms used in handling hawsers; ropes and cables.</p> <p>3.3 Identify the tools used for splicing both fibre and wire ropes.</p> <p>3.4 Demonstrate the ability to make Knots & Hitches commonly Used at sea.</p> <p>3.5 Demonstrate ability to splice fiber and wire Ropes.</p>	<p>the types of ropes used on ships.</p> <ul style="list-style-type: none"> • Explain the orders and terms used in handling hawsers, ropes and cables. • Identify and demonstrate the tools used for splicing both fibre and wire ropes. • Explain and demonstrate how to make knots and hitches commonly used at sea. • Demonstrate how to splice fibre and wire ropes. 	<p>textbooks, whiteboard, lecture notes, vessel models, multimedia projector and laptop computer, fibre and wire ropes.</p>	<p>ropes used on ships.</p> <ul style="list-style-type: none"> • Explain the orders and terms used in handling hawsers, ropes and cables. • List the tools used for splicing both fibre and wire ropes. • Explain and demonstrate ability to make knots and hitches commonly used at sea. • Demonstrate how to splice fibre and wire ropes. 	<p>errors in the students definitions and demonstration.</p> <ul style="list-style-type: none"> • Observes, instructs and guides the students in the exercises. • Supervise the students work. 	<p>assignment, test, etc</p>
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GENERAL OBJECTIVE 4.0: Know Rigging of Derricks and Deck Gears

10-	<p>4.1 Identify various types Of derricks and their rigging.</p> <p>4.2 State the general precautions to be taken before and during derrick operation.</p> <p>4.3 Identify a derrick in single and double gear.</p> <p>4.4 Explain the safety</p>	<p>Sketch and describes the various types of derricks and rigs in use.</p> <p>Explain the general precautions to be taken before and during derrick operation.</p> <p>Illustrate and sketch derrick in</p>	<p>Recommended textbooks, whiteboard, lecture notes, vessel models, multimedia projector and laptop computer.</p>	<p>Sketch and describe the various types of derricks and rigs in use.</p> <p>Explain the general precautions to be taken before and during derrick operation.</p> <p>Sketch derrick in single and double gear.</p>	<p>Correct any errors in the students definitions and concepts.</p> <p>Observes, instructs and guides the students in the exercises.</p> <p>Supervise the students work.</p>	<p>Class work, assignment, test, practical work etc</p>
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13	<p>precaution required during rigging of derricks.</p> <p>4.5 Explain the various deck machineries used for mooring and rigging.</p> <p>4.6 Explain the various Deck fittings used for mooring and rigging such as bollards, bitts, fairlead and panama leads.</p>	<p>single and double gear.</p> <p>Explain the safety precaution required during rigging of derricks.</p> <p>Explain the various deck machineries used for mooring and rigging.</p> <p>Explain the various deck fittings used for mooring and rigging such as bollards, bitts, fairlead and panama leads.</p>		<p>Explain the safety precaution required during rigging of derricks.</p> <p>Explain the various deck machineries used for mooring and rigging.</p> <p>Explain the various deck fittings used for mooring and rigging such as bollards, bitts, fairlead and panama leads.</p>		
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GENERAL OBJECTIVE 5.0: Know Mooring Operations

14– 15	<p>5.1 Define Mooring.</p> <p>5.2 Explain the positions of all mooring lines.</p> <p>5.3 List the functions of mooring lines mentioned in 5.2</p> <p>5.4 List the safety precautions when handling ropes during mooring operations.</p> <p>5.5 Explain the general maintenance of windlass and mooring equipment.</p>	<ul style="list-style-type: none"> • Define and explain the term mooring. • Sketch a ship alongside and show the position of all mooring lines. • List the safety precautions during mooring operations • List the functions of mooring lines. 	<p>Recommended textbooks, whiteboard, lecture notes, vessel models, multimedia projector and laptop computer.</p>	<ul style="list-style-type: none"> • Define and explain the term mooring. • Sketch a ship alongside and show the position of all mooring lines. • List the safety precautions during mooring operations • List the functions of mooring lines. • Describe the general maintenance of a windlass and the mooring equipment. 	<p>Correct any errors in the students definitions and concepts.</p> <p>Observes, instructs and guides the students in the exercises</p> <p>Supervise the students work.</p>	<p>Class work, assignment, test, etc</p>
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		<ul style="list-style-type: none">• Discuss the general maintenance of a windlass and the mooring equipments.				
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 112	Contact Hours 4/Credit Unit:4
Course: INTRODUCTION TO COMPUTER	Semester:	Theoretical: 2
Year: 1	Pre-requisite:	Practical: 2
Goal: The course is designed to enable students acquire a basic knowledge of computers and their application in ship's Navigation		
GENERAL OBJECTIVES		
<ol style="list-style-type: none"> 1. Explain the history, types and classification of Computers 2. Explain Computer hardware and software 3. Explain the types of Computer operating system, safety and security 4. Explain the use of computer applications such as word processor, spread sheet/power point and Data base software 5. Explain the application of computers on board ships and impact on shipping 6. Explain the concerns and impact of cybercrime on shipping 		

General Objective 0.1: Explain the history , types and classification of Computers						
	THEORETICAL CONTENTS			PRACTICAL CONTENTS:		
Week	Specific Learning Outcomes	Teacher's Activities	Resources Theoretical/ Practical	Specific Learning Outcomes	Teacher's Activities	Evaluation
1	1.1 Define the Computer 1.2 Explain the trend in computer development 1.2 Classify computers according to generation from 1 st to 5 th 1.3 Distinguish analogue, digital and hybrid computers/micro computers	Define computer and Trace the history Classify according to generations Distinguish classes of computer	White Board PC with power point and connected to OHP	Be able to classify computer system	Guide students to know about computers and classify them	Lab demonstration Assignment Continuous assessment test and semester examination
General Objective: 2.0 Explain Computer hardware and software.						
	2.1 Describe computer hardware and configuration 2.2 Describe computer software and types 2.3 List input and output devices and describe their functions.	Discuss the meaning of hardware Describe computer, List input and output devices Explain their functions.	White board PC loaded with power point and connected to OHP	Be able to identify the various types of computer hardware and software.	Guide students on how to identify the various components of a computer system.	Lab demonstration Assignment Continuous assessments test and semester examination.
General Objective: 3.0 Explain the types of computer operating systems.						
	3.1 Define an operating system 3.2 State functions of a operating system 3.3 Mention the examples	Define an operating system Discuss the procedures of	White board. PC loaded with power with power point and connected to	Students should be able to show, identify the versions of operating systems	Guide students to identify the types of operating systems.	Lab demonstration Assignment Continuous assessment

	of operating system such as UNIX, WINDOWS, etc.	operating a computer start up and shut down	OHP	used in PCs	Guide the students to operate PC	Lab examination demonstration
3.4	Describe how to operate a computer system	Identify computer storage medias both internally/externally	White Board PC loaded with power point and connected to OHP	Students should be able to show and demonstrate how to operate a PC start up shut down and access applications.	Students to show through practical demonstration the types of storage media and how to back up an external and internal medias.	Lab demonstration Examination.
3.5	Identify the different types of storage media on computer	Show how to use storage media and backing up systems.	PC with board PC loaded with power point			
3.6	Identify the process of using backup media and backing up of PC		PC Hard drives types power point with OHP			

General Objective: 4.0 Explain the use and application of word/spread sheet/PP/Data base software.

4.1	Describe MS word Describe MS Excel Describe MS PP Describe MS Database	Discuss use of the various applications Discuss writing of technical reports on Ship's activities. Inventory of items process and procedures Documentation.	PC white board MS packages word, Excel PP, Database	Be able to demonstrate loading and use of MS packages.	Guide the students on how to load and use packages.	Lab Demonstration Assignment Test and examination.
4.2	Explain the application of MS packages to computer systems on board ships		PC white board MS packages.	Be able to demonstrate the use of computer and application for producing reports.	Guide the students.	Lab Demonstration Assignment Test and examination.

General Objective: 5.0 Explain the application of computers on board ships and impact on shipping.

5.1	Discuss the use of computer hard wares in the ship's system Radar/ARPA	Discuss the use of computers in the ship's Bridge equipments.	PC white board.	Demonstrate understanding of use of computers and hard wares in	Guide the students on identifying the types of	Lab Demonstration Assignment Test
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	<p>ECDCS AIS ECHO sounder VDR – Back up of real time act rotes LRIT AMDSS PMS DP System Cargo Loading System On board CBT Integrated System.</p>			<p>ship’s equipments and Electronics.</p>	<p>Computer System in ship’s equipment.</p> <p>Use of the CBT on board ship’s cargo loading computers.</p>	<p>Exam</p>
General Objective: 6.0 Explain the concerns and impact of cybercrime on shipping.						
	<p>6.1 Explain the concerns, problems and impact of computer system failure on board ships</p> <p>6.2 The concerns with cybercrime against ships</p> <p>6.3 Care and maintenance of ships computers prevention of intrusion.</p>	<p>Discuss advantages of using computers on board ships.</p> <p>Problems.</p> <p>Action free cybercrimes.</p> <p>Care for and maintenance of computers.</p> <p>Protection against virus and malware updates.</p>	<p>PC power pint presentation.</p> <p>Presentation with OHP</p>	<p>Be able to identify the advantages of using PCs</p> <p>Identify problems</p> <p>Understand the potential problems of cybercrimes</p> <p>Be able to carry out maintenance and updates of Pc maintenance.</p>	<p>Guide the students on prevention of attacks on ship’s computer.</p> <p>How to avoid the spread of malware and virus.</p> <p>The use of password.</p>	<p>Log Book</p> <p>Lab Test Demonstration</p> <p>Continuous assessment</p> <p>Examination</p>

Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 113	Contact Hours/Credit unit: 4
Course: Introduction to Chart Work	Semester: 2	Theoretical: 2 hours/week
Year: 1	Pre-requisite:	Practical: 2 hours /week
GOAL: To enable students to have knowledge and understanding of basic concept, principle and application of chart work for safe and efficient navigation.		
GENERAL OBJECTIVES		
<p>1.0 Know the terms used for terrestrial and coastal navigation.</p> <p>2.0 Know chart datum.</p> <p>3.0 Understand information from charts, lists of lights and other publications and how to recognize chart symbols.</p>		

PROGRAMME: NATIONAL DIPLOMA NAUTICAL SCIENCE**COURSE: Introduction to Chart Work****Course Code:
NSC 113****Contact Hours: 2-0-2****THEORETICAL CONTENTS****PRACTICAL CONTENTS – No Practical****WEEK****General Objective 1.0: Know terms used for terrestrial and coastal navigation.****Specific Learning Outcomes****Teacher's
Activities****Resources****Theoretical/Prac
tical****Specific Learning
Outcomes****Teacher's
Activities****Evaluation**

1 - 2

- 1.1 Define great circle, small circle, spherical triangle and poles of a great circle.
- 1.2 Define earth poles, equator and meridians.
- 1.3 Define latitude, and parallels of latitude, prime meridian and longitude.
- 1.4 Define difference of latitude and difference of longitude.
- 1.5 Describe the earth as an ellipsoid.
- 1.6 Define compression and state its value.
- 1.7 Define international nautical mile

Explain the difference between the small and great circle of the earth.
Define meridian, Greenwich meridian and nautical mile on a chart

Models of earth ellipsoid
Large and small charts of oceans
Coastal charts
Ocean plotting sheets

Demonstrate the earth's projections.

Demonstration by globe of the earth models.

Assignment
Class work
Test
Examination

General Objectives 2.0: Know chart datum

3- 4	<p>2.1 Explain the rotation of the earth about its axis.</p> <p>2.2 Describe the direction on the earth surface.</p> <p>2.3 Describe the direction of the ship's head on a gyrocompass (gyro course).</p> <p>2.4 Describe the direction of the ship's head on a magnetic compass (compass course).</p>			<p>Demonstrate the rotation of the earth about its axis.</p> <p>Demonstrate the direction of the ship with magnetic compass, Gyro Compass and recognize coastline.</p>		
<p>General Objectives 3.0: Understand information from charts, list of lights and other publications and how to recognize chart symbols.</p>						
5 - 6	<p>3.1 Recognize and demonstrate the use of the symbols and abbreviations on a chart, especially light houses, bouys, beacons, radio beacons and other navigational marks.</p> <p>3.2 Identify the characteristics and range of lights.</p> <p>3.3 Calculate the distances of sighting lights and dipping distances.</p> <p>3.4 Identify the symbols for chart depths and nature of the bottom and explain the use of soundings.</p> <p>3.5 Recognize coastlines, coast and radar-responsive targets.</p> <p>3.6 Interpret coastline contours, bottom topography, depths and nature of bottom.</p> <p>3.7 Use the tidal information given on</p>	<p>Explain the various types of charts and meanings.</p> <p>Identify and differentiate the types of sea bottom.</p>	<p>Regular Charts Chart 5011 Nautical Publications</p>	<p>Show chart projections.</p> <p>Identify the characteristics and range of lights.</p> <p>Calculate the distances of sighting lights and dipping distances.</p> <p>Show how to recognize coastlines, coast and radar-responsive targets.</p>	<p>Demonstrate how to obtain and appraise information from navigational publications including sailing directions, notices to mariners and radio navigational warnings.</p> <p>Recognize suitable passages, approaches</p>	<p>Practical assessment Test Examination</p>

	<p>a chart.</p> <p>3.8 Recognize traffic lanes and separation zones.</p> <p>3.9 Explain the danger of implicit reliance upon floating navigational aids.</p> <p>3.10 Explain the danger of approaching navigational aids too closely.</p> <p>3.11 Obtain and appraise information from navigational publications including sailing directions, Notices to Mariners, radio navigational warnings and ship's routeing information.</p> <p>3.12 Demonstrate simple passage planning and execution including use of sailing directions, tide tables, radio navigational warnings and ship's routeing information within parameters established by the Master.</p> <p>3.13 Explain the use of clearing marks, horizontal and vertical danger angles.</p> <p>3.14 Recognize suitable passages, approaches and anchorages in clear weather and thick weather, using radar-responsive targets.</p> <p>3.15 Demonstrate planning of a passage between two ports from berth to berth using the procedures for passage planning</p>				<p>and anchorages. Demonstrate planning of a passage.</p>	
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	as per the guidelines for voyage planning provided by International Maritime Organization (IMO) in resolution A.893(21).					
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ND I SECOND SEMESTER

Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 212	Contact/Credit Hours: 4/4
Course: CELESTIAL NAVIGATION I	Semester: TWO	Theoretical: 20 Hours/Week
Year: Two	Pre-Requisite: Physical Geography	Practical: 26
GOAL: At the end of the Course, the student should be able to demonstrate knowledge and understanding of Celestial Navigation, by observation of Celestial bodies.		
GENERAL OBJECTIVES:		
<ol style="list-style-type: none">1. Know the concept of Celestial Sphere and Equinoctial System of coordinates.2. Know how to perform hour angles calculation using Almanacs.3. Know the horizontal system of co-ordinates.4. Demonstrate a knowledge and understanding of the sun and its relationship with the rest of the universe.5. Know the principle of Twilight.6. Demonstrate a knowledge and understanding of the sextant and the relevant corrections.7. Know the basic of accurate time measurement.8. know the behaviour of the earth and its only satellite, the moon.		

Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE		Course Code: NSC 212		Contact/Credit Hours: 4/4	
Course: CELESTIAL NAVIGATION I		Semester: TWO		Theoretical: 20 Hours/Week	
Year: TWO		Pre-Requisite: Physical Geography		Practical: 26	
GOAL: At the end of the Course, the student should be able to demonstrate knowledge and understanding of Celestial Navigation, by observation of Celestial bodies.					
General Objectives 1.0: Comprehend the concept of Celestial Sphere and Equinoctial System of coordinates.					
1	1.1. Explain the celestial sphere. 1.2. Explain the apparent annual motion of the sun and the concept of the ecliptic. 1.3. Define celestial poles, meridians, equinoctial and the obliquity of the ecliptic. 1.4. Explain the equinoctial as a fixed reference plane and the direction of the first point of Aries as reference direction. 1.5. Describe the equinoctial system of coordinates. 1.6. Defines SHA, declination and polar distance.	Explain the sun's apparent motion round the earth. Define each of the terms. Explain that the equinoctial and first point of Aries are reference planes for measurement. Describe the rotation of the earth. Use the Nautical Almanac to identify hour angles 'd' and 'v' correction.	Reference Textbook. Overhead projector. DKD of courses	Cadet Log Books	Students are taken to Simulator rooms. Hands on demonstration Continuous assessment Tests, Assignments Projects Questions and answers Tests Tutorials
General Objectives 2.0: Know how to perform hour angles calculation using Almanacs.					
2	2.1. Describe earth axial rotation and the resultant change in the hour angle	Explain the terms mentioned. Proof that the altitude of the elevated pole is equal	Reference Textbook. Overhead		Tutorials

	<p>of bodies.</p> <p>2.2. Describe GHA, LHA, and longitude and show their relationship.</p> <p>2.3. Identified the tabulation of SHA, GHA and declination 'd' and 'v' correction for the sun moon and planets.</p>	to the observer's latitude.	projector.			
General Objectives 3.0: Know the horizontal system of coordinates.						
3	<p>3.1 Explain the rational, sensible and visible horizons, zenith, and nadir, vertical and prime vertical circles.</p> <p>3.2 Define the elevated pole and show that the altitude is equal to the observer's upper and lower meridians.</p> <p>3.3 Explain the observer's upper and lower meridians.</p> <p>3.4 Define true altitude, Azimuth and Zenith distance.</p> <p>3.5 Name the parts of the PZX triangle.</p> <p>3.6 State that for sight reduction, the haversine formula is used to solve the PZX triangle.</p>	<p>Describe the components of the solar system.</p> <p>Indicate the extent of the solar system.</p> <p>Describe how the inclination of axis of the earth affects the seasons.</p> <p>Mention the dates of the solstices and equinoxes.</p> <p>Define the solstices and equinoxes.</p>	Reference Textbook. Overhead projector.	Use of sextants azimuth mirrors and other instruments used for Navigation		
General Objectives 4.0: know the sun and its relationship with the rest of the universe.						
4	<p>4.1 Describe the dimension of the solar system.</p> <p>4.2 State Kepler's law of</p>	<p>Explain Twilight. Differentiate between Twilight.</p>				

	<p>planetary motion.</p> <p>4.3 Describe the earth's elliptical orbit.</p> <p>4.4 Define aphelion and perihelion.</p> <p>4.5 Describe the inclination of the earth's axis to the plane of its orbit and its effect on the seasons.</p> <p>4.6 State the dates of solstices and equinoxes and the effect of Kepler's law on the season.</p>	<p>Explain the principles of the sextant.</p> <p>Show the necessity of sextant correction.</p> <p>Explain altitude corrections.</p> <p>Apply corrections to a given sextant altitude.</p>		<p>Reference Textbooks.</p> <p>O.H.P. & Transparencies.</p>		
General Objectives 5.0: know the principle of Twilight.						
5	<p>Explain Twilight.</p> <p>5.1. Differentiate between Civil, Nautical and Astronomical Twilight.</p> <p>5.2. Extract information from the tabulation of these phenomena in the Nautical Almanac.</p>		<p>Reference Textbooks.</p> <p>O.H.P. & Transparencies.</p>			
General Objectives 6.0: Know the sextant and the relevant corrections.						
6	<p>6.1. Explain the basic principles and uses of the sextant.</p> <p>6.2. Describe the purpose of altitude and true altitude.</p> <p>6.3. Define sextant altitude,</p>	<p>Explain why the mean sun is used for time-keeping.</p> <p>Explain the terms and show how they relate.</p>	<p>Reference Textbooks.</p> <p>O.H.P. & Transparencies.</p>			

	<p>observed altitude and true altitude.</p> <p>6.4. Explain dip, refraction, semi diameter, parallax and index error.</p> <p>6.5. Apply corrections that determine their magnitude including the augmentation of the moon's S.D. (Semi Diameter).</p> <p>6.6. Describe the uses and application of the altitude correction tables in the almanac including critical and interpolation tables.</p> <p>6.7. Explain the basic principles and uses of the sextant.</p> <p>6.8. Describe the purpose of altitude correction.</p> <p>6.9. Define sextant altitude, observed altitude and true altitude.</p>	Describe the motion of the moon around the earth.	Reference Textbooks. O.H.P. & Transparencies.			
General Objectives7.0: know the basic of accurate time measurement.						
7	<p>7.1 Define Sidereal day, Lunar day and Solar day.</p> <p>7.2 Explain the reasons for the sun's irregular rate of change of SHA and hence the necessity to adopt the Astronomical means sun</p>	Explain the phase of the moon.				

	<p>for time –keeping purposes.</p> <p>7.3 Define GMT, LMT and longitude and show their relationship.</p> <p>7.4 Explain zone times and standard times.</p>					
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General Objectives 8.0: know behavior of the earth and its only satellite the moon.

8	<p>8.1. Describe motion of the moon around the earth in an elliptical orbit.</p> <p>8.2. Define apogee and perigee.</p> <p>8.3. Explain the phases of the moon.</p> <p>8.4. Explain the phenomena of eclipse of the moon and the sun.</p>					
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 123	Contact Hours/Credit unit: 2/3
Course: SEAMANSHIP II	Semester: TWO	Theoretical: 30 hours/week
Year: ONE	Pre-requisite: Seamanship Knowledge	Practical: 45 hours /week
GOAL: At the end of the course, the student should have a basic knowledge and understanding of helmorders steering, rope, anchoring.		
GENERAL OBJECTIVES		
<p>1.0: Know the helmsman ship</p> <p>2.0: Know the manufacture of ropes and wires</p> <p>3.0: Know anchoring of ships.</p> <p>4.0: Understand the windlass and its uses.</p>		

PROGRAMME: NATIONAL DIPLOMA NAUTICAL SCIENCE						
COURSE: GENERAL SEAMANSHIP II		SEMESTER II		CODE: NSC123		CONTACT HRS: 30HOURS COURSE UNIT: 2.0
GOAL: TO ENABLE STUDENTS ACQUIRE THE BASIC KNOWLEDGE OF SEAMANSHIP AS A FUTURE CAPTAINS OF SHIPS						
GENERAL OBJECTIVES 1.0: KNOW THE HELMSMAN SHIP						
THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	Specific learning outcomes for students	Teachers activity	Resources	Specific learning outcome	Teachers activity	Evaluation
1-3	<p>1.1. Explain the compass card.</p> <p>1.2. Identify relative bearings of objects.</p> <p>1.3. Explain vividly the term Box the compass in points and half points.</p> <p>1.4. Explain the procedures to helms orders.</p> <p>1.5. What is helmsman ship?</p>	<p>Draw and explain the compass card.</p> <p>Explain the division of card in points/quarter points.</p> <p>Demonstrate relative bearing of objects.</p> <p>Explain “boxing” of the compass in points and half points.</p> <p>Identify the meaning of the standard helms orders.</p> <p>Conduct some exercises with the students using training boats or</p>	<p>Recommended textbooks, whiteboard, lecture notes, vessel models, multimedia projector with laptop computer, simulator and training boat.</p>	<p>Demonstrate the drawing and then explain the compass card.</p> <p>Explain the division of card in points/quarter points.</p> <p>Demonstrate relative bearing of objects.</p> <p>Explain “boxing” of the compass in points and half points.</p> <p>Identify the meaning of the standard helms orders.</p> <p>Conduct some exercises with the students using training boat or simulator.</p>	<p>Correct any errors in the students definitions and concepts.</p> <p>Observes, instructs and guides the students in the exercises.</p> <p>Supervise the students work.</p>	<p>Class work, assignment, test, etc</p>

		simulator.				
General Objective 2.0: Know The Manufacture Of Ropes And Wires Ropes						
4-7	<p>2.1 Describe the manufacture of ropes and wires.</p> <p>2.2 Demonstrate the Handling of ropes and wires from new coil.</p> <p>2.3 Explain the care and maintenance of ropes and wires.</p> <p>2.4 Explain rope handling for various ship operations e.g stowage, salvage, shifting etc.</p>	<p>Explain the stages of rope manufacture.</p> <p>Explain the construction of steel wire ropes, combined wire/fiber ropes and their uses.</p> <p>Discuss with students on the care in maintenance of wire ropes from new coil, handling and storage.</p> <p>Demonstrate the methods of cutting wires and ropes with safety precautions.</p>	<p>Recommended textbooks, whiteboard, lecture notes, vessel models, multimedia projector with laptop computer.</p>	<p>Explain the stages of rope manufacture.</p> <p>Explain the construction of steel wire ropes, combined wire/fiber ropes and their uses.</p> <p>Discuss care in maintenance of wire ropes from new coil, handling and storage.</p> <p>Demonstrate the methods of cutting wires and ropes with safety precautions.</p>	<p>Correct any errors in the students explanation.</p> <p>Observes, instructs and guides the students in the exercises.</p> <p>Supervise the students work.</p>	<p>Class work, assignment, test, etc</p>
General Objective 3.0: Know Anchoring Of Ships						
8 – 11	<p>3.1 Describe an anchor and its various types.</p> <p>3.2 Name parts of the anchors.</p> <p>3.3 Explain the markings on the anchor cable.</p> <p>3.4 Explain how the cable is joined to the anchor.</p>	<p>Describe an anchor and its various types</p> <p>Draw different types of anchors and label them.</p> <p>Show the markings on the anchor cable.</p> <p>Explain how the cable is joined to the anchor.</p> <p>Show how the bitter</p>	<p>Recommended textbooks, whiteboard, lecture notes, vessel models, multimedia projector with laptop computer.</p>	<p>Describe an anchor and its various types.</p> <p>Draw different types of anchors and label them.</p> <p>Show the markings on the anchor cable.</p> <p>Show how the cable is joined to the anchor.</p> <p>Show how the bitter</p>	<p>Correct any errors in the students definitions and concepts.</p> <p>Observes, instructs and guides the students in the exercises.</p> <p>Supervise the</p>	<p>Class work, assignment, test, etc</p>

	<p>3.5 Explain how the cable is secured in the chain locker.</p> <p>3.5 Define and explain the following terms: Devils claw, compression bar, bow stopper, hawse pipe and spur-ling pipe</p> <p>3.6 List the steps for preparing the anchor for letting-go (Pre-anchoring).</p> <p>3.7 State the general procedure for anchoring</p> <p>3.9 State the general procedure for giving-up.</p>	<p>end is secured in the cable locker.</p> <p>Define and explain the following terms: Devils claw, compression bar, bow stopper, hawse pipe and spur-ling pipe.</p> <p>List the steps for preparing the anchor for letting-go (Pre-anchoring).</p> <p>State the general procedure for anchoring.</p> <p>State the general procedure for giving-up.</p>		<p>end is secured in the cable locker.</p> <p>Define and explain the following terms: Devils claw, compression bar, bow stopper, hawse pipe and spur-ling pipe.</p> <p>List the steps for preparing the anchor for letting-go (Pre-anchoring).</p> <p>State the general procedure for anchoring.</p> <p>State the general procedure for giving-up.</p>	<p>students work.</p>	
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General objective 4.0: Understand the windlass and its uses.

	<p>4.1 Explain the windlass.</p> <p>4.2 Outline the maintenance procedures for:</p> <ul style="list-style-type: none"> • Electric 	<p>Explain the windlass</p> <p>Mention the various components of windlass.</p> <p>Sketch out the different types of</p>	<p>Recommended textbooks, whiteboard, lecture notes, vessel models, multimedia</p>	<p>Explain the windlass.</p> <p>Mention the various components of windlass.</p> <p>Sketch out the different types of</p>	<p>Correct any errors in the students definitions and concepts.</p> <p>Observes,</p>	<p>Class work, assignment, test, etc</p>
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<p>12– 15</p>	<p>windlass</p> <ul style="list-style-type: none"> • Electro-hydraulic windlass • Steam windlass <p>4.3 Explain the precaution of using steam windlass in temperate climate.</p> <p>4.4 List safety precaution to be observed when using the windlass.</p> <p>4.5 Explain the use of windlass during mooring, anchoring combine operation and idle use.</p>	<p>windlass.</p> <p>Outline the maintenance procedures for:</p> <ul style="list-style-type: none"> – Electric windlass – Electro-hydraulic windlass – Steam windlass. <p>Explain the precaution of using steam windlass in temperate climate.</p> <p>List safety precaution to be observed when using the windlass.</p> <p>Explain the use of windlass during mooring, anchoring combine operation and idle use.</p>	<p>projector with laptop computer.</p>	<p>windlass.</p> <p>Outline the maintenance procedures for:</p> <ul style="list-style-type: none"> – Electric windlass – Electro-hydraulic windlass – Steam windlass <p>Explain the precaution of using steam windlass in temperate climate.</p> <p>List safety precaution to be observed when using the windlass.</p> <p>Explain the use of windlass during mooring, anchoring combine operation and idle use.</p>	<p>instructs and guides the students in the exercises. Supervise the students work.</p>	
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 126	Contact Hours/Credit unit: 2
Course: PHYSICAL GEOGRAPHY	Semester:	Theoretical: 2 hours/week
Year: ONE	Pre-requisite: WASC/NECO	Practical: hours /week

GOAL: At the end of the course the student should be able to demonstrate the knowledge and understanding of the Geography of the World, including World weather, climate, map and Coastline features

GENERAL OBJECTIVES

1. Know continents of the World Maritime Nations and their coastlines
2. Know the major Ports of the World, Oceans, Navigable Rivers and other Water Ways
3. Know the Wind Systems
4. Understand Ocean Tides and Ocean Currents
5. Understand seasonal meteorological Hazards
6. Know the Distances between major Ports of the World
7. Understand load-line Zones
8. Know the Earth in space
9. Know the main scale and measurement
10. Know map contains and interpretations
11. Work out Map Reduction and Enlargement
12. Work out Statistical Mapping and Elementary Surveying

General Objective: 1.0: Know the contents of the World Maritime Nations and their Coastlines.						
Theoretical Content			Practical Content			
WEEK	Specific Objectives	Teacher Activity	Resources	Specific Learning Outcomes	Teacher's Activities	Evaluation
1	1.1 Introduction to the knowledge of continents of the World, Countries in Africa and their Coastlines. 1.2 Explain the differences between continent and Nations.	Lecture and Questions and illustration	Video tapes Charts Maps	Learn to sketch Africa prominent features Identify World Maritime Nations Sketch Coastlines of World Maritime Nations.	Sketch map of Africa Sketch Coastlines of Maritime Nations	Project or screen of wall maps Sketches and Charts
General Objective: 2.0 Know major Ports of the World, Oceans, Navigable Rivers etc.						
2	2.1 Identify and Introduce World's major Ports and their locations 2.2 Introduce the Oceans of the World and Seas of the World 2.3 Explain their different features and characteristics.	Lectures, illustration and Questions Lectures and Questions Lectures	Maps of World Oceans Maps of Ports of the World Charts Video Map of Wind System Beafort Scale	Identify the major Ports of Europe List restrictions in Ports Post entry guides Identify oceans of the World Explain their features and characteristics.	Explaining multimedia For explanation of ports Restrictions in Ports Video and map illustrations Map illustrations	Ports guides Port Charts Maps Charts Maps Videos Maps
3	General Objective: 3.0 Know the Wind Systems.					

	<p>3.1 Introduce measurements of World Systems</p> <p>3.2 Identify types of wind System</p> <p>3.3 Differentiate wind systems</p> <p>3.4 Explain Beaufort scale of measurement of wind.</p>	<p>Lectures and illustration.</p> <p>Lectures</p> <p>Lectures</p> <p>Lectures</p>	<p>Videos</p> <p>Tidal Charts</p>	<p>Explain Beaufort wind scale</p> <p>Trade winds and seasonal winds</p> <p>Effect of Earth's rotation</p> <p>Rise and fall of tide</p> <p>High tide and low tide</p> <p>Current of ocean</p>	<p>Explain trade winds and seasonal winds, using projection screen</p> <p>Diagrams of atmosphere circulations</p> <p>Diagrams on the tidal Tidal value</p> <p>Ocean current</p>	<p>Diagrams of wind circulation</p> <p>Charts of wind pattern</p>
General Objective: 4.0 Understand Ocean Tides and Ocean Currents						
4	<p>4.1 Introduce Ocean Current and tides</p> <p>4.2 Explain what makes the current and tides</p> <p>4.3 State tidal effect on Land.</p> <p>.</p>	<p>Lectures</p> <p>Lectures</p> <p>Lectures</p>	<p>Weather Map</p>	<p>Hurricanes and local names</p> <p>Path of hurricane</p> <p>Middle latitude and depression</p>	<p>Annotation of hurricane</p> <p>Paths of hurricane</p>	<p>Illustrations of Tides</p> <p>Charts</p> <p>Diagrams</p> <p>Atlas</p> <p>Synoptic maps and Charts</p> <p>Diagrams</p>

5	General Objective: 5.0 Understand seasonal Meteorological Hazards (Hurricane or Ice)					
	5.1 Introduce seasonal Meteorological Hazards 5.2 Identify severe weather phenomenon 5.3 Explain how the hazards affect the sea activities 5.4 Identify drought, Hurricanes TRS etc. and SMH	Lecture	Map of World Ports Distance	Identify principal trade specialization of Ports Use World distance tables to identify distances Show how to calculate voyage time ETA	Illustrations with ship models	Maps of Ports distance.
General Objective:6.0 Know the distances between major Ports of the World						
6	6.1 Describe the principal trades of Ports 6.2 State the distances between Ports and other major way points 6.3 Calculate voyage time, given the speed of a ship and distances between Ports.	Lectures	Load line Charts Ship Model	Describe with diagrams load line zone State the limiting dates of summer zone Winter zone Tropical zone State significant areas with respect to water densities Distinguish between timber deck load line mark and steel deck load line mark	Illustrations with map and Charts	Load line Charts Maps Ship models

General Objective:7.0 Understand Load Line Zones						
7	7.1 Explain the use of a Load line Zones chart 7.2 Identify the limits of the various zones on a zone charts 7.3 State the limiting dates of seasonal zones in different regions of the World 7.4 State the load line restructures imposed on ships when moving from one zone to another. 7.5 Explain the use of Timber load lines with respect to the zones and areas. 7.6 Explain the application of the provisions of the load line rules to Ports of boundary lines between two zones.	Lectures Questions	Diagrammatic Illustration Video	Understanding the solar system and the movements Understanding the content of solar system, Earth rotations and revolutions	Use of solar system models Use videos for illustrations	Books Model
General Objective:8.0 Know the Earth in space						
Theoretical Content			Practical Content			
8	Specific Objectives	Teacher Activity	Resources	Specific Learning Outcomes	Teacher's Activities	Evaluation

8.1 Introduce the Solar Systems and the Universe 8.2 Introduce the Moon and the Sun 8.3 Introduce the Solar and Lunar Eclipse 8.4 Introduce Earth Rotation and revolution	Lectures	Contour maps for practicals.	Understanding types of map scale.	Use contour maps of places for measurements.	Contour maps.
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General Objective:9.0 Know the Map scale and measurement

Theoretical Content				Practical Content		
WEEK	Specific Objectives	Teacher Activity	Resources	Specific Learning Outcomes	Teacher's Activities	Evaluation
9	9.1 Introduce Map Scale and their types 9.2 Measurement of Distances on Maps 9.3 Finding Areas, Direction and longitudes and latitude 9.4 Calculation of Map Gradient 9.5 Introducing Section Drawing 9.6 Inter visibility	Lectures Lectures	Use of compass for Direction. Use GPS for distance measurements.	Understanding the measurement of instances Calculation of measurement of intervisibility	Use contour maps for Areal measurements Use maps for Gradient and Section drawing	Contour maps. Books Contour maps.

General Objective:10.0 Know Map contours and Interpretation

Theoretical Content				Practical Content		
WEEK	Specific Objectives	Teacher Activity	Resources	Specific Learning Outcomes	Teacher's Activities	Evaluation

10	10.1 Introduce methods of showing Relief on maps 10.2 Introducing methods of showing major landforms 10.3 Introduce map Interpretation	Lectures and Teaching Illustration	Diagram Illustration	Understanding methods of showing Relief on maps Explain map Interpretation	Use of Relief models for illustrations Use maps and charts for interpretation	Maps Charts
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General Objective: 11.0 Work out Map Reduction and Enlargement

Theoretical Content				Practical Content		
WEEK	Specific Objectives	Teacher Activity	Resources	Specific Learning Outcomes	Teacher's Activities	Evaluation
11	11.1 Introduce Map Reduction and Enlargement 11.2 Grid line Systems of Reduction and Enlargement	Lectures	Grid maps	Understand the steps of map Reduction/ Enlargement Understand grid lines	Use of Relief maps Use contour maps	Maps Charts

General Objective:12.0 Work out Statistical Mapping and Elementary Survey

Theoretical Content			Practical Content			
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12	<p>12.1 Introduce statistical mapping</p> <p>12.2 Explain types of statistical mapping</p> <p>12.3 Introduce Elementary Surveying</p> <p>12.4 Introduce chain surveying and field procedure.</p>	<p>Lectures</p> <p>Teacher's illustration</p>	<p>Map</p> <p>Diagrams</p> <p>Charts</p>	<p>Understand simple line graph, Bar graph, Pie charts</p> <p>Flow diagrams</p> <p>Explain chain surveying</p>	<p>Use of statistical map for class illustration</p> <p>Use instruments for chain surveying</p>	<p>Statistical maps and Charts</p> <p>Chain survey equipment</p>
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ND II THIRD SEMESTER

Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 211	Contact Hours/Credit Unit:2/2
Course: Marine Meteorology	Semester: 2ND	Theoretical: 3 Hour/Week
Year: 1	Pre-requisite: SSC/NECO	Practical: Nil
Goal: This course is designed to enable students have basic knowledge of Marine Meteorology		
GENERAL OBJECTIVES:		
<ol style="list-style-type: none">1. Know the basic composition of Earth's atmosphere and weather2. Identify and understand the various weather measuring instruments3. Identify and understand High and Low – Pressure Systems and Fronts4. Know the weather Map5. Understand weather services6. Understand winds7. Know and understand Atmospheric Moisture and clouds8. Understand waves9. Understand and explain severe weather10. Explain and describe ocean currents		

General Objective: 1.0: Know the basic composition of Earth's atmosphere and weather.						
Theoretical Content			Practical Content			
WEEK	Specific Objectives	Teacher Activity	Resources	Specific Learning Outcomes	Teacher's Activities	Evaluation
1	1.1 Define weather 1.2 Explain the elements of weather 1.3 Air pressure 1.4 Temperature 1.5 Air movement (wind) 1.6 Clouds 1.7 Causes and effects of weather	Define weather and types Explain various weather elements Examine the causes and effects Explain models of earth's atmosphere and weather	White Board Recommended text books lecture notes PP presentation and OHP			Class work Assignment Test Exam
General Objective: 2.0 Identify and understand the various weather measuring instruments						
2	2.1 Thermometer 2.2 Hygrometer 2.3 Barometer 2.4 Barograph 2.5 Anemometer	Identify the various measuring instruments Draw and label the types of	White Board Lecture notes recommended text books PP presentation with OHP			Class work Assignment Test Exam
General Objective: 3.0 Identify and understand High and Low – Pressure Systems and Fronts						
3	3.1 Identify various air masses and its movement 3.2 Fronts 3.3 Low and high – pressure Systems	Discuss and identify the Air masses using diagrams	Diagrams Charts PP presentation with OHP lecture notes			Class work Assignment Test
General Objective: 4.0 Know the weather Map						

4	<p>4.1 Understand, be familiar with Simplified weather Map.</p> <p>4.2 Understand and analyse weather at any given moment</p> <p>4.3 Understand Fronts Troughs and Ridges</p> <p>4.4 Understand and identify weather Map and symbols.</p>	<p>Explain the weather map and interpretation of features</p> <p>Explain the analyse of weather presentation.</p>	<p>Maps Diagrams Lecture notes PP presentation with OHP</p>			<p>Class work Assignment</p> <p>Test</p>
General Objective: 5.0 Understand weather services						
5	<p>5.1 Describe the importance of weather services to Navigation</p> <p>5.2 List sources of weather services and broadcast</p> <p>5.3 List the information contained in weather bulletins</p> <p>5.4 Understand warning systems</p> <p>5.5 Weather routing</p>	<p>Explain the importance of weather services to students</p> <p>List sources of weather broadcast services</p>	<p>Recommended textbooks, white board, lecture</p> <p>PP presentation with OHP</p>			<p>Class work Assignment</p> <p>Test</p> <p>Exam</p>
General Objective: 6.0 Understand Wind						

6	6.1 Define wind 6.2 Understand the global wind system. 6.3 Seasonal influence of wind 6.4 Understand land and sea-breezes and their effects	Define wind Explain the global wind system	Recommended text books White board			Class work Assignment Test Exam
General Objective: 7.0 Know and understand Atmospheric Moisture and clouds						
7	7.1 Understand and define atmospheric moisture 7.2 Relative Humidity 7.3 Measurement of relative Humidity 7.4 Causes and results of cooling moisture laden Air 7.5 Define clouds 7.6 Identify types of clouds 7.7 Classification of clouds	Teach with the Aid of Drawings Diagrams The atmosphere moisture				Class work Test Exam
General Objective:8.0 Understand Waves						
8	8.1 Define waves 8.2 How ocean waves are formed 8.3 Causes of waves 8.4 Characteristics of waves 8.5 Measuring wave height 8.6 Factors affecting characteristics of wave height 8.7 Ship's safety in big seas	Define and describe waves Causes Characteristics	White Board, Recommended textbooks Lecture notes PP presentation with OHP			Class work Assignment Test Exam

General Objective: 9.0 Understand and explain severe weather

9	<p>9.1 Explain severe weather</p> <p>9.2 Tropical –revolving storms, Cyclones, cold fronts</p> <p>9.3 Thunderstorms and Fogs</p> <p>9.4 Describe Tropical Cyclones, its formation and development</p> <p>9.5 Describe how to read the weather, signs</p> <p>9.6 Describe how to take proper and correct action during heavy weather</p> <p>9.7 Which within reach of shelter</p>	<p>Explain and describe severe weather</p> <p>Cold fronts Cyclones</p>	<p>Textbooks</p> <p>White board</p> <p>PP presentation with OHP</p>			<p>Class work</p> <p>Assignment</p> <p>Test</p>
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	<p>9.8 How to select safe anchorage</p> <p>9.9 Understand cold Fronts</p> <p>9.10 Thunderstorms and their nature</p> <p>9.11 Thunderstorm movement and development</p> <p>9.12 Lightening, how it happens and precautions</p> <p>9.13 Define Fog</p> <p>9.14 List regions with most frequent Fogs</p> <p>9.15 Describe action to take when entering Fog and the use of Radar information in Fogs</p>		<p>White Board,</p> <p>Recommended textbooks</p> <p>Lecture notes</p> <p>PP presentation with OHP</p>			<p>Class work</p> <p>Test</p> <p>Assignment</p>
General Objective: 10.0 Explain and describe ocean currents						
10	<p>10.1 Explain and describe the effects of ocean currents</p> <p>10.2 It's significance to Navigation</p> <p>10.3 Effects of total stream on Navigation</p>	<p>Explain and describe Navigation</p> <p>Enumerate the significance to Navigation</p>	<p>Textbooks</p> <p>White Board, Drawing</p> <p>Diagram</p> <p>PP presentation with OHP</p>			<p>Assignment</p> <p>Class work</p> <p>Test</p>

Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 212	Contact Hours/ 75 Credit unit: 5
Course: CELESTIAL NAVIGATION II	Semester: 3	Theoretical: 2 hours/week
Year: 2	Pre-requisite: CELESTIAL NAVIGATION I	Practical: 3hours /week

GOAL: To enable the students to understand basic concept of Marine Navigation.

GENERAL OBJECTIVES: On completion of this course the students will be able to:

- 1.0 Comprehend the Solar System
- 2.0 Know the equinoxial system of coordinates
- 3.0 Know the hour angles
- 4.0 Know the horizontal system of coordinates
- 5.0 Know the principles of the sextant and altitude corrections
- 6.0 Understand the Amplitude
- 7.0 Know time and equation of time
- 8.0 Know how to find latitude by meridian altitude
- 9.0 Know how to find Latitude from observation of the Pole Star

General Objective:- Comprehend the Solar System

General Objective:- Comprehend the Solar System						
	THEORETICAL CONTENTS			PRACTICAL CONTENTS (NOT REQUIRED)		
Week	Specific Learning Outcomes	Teacher's Activities	Resources Theoretical/practical	Specific Learning Outcomes	Teacher's Activities	Evaluation
1-4	<p>1.1 Describe the composition and dimension of the solar system.</p> <p>1.2 Describe the INFERIOR and SUPERIOR PLANETS</p> <p>1.3 Describe the Earth's elliptical orbit and state the approximate perihelion and Aphelion distances and Dates</p> <p>1.4 Explain how Kepler's Laws confirm the movements of the members of the solar system.</p> <p>1.5 Describe the inclination of the Earth's axis to the Plane of orbit and show it causes the seasons.</p> <p>1.6 State the dates and positions of the SOLSTICES and EQUINOXES</p> <p>1.7 Explain the concept of the Earth's axial rotation giving day and night.</p> <p>1.8 Explain the varying lengths of day-light through the year.</p>	<p>With the aid of a screen show the film 'THE SOLAR SYSTEM'.</p> <p>Draw and show the position of the planets in the system, then show the inferior & superior planets.</p> <p>Describe how the planets revolve around the sun in elliptical orbit and show the position at perihelion and Aphelion.</p> <p>Explain the three Laws and show how they predict the movement in</p>	<p>16mm Film on the SOLAR SYSTEM</p> <p>Reference Books:</p> <p>(i) Concise Guide Vol. I</p> <p>(ii) Principles & Practices of Navigation – Frost</p> <p>(iii) Nav. For 2nd Mates – Frost.</p> <p>(iv) Internet, Journals.</p>			

		<p>the Solar System</p> <p>Explain with diagrams the inclination of the axis of the Earth to the Vertical rotation revolving.</p> <p>Sketch the plane of the Ecliptic and the Equinoclies and indicate the position of the Solstices and Equinoxes.</p> <p>Explain the inclination of the Earth's axis and its effect.</p>				
General Objective 2.0: Know the equinoctial system of coordinates						
1 - 4	<p>2.1 Define the celestial sphere and identify the following:</p> <ul style="list-style-type: none"> - celestial poles, - equinoctial, - celestial meridians, - Obliquity of the Ecliptic. 	<p>Draw a celestial sphere and label fully to illustrate all the terms.</p> <p>Explain the apparent movement</p>	<p>-Text Books,</p> <p>-OHP & Transparencies,</p> <p>Nautical Almanac.</p>			

	<p>2.2 Explain the apparent annual motion of the sun and the concept of the Ecliptic.</p> <p>2.3 Define the 1st Point of Aries and the 1st Point of Libra and indicate the importance of the former.</p> <p>2.4 Describe the EQUINOCTIAL System of coordinates and define the following:</p> <ul style="list-style-type: none"> - Sidered Hour Angle (SNA), - Declination, - Polar Distance. <p>2.5 Extract information from the star diagrams in the Nautical. Almanac.</p>	<p>of the Sun differentiating between the places of the Equinoctial and that of the Ecliptic.</p> <p>Describe with the aid of diagrams the use of Chart to show position of some stars.</p>				
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General Objective: 3.0 Know the hour angles

5 - 6	<p>3.1 Describe the concept of the earth's axial rotation causing change in the Hour angle of bodies</p> <p>3.2 Define the following</p> <ul style="list-style-type: none"> - Hour Circle - Hour Angle - Local Hour Angle (LHA) - Greenwich Hour Angle (GHA) <p>3.3 Explain the Rate of change of GHA of the Sun and Aries.</p> <p>3.4 Identify the Tabulation of SHA GHA, Declination and 'd' and 'v'</p>	<p>Explain the various movements of the Earth's on spinning a lot its axis and revolution a lot the sun.</p> <p>Draw a Sphere and indicate Hour Circles, Hour Angles and LHA.</p> <p>Explain the arrangement of the</p>	Nautical Almanac.	Use the Nautical Almanac to find the hour angles and GMT	Supervises and ensure the student can use the Nautical Almanac	Assignment and Texts
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	<p>corrections) for all celestial bodies in the Almanac.</p> <p>3.5 Determine the Geographical position of a body for any GMT.</p>	<p>tables in the Almanac.</p> <p>Use the tables to extract the GHA of declination of various bodies.</p> <p>Explain with diagram, the importance of Geographical Position (G.P.).</p>				
General Objective 4.0 Know the horizontal system of coordinates						
5 - 6	<p>4.1 Define the followings:-</p> <ul style="list-style-type: none"> - Rational Horizon, - Zenith and Nadir of an observer, - Vertical and Prime Vertical Circles, - Elevated Pole and Depressed Pole. <p>4.2 Show that the attitude of the elevated pole is equal to the observer's latitude.</p> <p>4.3 Define the observer's Upper and Lower Celestial Meridian.</p> <p>4.4 Define: – True Attitude, Azimuth & True Zenith Distance.</p> <p>4.5 Explain the relationship between Azimuth, Quadrant Bearings and the</p>	<p>By means of a sketch of the Celestial Sphere, indicate the vertical circles etc.</p> <p>Draw a Circle/Sphere and indicate the true altitude and show the observed Lat</p> <p>Prove the relationship.</p> <p>Sketch the Celestial Sphere and identify the items.</p> <p>Determine the</p>	Reference Textbooks.			Assignment and Test and Examinations

	<p>360⁰ rotations.</p> <p>4.6 Explain the meaning of CIRCUM POLAR, bodies and give the conditions for a body to be circumpolar.</p> <p>4.7 Identify the parts of the celestial spherical Triangle PZX.</p> <p>4.8 Draw figures on the plane of Rational Horizon and the Observer's Celestial Meridian using the EQUIDISTANT PROJECTION method.</p>	<p>Azimuth of setting and Rising bodies and convert some into other rotations. State the characteristics of circumpolar bodies. Define the PZX triangle and label the parts fully. Solve Various navigational problems using the Equidistant projection methods.</p>				
General Objective 5.0: Understand the principles of the sextant and altitude corrections						
7 - 9	<p>5.1 Explain what the sextant is used for.</p> <p>5.2 Demonstrate how to read a sextant.</p> <p>5.3 Demonstrate how to find the Index Error of the sextant by the Horizon and also by the Sun.</p> <p>5.4 Define – Visible, Sensible and Rational Horizons</p> <p>5.5 Demonstrate the use of the sextant for taking vertical and horizontal angles</p> <p>5.6 Define the following:</p> <ul style="list-style-type: none"> - Dip - Refraction - Parallax - Observed Altitude - True Altitude 	<p>Demonstrate how to handle the sextant to take readings.</p> <p>Explain how to read the Vernier and then the Index Error if any.</p> <p>Sketch the Celestial Sphere and show the various Horizons.</p>	<p>SEXTANTS</p> <p>Nautical Almanac</p> <p>Nories tables</p>	<p>Uses the sextant to determine altitude of heavenly bodies.</p> <p>Uses the sextant to calculate Horizontal angle</p> <p>Uses the sextant to calculate vertical angle</p>	<p>Ensure students calculate the index error and apply the correction accurately.</p>	<p>Examination, Tests and Assignments</p>

	5.7 Demonstrate how to apply the various corrections to the sextant altitude to obtain the True Altitude and then the Zenith Distance.	Demonstrate the use of the sextant. Asst/Guide the students. With the aid of diagrams, describe the items. With the aid of diagrams, describe the items.				
General Objective 6.0: Understand the amplitudes						
7 - 9	6.1 Explain Amplitude and how it is measured 6.2 Calculate the theoretical and visible Rising and setting of the Sun using the Almanac.	With the aid of a diagram describe Amplitude and show how it is measured. Work out examples using the Almanac.	Almanac Compass	Uses the compass to determine the amplitude	Ensure the student can use the Nautical Almanac efficiently well	Tests, Assignment and Examinations
General Objectives 7.0: Know time and equation of time						
7 - 9	7.1 Define – Apparent Solar Day, Sidereal Day 7.2 Explain the sun's irregular rate of change of SHA and hence the need to adopt the astronomical Mean sun for time keeping	Define and show the duration/length of each. From Kepler's law, show that the speed	Reference Textbook Nautical Almanac	Uses Nautical Almanac to calculate equation of time	Assignment from Nautical Almanac	Tests, Assignments and Examinations

	<p>7.3 Define GMT, LMT, Longitude and state their relationship</p> <p>7.4 Define Equation of Time (ET) and its components and determine its value from the Almanac.</p> <p>7.5 Calculate the Error of a Chronometric or Watch.</p>	<p>of the sun is NOT constant. This implies a more accurate means needed to measure time.</p> <p>Explain GMT, LMT etc.</p> <p>Explain that the difference between the mean sun and Time sun give the equation of Time.</p> <p>Explain the need to have different times at different places.</p> <p>Work out examples.</p>				
General Objectives 8.0: Know how to find latitude by meridian altitude						
10-15	<p>8.1 Explain the term Meridian Passage or Transit</p> <p>8.2 Explain what is meant by a circumpolar body and the terms upper and lower Transit</p> <p>8.3 Explain the importance of the times of Meridian passage of Heavenly Bodies</p>	<p>Define Mer. Passage using the sun as an example.</p> <p>Explain that at the time of Mer. Passage, LHA=0 There is then</p>	Nautical Almanac, Nories Tables	<p>Uses the Nautical Almanac and Nories tables to determine time of Meridian passage</p> <p>Uses the Sextant to obtain the Altitude of Meridian Passage and</p>	Supervises and ensures the students can extract information accurately from the tables	Tests Assignment and Examinations

	<p>8.4 Identify times of Meridian Passage of some bodies from the Nautical Almanac</p> <p>8.5 Find the GMT and LMT for Meridian Passages of various H.B. (heavenly bodies) from the Longitude of the observer.</p> <p>8.6 Explain that at the instant of Meridian Passage Latitude = MZD \pm Declination</p> <p>8.7 State the procedure/steps for obtaining the Lat from observation at mer. Passage.</p> <p>8.8 Apply the Procedure to calculate the Latitude using various H.B.</p>	<p>a simple relationship between Lat, MZD and Declination.</p> <p>Make reference to the Times of Mer. Pass. Indicate in the Almanac.</p> <p>Work examples to calculate these times.</p> <p>The relationship to be provided with the aid of diagrams.</p> <p>List the various steps and explain each step. Examples on the application of the procedure to be worked out using different H.B.</p>		calculate the latitude		
General Objectives: 9.0 Know how to find latitude from observation on the pole star						
10 - 15	<p>9.1 Identify the position of POLARIS</p> <p>9.2 Establish the relationship between the altitude of the elevated pole and the Lat. Of the observer</p> <p>9.3 Explain that the alt. Of the Pole Star</p>	<p>Explain the special position of Polaris as the Pole Star.</p> <p>Prove the relationship</p>	Almanac	Uses Nautical Almanac to extract Azimuth from Pole star Table and use the procedure to find Latitude by use of Alt of	Supervises and ensures the students can extract the various data	Tests Assignment and Examinations

	<p>after some corrections can be used to find the altitude of the observer.</p> <p>9.4 Extract the corrections a_0, a_1, a_2 and the Azimuth from Pole Star Table</p> <p>9.5 State and apply the procedure for finding Lat by use of the alt of the Pole Star.</p>	<p>by the aid of Diagram.</p> <p>Explain why there is the need for corrections.</p> <p>Illustrate by working examples.</p> <p>Work out examples.</p>		pole star	accurately	
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 213	Contact Hours/Credit Unit:4/4
Course: COLLISION REGULATIONS	Semester: 3rd Semester	Theoretical: 2 Hour/Week
Year: 11	Pre-requisite: Gen Ship Know	Practical: 3 Hour/Week
Goal: At the end of the course, the student should understand and have thorough knowledge of the contents; intents and application of the International regulations for preventing collision at sea		
GENERAL OBJECTIVES:		
<p>1.0 Know the regulations for preventing collision at sea</p> <p>2.0 Know the sound and light signals prescribed by the rules</p>		

THEORETICAL CONTENTS			PRACTICAL CONTENTS			
WEEK	General Objective: 1.0: Know the regulations for prevention of collision at sea					
	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	TEACHER'S ACTIVITIES	Evaluation
1 -4	<p>1.1 State the history of the collision Regulations.</p> <p>1.2 Explain the application of the rules.</p> <p>1.3 State the use of a routing systems(Rule 1).</p> <p>1.4 Interpret responsibilities Between vessels (Rule2).</p> <p>1.5 Explain the definitions in the rules(Rule 3).</p> <p>1.6 State conduct of vessels in any condition of visibility. (Rules 4-10).</p> <p>1.7 Explain the duties and responsibilities required by the rules (Rule 7).</p> <p>1.8 Distinguish clearly between rules which apply when vessels are in sight of one</p>	<p>Give a brief history of how the rules originated and development to the 1972 regulations.</p> <p>Explain the application of the rules. Define the various terms used.</p> <p>Explain the conduct of vessels as in Rules 4-10:</p> <ul style="list-style-type: none"> - Separate the steering and sailing rules into those that apply when in sight of one another and when not. - Use case studies to emphasize the need for early and substantial actions. 	<p>Ref IMO resolution A736 (18) colreg 72</p> <p>Text Books on the collision Regulations. Slide project, C.B.T. and ship model.</p>	<p>No practical</p> <p>Simulator/DVD description with the use of models</p> <p>Demonstrate with models</p>	<p>Supervise</p> <p>Guide students</p>	<p>Convention, Colreg 1972</p>

	<p>another and when not.</p> <p>1.9 Identify the need for early and substantial action.</p> <p>1.10 Appreciate the hazards associated with small alternations of course and /or speed.</p> <p>1.11 Describe the factors which from case studies, have been found to contribute to collisions involving radar in general, and in particular the case of cumulative turn.</p> <p>1.12 State the conduct of vessels in sight of one another (Rules 11-18).</p> <p>1.13 State the conduct of vessels in restricted visibility.(Rule 19).</p> <p>1.14 Recognize that in restricted visibilities prior to visual sighting, there is no stand on and no give way.</p> <p>1.15 Identify vessels lights & shapes. (Rules 20-31).</p>	<ul style="list-style-type: none"> - Use case studies to show that if radar is not properly used it can aid collision. - Explain the conduct vessels in sight of one another in line with rules 11 – 18. - Explain that before visual sighting in reduced visibility. - There is no stand on, and no give way vessel. <p>Use light board or CBT to identify vessels lights & shapes.</p>		Radar/Simulator		
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				No practical Demonstrate with models, CBT/light Board	Supervise	
General Objectives: 2.0 Know the sound and light signals prescribed by the rules						
5	<p>2.1 Define the terms whistle, short and Prolonged blast (Rule 32).</p> <p>2.2 Describe equipment for sound signals (Rule 33)</p> <p>2.3 Recognize maneuvering signals (Rule 34).</p>	<p>Define terms used in the rules in relation to sound and light signaling. Use Audio/visual aids to show the various sound signals.</p>	<p>Text Book on the collision Regulations. CBT, Slide Projector</p>	<p>Demonstrate with models, CBT/light Board</p>		

Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 214	Contact Hours/Credit Unit:4/4
Course: CHART WORK I	Semester: Three	Theoretical: 26 Hour/Week
Year: II	Pre-requisite: Intro to Chart Work	Practical: 24 hours/week
Goal: At the end of the course, the student should demonstrate a goal knowledge of principles of chart projections, distances on Charts Maritime Buoyage System and Tidal calculation		
GENERAL OBJECTIVES:		
<p>1.0 Understand Charts</p> <p>2.0 Know distances, polar and equatorial circumferences of the earth.</p> <p>3.0 Know IALA Buoyage System</p> <p>4.0 Understand the theory of Tide and tidal predictions</p> <p>5.0 Know how to keep a log</p>		

General Objective 2.0 Know distances, polar and equatorial circumferences of the earth

4-5	2.1 Describes the approximate polar and equatorial circumferences of the earth 2.2 Demonstrates how to measure the distance between two positions on a Mercator chart based on the latitude of the two positions					
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General Objective 3.0 Know IALA Buoyage System

5-6	3.1 Explains the principle and rules of the International Association of Lighthouse Authorities (IALA) Maritime Buoyage System, Systems "A" and "B" 3.2 Recognizes the lights and shapes displayed on lateral and cardinal marks 3.3 Recognizes the lights and shapes displayed on other types of buoys in the system					
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General Objective 4.0 Understand the theory of tide and tidal predictions

4.1	Explains the basic theory of tides					
4.2	Defines 'spring tides', 'neap tides', 'height of tide', 'high water' and 'low water', 'mean high water springs', 'mean high water neaps', 'mean low water springs', 'mean low water neaps', 'range', 'chart datum', 'highest astronomical tide'					
4.3	Calculates the spring and neap ranges for standard and secondary ports					
4.4	Finds the predicted time and height of high and low water at standard and secondary ports					
4.5	Finds the time of a desired height of tide					

General Objective 5.0 Know how to keep a log

5.1	Describes the rules, regulations and common practice regarding keeping of a navigational log and voyage records					
5.2	Describes the proper keeping					

	of different kinds of log during ocean passages, coastal navigation and in port in line with the requirement in the company's ISM Safety Management System.					
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 215	Contact Hours²/Credit unit: 2
Course: General Ship Knowledge	Semester: 3	Theoretical: 3hours/week 3
Year: ONE	Pre-requisite: Seamanship II	Practical: 3 hours /week
GOAL: Introduction of Ship Structure, Stress, Stability, Shipboard Operations-Loading Gears.		
<p>GENERAL OBJECTIVES:</p> <ol style="list-style-type: none"> 1.0 Explain Names of Principal parts of ship. 2.0 Understand ship types and terminologies. 3.0 Understand shipboard organization. 4.0 Know the procedures for stowage, care and discharge of cargoes. 5.0 Work out simple loading, calculations using TPC.FWA, DWA, GM. 6.0 Know the Load line Marks &Load line Zones. 		

General Objective 1.0: Explain Names of Principal parts of ship.

General Objective 1.0: Explain Names of Principal parts of ship.						
	THEORETICAL CONTENTS			PRACTICAL CONTENTS		
Week	Specific Learning Outcomes	Teacher's Activities	Resources Theoretical/practical	Specific Learning Outcomes	Teacher's Activities	Evaluation
1	<p>1.1 Define Aft, After peak, Anchor, Bow, Bulkheads, Bulwark, Bridge, Cofferdam deck; Deep tank; Double Bottom, Bilge, Derrick.</p> <p>1.2 Define forehead, forecastle, forepeak; hull, load line, Plimsolimark, mast; propeller, rudder, stabilizers, stem, superstructure.</p> <p>1.3 Draw a ship and identify parts in (1.1) and (1.2) above.</p>	<p>a) Organize visit to ship model, video clip, printed pictures of ships, etc.</p> <p>b)</p>	OHP, ship model, video clip, printed pictures of ships, etc.	<ul style="list-style-type: none"> Identify; Aft, After peak, Anchor, Bow; bulkheads, Bulwark, Bridge. Cofferdam deck; Deep tank, Double Bottom, Bilge, Derrick. Show the forehead, forecastle, forepeak hatch; hull, load line, Plimsolimark, rudder, stabilizers, stem, etc. 	<p>a) Organize visit to a ship.</p> <p>b) Identify various parts on an actual ship or model.</p>	Ask the cadets questions on the topic.

General Objective 2.0: Understand ship types and terminologies.

2-3	2.1 Define: Length overall; Length between perpendiculars, Breadth extreme; Breadth moulded; Draft extreme; Draft moulded; Length on waterlines camber; sheer, flare etc.	<p>a) Use a sketch to show the principal dimensions of a ship.</p> <p>b) Describe the general arrangements of</p>	Ship Model OHP	Students be able to identify the various cargo ship types.	Draw or paste pictures/diagrams of different ships.	Give continuous assessment test.
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	<p>2.2 Describe:</p> <p>a) General cargo ship. b) Bulk carrier. c) Container vessel d) Ro-Ro ship e) Tanker; ULCC, VLCC, LNG, PLG, etc f) Passenger ships g) Combination carriers h) Fishing Trawlers.</p> <p>2.3 Draw ship in (a)-(h) in profile.</p>	<p>ships.</p> <p>c) Illustrate ship types with sketches.</p>				
General Objective 3.0: Understand Shipboard organization.						
3-5	<p>3.1 State the departments of a merchant ship. 3.2 Sketch a ship organogram. 3.3 Describe the duties of the officers and crew on board merchant ships. 3.4 State the duties of the officers and crew on board merchant ships. 3.5 Describe the processes involved in engagement and disengagement of crew.</p>	<p>a) Draw a ship organogram and show lines of responsibilities on board ship.</p> <p>b) Describe how a crew member may be engaged on board and vice versa.</p> <p>c) State the measures that may be of crew for certain misconducts.</p>	OHP, white board and marker.	<p>Cadets should be able to:</p> <ul style="list-style-type: none"> • Draw a ship organogram and show lines of responsibilities on board ship. • Describe how a crew member may be engaged on board and vice versa. 	<p>Draw a ship organogram and show lines of responsibilities on board ship.</p> <p>Describe how a crew member may be engaged on board and vice versa.</p>	

General Objective 4.0: Know the procedures for stowage, care and discharge of cargoes.

6	<p>4.1 Explain what is involved in the preparation of cargoes holds for dry cargoes.</p> <p>4.2 Describe the duties of the cargos officer.</p> <p>4.3 Describe the stowage requirements for bagged cargoes, bales, crates; cases; cartons; drums, barrels and containers.</p>	<p>a) Explain what is involved in cargo hold cleaning.</p> <p>b) Use one or two types of cargo to describe stowage requirements for categories of cargoes.</p>	OHP, white board and marker.	<p>Cadets should be able to:</p> <ul style="list-style-type: none"> Explain what is involved in the preparation of cargoes holds for dry cargoes. Describe the duties of the 	<p>Explain what is involved in cargo hold cleaning.</p> <p>Use one or two types of cargo to describe stowage requirements for categories of</p>	Ask questions at end of lecture.
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General Objective 5.0: Work out simple loading, calculations wing TPC.FWA, DWA, GM.

7-8	<p>1.1 Define: TCP, FWA and DWA.</p> <p>1.2 Calculate change of mean draft after loading/discharging using TPC.</p> <p>1.3 Calculate cargo to load on board given TPC and FWA.</p> <p>1.4 Calculate cargo to load given TPC and DWA.</p> <p>1.5 Calculate ships new drafts after loading/discharging.</p>	<p>a) Define TPC, FWA, DWA and GM.</p> <p>b) Define change of draft rise: Rise and Sinkage.</p> <p>c) Calculate cargo to load onboard and mean draft.</p>	Projector	<p>Cadets should be able to:</p> <ul style="list-style-type: none"> Define: TPC, FWA and DWA, GM. Calculate change of mean draft after loading/ discharging using TPC. Calculate cargo to load on board given TPC and FWA. 	<p>Define TPC, FWA, DWA, GM.</p> <p>Define change of Draft: Rise and Sinkage.</p>	
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General Objective 6.0: Know the Load line Marks & Load line Zones.

9-10	<p>6.1 Define: Freeboard, assigned freeboard; Deck line.</p> <p>6.2 Interpret information on a load line mark.</p> <p>6.3 Draw a load line mark to scale.</p> <p>6.4 Read a ship's draft.</p> <p>6.5 Identify the seasonal zones on a map.</p> <p>6.6 State the use of a seasonal zone map to cargo officer.</p>	<p>a) sketch a load line mark.</p> <p>b) Interpret informant on thereon.</p>	<p>Ship model, white board and maker, map of the world showing the load line zone</p>	<p>Cadets should be able to Sketch a load line mark.</p>	<p>a) Sketch a load line mark.</p> <p>b) Interpret information thereon.</p> <p>c) Embark on excursion with the cadets.</p>	
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 216	Credit Hours:4 60
Course: ELECTRONIC NAVIGATIONAL AIDS	Semester: 3	Theoretical: 2hours/week
Semester:4	Pre-requisite:	Practical: 2hours /week
GOAL: At the end of the course the student should have a knowledge and understanding of usage of electronics aids to assist in sage Navigation		
GENERAL OBJECTIVES:		
1.0 Know how to find position using Loran System		
2.0 Know how to find position using Decca Navigator		
3.0 Know how to find position using Omega system		
4.0 Know how to find position using Radio Direction finder		
5.0 Understand the operation and use of the Echo sounder		
6.0 Know how to use a Magnetic compass to find direction		
7.0 Know how to obtain direction using a magnetic compass.		
8.0 Know how to use a Gyro Compass to find direction		
9.0 Understand the basic principle of operation and uses of Marine Radar.		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE						
COURSE: Electronics Navigation Aids			Course Code: NSC 216	Contact Hours: 4hrs/ week		
Course Specification: Theory				Practicals		
General Objective: 1.0 Understand the basic principles of hyperbolic navigation system.						
Week	SPECIFIC LEARNING OUTCOME	TEACHERS ACTIVITIES	RESOURCES	SPECIFIC LEARNING OUTCOMES	TEACHER'S ACTIVITIES	Evaluation
1-2	1.1 Describe the nature and properties of a hyperbola. 1.2 Explain how ambiguity occurs when two stations situated at the foci transmit at the same time. 1.3 Explain how the ambiguity is removed by means of time delay. 1.4 Explain causes of ambiguity and reduced accuracy on the base line extension. 1.5 Describe how to combine two patterns to show the method obtaining position. Describe how hyperbolic patterns can be produced between two stations transmitting on the same frequency and on exact number of wave lengths apart, with signals starting in phase. 1.6 Describe how phase difference can be used to ascertain and draw	Define maritime law. State the problems that may call for legal solution arising out of conduct of sea transport. Define the term "vessel" as it applies to floating structures which have been conferred to special remedies powers on the courts.	References textbook GPS Receiver Echo sounders Gyro compass Automatic Pilot AIS. BNWAS LRIT Speed log ARPA	Illustrate using models And via simulator		Tests Assignments and Examinations

	intermediate hyperbolic lines between in-phase conditions. 1.7 Describe how time difference can be used to ascertain and draw intermediate hyperbolic position lies between integral time differences.					
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General Objective 2:0 Know how to find position using loran system.

2-4	2.1 Describe the basic loran system 2.2 Identify the loran lattice chart and the additional information printed thereon. 2.3 Switch on equipment select chain and obtain a reading. 2.4 Describe how to transfer the reading to the chart to obtain a fix. 2.5 Explain corrections required before plotting the curves.	Explain the principles of operation of Loran C system	Loran C system Text books	Demonstrate the use of Loran C Demonstrate the transfer of readings to chart Carryout corrections	Guide the student in the use of Loran C Guide the student to understand correction before plotting curves	Laboratory Assignment Test and Examination
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General Objective: 3:0 Knows how to find position using satellite navigation system.

4	3.1 Explain time sharing and the basic Omega signal format 3.2 Identify the omega chart and/or plotting chart and any other information on it. 3.3 Explain reasons and the method for selecting an appropriate station pair.	Describe the set up and operation of Basic Omega System	Text book	Draw with Figures basic omega signal Describe how to set up Show how to fix position using corrected values	Guide the student	Assignment Test and Examination
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	<p>3.4 Describe how to set up and omega receiver.</p> <p>3.5 Describe lane slip and its method of correction.</p> <p>3.4 Show how to fix ship's position using the corrected values.</p>					
General Objective: 4.0 Knows how to find position using satellite navigation system						
5-6	<p>4. 1 Describe the overall operation of the transit satellite system</p> <p>4.2 Describe the satellite ideal orbits and their limitations.</p> <p>4.3 Describe the roles of the tracking station, the injection station and the computing center.</p> <p>4.4 List the relevant information that can be transmitted by the satellite.</p> <p>4.5 Explain Doppler effect and dopler count.</p> <p>4.6 Explain how the Doppler count together with a knowledge of two satellite positions will define a positions surface which is hyperbolic of revolution.</p> <p>4.7 Explain how two or more such surface can be combined to fix an observer's position.</p> <p>4.8 Describe sources of error such</p>	Understand and explain the Doppler equipment		Text books		Assignment Tests Examinations

	<p>as refraction etc.</p> <p>4.9 List a typical shipboard equipment for the set system.</p> <p>4.10 Operate a typical Transit/satellite navigation receiver.</p>					
General Objective: 5.0 Know how to find position using Radio Direction Finder.						
6	5.1 Describe the basic principle of the R.D.P from such bearings.		Text book			Assignment Test Examination
General Objective: 6.0 Understand the operation of the Echo Sounder						
7-8	<p>6.1 Describe the basic principles of marine Echo sounding equipment.</p> <p>6.2 Identify units on a simple block diagram of an echo sounder and state the functions of each.</p> <p>6.3 State the velocity of sound in seawater and the factors, which affect the velocity.</p> <p>6.4 Operate a typical echo sounder and carry out basic adjustment of stylus etc.</p> <p>6.5 Identify the various types of false echoes and describe their causes and methods of eliminating or minimizing them.</p>		Text book			Assignment Test Examination

General Objective 7.0 Know how to obtain direction using a magnetic compass.

8-9	7.1 Describe how the magnetic compass is enable to point constantly in a fixed direction. 7.2 Describe magnetic variation and state the source from which this information may be obtained. 7.3 Describe magnetic deviation due to ferro-magnetic in the ship's structure and the effect due to change of heading and change of position on the earth. 7.4 Identify the deviation card and extract information from it. 7.5 Explain how compass error can be obtained by applying deviation and variation.					Assignment Test Examination
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General Objective 8.0 Know how to use a gyro compass to measure direction.

10	8.1 Describe the general properties of a free gyroscope. 8.2 Explain how the gyroscope can be controlled to point to the direction of the true North and be made to maintain that same direction. 8.3 Explain how to check and measure a gyrocompass error					Assignment Test Examination
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	and how to apply the error to any reading.					
General Objective: 9:0 Understands the basic principles of operation and uses of Marine Radar.						
11	<p>9.1 Explain the basic principles of marine radar</p> <p>9.2 Sketch a block diagram of the major components and explain the functions of each list.</p> <p>9.3 Enumerate the uses of radar.</p> <p>9.4 Explain how to use radar to determines position.</p> <p>9.5 Describe parallel indexing technique.</p>	Demonstrate the principles of Radar with diagram	Text books PP presentation	Demonstrate and explain the operation of a Radar		Assignment Lab Test Examination

NDII FOURTH SEMESTER

PROGRAMME: NATIONAL DIPLOMA IN BOAT AND SHIPBUILDING TECHNOLOGY			
COURSE TITLE: SHIP MANAGEMENT	COURSE CODE: NSC 221	UNIT:4	CREDIT HRS: 2
Year : 2	PRE-REQUISITE: GENERAL SHIP KNOWLEDGE		THEORETICAL: 2HRS/WK
SEMESTER: 4			PRACTICAL:
GOAL: This course is designed to enable students know the basic concept and regulatory requirement towards an efficient ship management system			
<p>GENERAL OBJECTIVES: On completion of this course the Students will be able to:-</p> <ol style="list-style-type: none"> 1. Discuss and understand the requirements of the ISM CODE and its application in ship management. 2. Discuss and understand the importance of safety and security in Marine operations. 3. Be familiar with the Maritime occupational safety and Health regulation. 4. Know vessel certification regulation. 5. Understand MARPOL, SOLAS, STCW, MLC 2006. 6. Understand IMO Regulatory Frame work with port and flag state requirement to shipping. 			

PROGRAMME: NATIONAL DIPLOMA IN BOAT/SHIPBUILDING TECHNOLOGY						
COURSE TITLE: SHIP MANAGEMENT			COURSE CODE: NSC 221	UNIT: 4	CONTACT HOURS: 4	
					THEORETICAL: 3 HOURS/WEEK	
SEMESTER: 2			PRE-REQUISITE		PRACTICAL: 1 HOUR/WEEK	
GENERAL OBJECTIVE 1:0 Discuss and understand the requirements of the ISM CODE and its application in ship management						
THEORETICAL CONTENT			PRACTICAL CONTENT			
WK	Specific Learning Outcomes	Teacher's Activities	Resources	Specific Learning Outcomes	Teacher's Activities	Evaluation
1-2	1.1 Define ISM code and state the elements of the code. 1.2 Define and understand the purpose of the code. 1.3 Requirements imposed by the code . 1.4 Responsibilities of the owner 1.5 Designated person ashore of the 1.6 Master and his Authority	Explain the ISM code State the purpose of the code Explain the requirements of the code, the owner DPA and master	ISM ODE Lecture notes Power point presentation with over head projector			Assessment test Assignment Examination
General Objective 2: Discuss and understand the importance of safety and security in Marine operations.						
3-4	2.1 understand basic ship board safety. 2.2 define safety 2.3 define role of a manager in ship management. 2.4 understand ISPS code/ship board security.	Define safety highlight basic ship board safety. Define and list manager role. Define security.				Test Assessment Class work Examination.

	2.5 Describe the ISPS code Evaluation various security measures an board and in ports	Describe ISPS code and security measures				
General Objective: 3 Be familiar with the Maritime occupational safety and Health regulation						
4-5	<p>3.1 Define and list duties.</p> <ul style="list-style-type: none"> ➤ The Employers ➤ Safety equipments and facilities to be provided by employers. ➤ First aid kilt and first aiders. <p>3.2 Safety provision for staff on board ships.</p> <ul style="list-style-type: none"> ➤ Safety officers, ➤ Safety Committees ➤ Safety Representatives ➤ Care of lifting equipments ➤ Safeguard of machinery ➤ Electrical equipment. ➤ Safety measures when working under hazardous conditions. ➤ Safe access of persons on board. 	<p>Define and explain duties of employers contents of first aid keit and responsibilities of first Aiders</p> <p>Explain safety provisions on board ship</p>	<p>Code of safe working practice</p> <p>Basic ship board safety</p> <p>white board</p> <p>coswop</p> <p>White Board</p> <p>Power point presentation with over head projector</p>			<p>Class work</p> <p>Assessment</p> <p>Test</p> <p>Examination</p>

	<ul style="list-style-type: none"> ➤ Safety signs ➤ Guard ails ➤ Fixed ladders ➤ Enclosed or confirmed space. 					
General Objective 4: Know vessel certification regulation						
6-7	<p>4.1 Explain and know certificates to be carried on board ships.</p> <ul style="list-style-type: none"> ➤ Passenger ships ➤ Cargo ships ➤ Oil Tankers ➤ Records of equipments. ➤ Exemption certificates 	Explain and identify certificates to be carried on board various types of ships	<p>SOLAR</p> <p>PP Presentation with Overhead projector.</p> <p>Lecture notes</p>			<p>Assessment</p> <p>Class work</p> <p>Test</p> <p>Examination</p>
General Objective 5: Understand MARPOL, SOLAS, STCW, MLC 2006						
8-9	<p>5.1 Understand the Following IMO conventions.</p> <ul style="list-style-type: none"> ➤ MARPOL ➤ SOLARS ➤ STCW ➤ MLC 2006 	Explain the IMO conventions and what the stand for	<p>MARPOL</p> <p>SOLARS</p> <p>STCW</p> <p>MLC 2006</p> <p>PP Presentation with overhead projector</p>			<p>Class work</p> <p>Assessment</p> <p>Examination</p>
General Objective 6: Understand IMO Regulatory Framework with port and flag state requirement to shipping.						
10	<p>6.1 Explain and understand port state jurisdiction.</p> <p>6.2 Explain and understand flag state</p>	Explain port and flag state jurisdiction	IMO Convention on the law of the sea			<p>Class work</p> <p>Assessment</p> <p>Test</p>

	jurisdiction.					Examination
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 222	Contact 52 Hours/Credit unit: 2
Course: INTRODUCTION TO MARITIME LAW	Semester: FOUR	Theoretical: 2hours/week
Year: TWO	Pre-requisite: SSC/NECO Certificate	Practical: hours /30week NIL
GOAL: Upon completion of this course the student should be able to demonstrate knowledge of legislative requirements compliance, SOLAS, MARPOL, STCW		
GENERAL OBJECTIVES		
1.0 Know the history and maritime jurisdiction which extends to all water that are navigable and to all maritime in nature. 2.0 Know the importance of marine insurance as an integral part of admiralty and maritime jurisdiction as it applies to seaman's injuries or collision. 3.0 Know the carriage of good under the bill of lading. 4.0 Know the term 'charter party' which designate the document in which arrangements and contractual engagement are entered into over the use of a ship belongs. 5.0 Know the general averaged law as it applies to merchandise thrown overboard to lighten the ship for the benefit of all 6.0 Know the right of seaman and maritime workers in the compensation for death and injury 7.0 Know the consequences of collision 8.0 Understand maritime liens an ship mortgages 9.0 Understand maritime liens an ship mortgages		

General Objective 1.0: Know the history and maritime jurisdiction which extends to all water that are navigable and to all maritime in nature

	THEORETICAL CONTENTS			PRACTICAL CONTENTS		
Week	Specific Learning Outcomes	Teacher's Activities	Resources Theoretical/ practical	Specific Learning Outcomes	Teacher's Activities	Evaluation
1	<p>1.1 Define the law of admiralty or maritime law.</p> <p>1.2 State the problems that may call for legal solution arising out of the conduct of sea transport industry.</p> <p>1.3 Define with regards to the character of waters where or with reference to which the given transaction or occurrence takes place.</p> <p>1.4 State and define the term "vessel" as it applies to floating structures or objects.</p> <p>1.5 State the statutes which have been conferred to</p>	<p>Define maritime law. State the problems that may call for legal solution arising out of the conduct of sea transport. Define the term 'vessel' as it applies to floating structures or objects. State the statutes which have been conferred to special remedial powers on the courts. Define those criminal cases that fall within admiralty jurisdiction.</p>	<p>Textbooks, Imo Resolution SOLAS Resolutions Imo Conventions MLC 2006, STCW Flag state implementation Ballet water management ISM Code Imo references</p>			<p>Tests Assignment examination</p>

	<p>special remedial powers on the courts</p> <p>1.6 Define those criminals cases that fell within the admiralty jurisdiction, i.e. piracy, wreck.</p>		Assembly resolutions			
General Objective2.0: Know the importance of marine insurance as an integral part of admiralty and maritime jurisdiction as it applies to seaman’s injuries or collision.						
2- 5	<p>2.1 Explain the history of marine insurance.</p> <p>2.2 Define the general principles of maritime insurance.</p> <p>2.3 State what are insured and insurable interests.</p> <p>2.4 Explain certain ways in which the policy may be avoided.</p> <p>2.5 Define the express warranties for policy to be valid.</p> <p>2.6 Explain the risks insured against.</p> <p>2.7 State the proximate cause of</p>	<p>Explain the history of marine insurance.</p> <p>State and explain the general principles of marine insurance.</p> <p>Explain the conditions under which the marine insurance policy may be avoided.</p> <p>Define express warranty.</p> <p>List the different types of risk insured against.</p> <p>Define the proximate cause of the peril insured against and claimed under.</p> <p>Explain the different types of losses.</p>	<p>Marine Insurance Act, 1906.</p>			

	the peril insured against and claimed under.	State the doctrine of subrogation.				
General Objective 3.0: Know the carriage of good under the bill of landing						
5-7	<p>3.1 State and define the term “negotiability of bill of lading”.</p> <p>3.2 State the purpose of a bill of lading.</p> <p>3.3 Describe the different types of sales of goods.</p> <p>3.4 Define the mercantile terms of shipment: FOB, CIF, FAS. Etc.</p> <p>3.5 State the documentary sales of goods.</p> <p>3.6 State what the Bank Letter of credit stands for.</p> <p>3.7 Describe the content of the Bank Letter of credit.</p> <p>3.8 Explain who bears the loss when goods are damaged or lost.</p> <p>3.9 State the duty of a carrier.</p> <p>3.10 State the liabilities of the carrier.</p> <p>3.11 Define the “Both-to-Blame” clause.</p> <p>3.12 Define the term “Deviation and Burden of Proof”.</p>	<p>State the functions of the Bill of lading.</p> <p>Explain the ‘negotiability’ provision of the bill of lading.</p> <p>Describe the different types of sales of goods.</p> <p>Define the mercantile terms of shipment: FOB,CIF, FAS, etc.</p> <p>State the documentary sales of goods.</p> <p>State what the Bank Letter of credit stands for.</p> <p>Describe the content of the Bank Letter of credit.</p> <p>Explain who bears the loss when goods are damaged or lost.</p> <p>State the duty of a carrier.</p> <p>State the liabilities of the carrier.</p> <p>Define the term</p>	Bill of Lading document..			

		'Deviation and Burden of Proof'.				
General Objective 4.0: Know the term 'charter party' which designate the document in which arrangements and contractual engagement are entered into over the use of a ship belongs.						
5-6	<p>4.1 State the different types of charter parties.</p> <p>4.2 Define the voyage charter and the clauses attached to it.</p> <p>4.3 Define the time charter and the basic terms.</p> <p>4.4 Define demise or bare-boat charter.</p> <p>4.5 State the legal consequences of demise or bare-boat charter.</p>	<p>State the different types of charter parties.</p> <p>Define voyage charter and the applicable clauses.</p> <p>Define time charter and the applicable clauses.</p> <p>Define bareboat or demise charter.</p> <p>State the legal consequences of demise or bareboat character.</p>	Standard charter party forms	•		
General Objective:5.0: Know the general averaged law as it applies to merchandise thrown overboard to lighten the shipfor the benefit of all						
6-7	<p>5.1 State the origin of the general average law.</p> <p>5.2 Define the general average rule.</p> <p>5.3 State those things that will occur to constitute a general average law.</p> <p>5.4 Describe the work of the general average adjuster</p> <p>5.5 State the exceptions to general average contributions or claim.</p>	<p>Explain the origin of the general average law.</p> <p>Define the general average rule.</p> <p>State the conditions for general average.</p> <p>Describe the work of the general average adjuster.</p> <p>State the exceptions to the general average</p>	York-Antwerp Rules 1974.	•		

		contributions or claim.				
General Objective: 6.0 Know the right of seaman and maritime workers in the compensation for death and injury						
7-8	<p>6.1 State the liability of ship owners and other maritime labour for injuries suffered in the cause of employment.</p> <p>6.2 Explain the work compensation Act of Nigeria.</p> <p>6.3 Define the term: “unseaworthiness” and “negligence”.</p> <p>6.4 Explain the amount of recovery- duration and extent the ship owner’s liability.</p> <p>6.5 Explain the ship owner’s right to indemnity from their party for maintenance and cure expenses.</p>	<p>State the liability of ship owners and other maritime labour for injuries suffered in the cause of employment.</p> <p>Explain the work compensation Act of Nigeria.</p> <p>Define the terms:- “unseaworthiness” and “negligence”.</p> <p>Explain the ship owner’s right to indemnity from third party for maintenance and cure expenses.</p>	Reference Textbooks.	•		
General Objective: 7.0 Know the consequences of collision						
8-9	<p>7.1 State the element of collision liability.</p> <p>7.2 Explain the critique of the divided damages rule in collision.</p>	<p>State the element of collision liability.</p> <p>Explain the oil pollution laws in Nigeria and of the IMO.</p>	Reference Textbooks.	•		

General Objective: 8.0 Understand maritime liens an ship mortgages

9-10	<p>8.1 State the meaning of a salvor.</p> <p>8.2 Explain the salvage award and how it is computed and distributed.</p> <p>8.3 Explain the different types of salvage.</p>	<p>Define Salvage and salvor.</p> <p>Explain the Salvage award and how it is computed and distributed.</p> <p>Explain the different types of salvage.</p>	Reference Textbook..	•		
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General Objective: 9.0 Understand maritime liens an ship mortgages

10-11	<p>9.1 Define a maritime lien.</p> <p>9.2 Explain the true nature of the maritime lien as used in the personification of the ship.</p> <p>9.3 Explain the enforceability of liens when owners are not personally liable.</p> <p>9.4 Explain liens arising when the ship is in control of characters and the like.</p> <p>9.5 Explain the liable in Rem, the libel in personal and the problem of Res Judicata.</p> <p>9.6 Explain the claims, which give rise to liens.</p>	<p>Define maritime lien.</p> <p>Explain the different categories of maritime lien.</p> <p>Explain the enforceability of liens when owner is not personally liable.</p> <p>Explain liens arising when the ship is in control of charters and the like.</p> <p>Explain the claims, which give rise to liens.</p>	Reference Textbook..			
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 223	Contact Hours 60 Credit unit: 4
Course: Practical Navigation	Semester: 4	Theoretical: 2hours/week
Year: 2	Pre-requisite: Chart work I	Practical: 2hours /week
GOAL: At the end of the course the student should be able to demonstrate a Knowledge and understating of Plane sailings, rhumbline sailings, parallel sailing, great circle sailing Mercator sailing.		
GENERAL OBJECTIVES		
1.0 Understand Sailings including rhumb line, plane sailing, Mercator sailing great circle sailing, use of traverse table, composite great circle 2.0 Understand gnomonic Charts		

General Objective: 1.0: Understand Sailings including rhumb line, plane sailing, Mercator sailing great circle sailing, use of traverse table, composite great circle

THEORETICAL CONTENTS		PRACTICAL CONTENTS <i>NOT REQUIRED</i>				
Week	Specific Learning Outcomes	Teacher's Activities	Resources Theoretical/ practical	Specific Learning Outcomes	Teacher's Activities	Evaluation
1-3	<p>Sailings</p> <p>1.1 Defines departure and states relationship to difference of longitude</p> <p>1.2 Define 'true course' and 'rhumb line'</p> <p>1.3 Derives the plane sailing formulae</p> <p>1.4 Explains the relationship between departure and difference of longitude in cases involving a change of latitude by using mean latitude.</p> <p>1.5 Uses the parallel sailing formulae: Departure/ Diff. of longitude = cosine of latitude</p> <p>1.6 Calculate the distance between two position on the same parallel of latitude.</p> <p>1.7 Calculate the difference of</p>	<p>Explain the difference between long and departure and relationship between them.</p> <p>Demonstrates calculation of distances between</p>	<p>Charts</p> <p>Charts 5011</p> <p>Drawings</p> <p>Diagrams</p>	<p>Demonstrate the relationship and difference between longitude and latitude</p>	<p>Show student relationship between longitude and latitude</p> <p>Time course rhumb line</p>	<p>Assignment, Test and Examinations</p>

	<p>longitude for a given distance run along a parallel of latitude.</p> <p>1.8 Derives the final position after sailing along a parallel of latitude.</p> <p>1.9 Demonstrates the uses of the plane sailing formulae.</p> <p>1.10 Understands the meaning of and can derive, mean latitude.</p> <p>1.11 Calculate the correct departure to use in plane sailing problem.</p> <p>1.12 Calculate the course and distance between two positions, using the plane sailing formula.</p> <p>1.13 Calculate a DR position or an estimated position by using the plane sailing formula, given compass course and compass error, distance by log, estimated speed, tidal and current information and leeway.</p> <p>1.14 Describes the layout of a traverse table.</p> <p>1.15 Derives the information required in a parallel or plane sailing problem using a traverse table or calculator.</p>					
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General Objective:2.0 Understand gnomonic Charts

3-4	<p>2.1 Solve problems of plane sailing 2.2. Solves problem of DR and fixing positions using plotting charts 2.3 States the Mercator sailing formula 2.4. Uses the Mercator formula to calculate course and distance between two positions. 2.5 Uses the Mercator formula to calculate final position , given the initial position, course and distance 2.6 Demonstrate understanding of great circle sailing including composite and limited latitude great circles 2.7 Calculates initial course and distance of a great circle track 2.8 Calculates composite great circles 2.9 Demonstrate the use of gnomonic charts for plotting the great circle between two points. 2.10 Transfers a great circle from a gnomonic chart to a Mercator chart</p>	<p>Two position line explain the layout of the transverse table Explain the formulas for m' latitude meridional parts and other formulae</p>	<p>Nore's Nautical Tables Burtons tables</p>	<p>Demonstrate problem solving of plane sailing Calculate initial course and distance of a great circle Demonstrate the use of gnomonic charts for plotting Show how to transfer a great circle from a gnomonic chart to Mercator chart</p>	<p>Guide the students in the plane sailing Guide the student in the use of gnomonic chart</p>	<p>Log book assessment t Test and Examinations</p>
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Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 224	Contact Hours/Credit Unit:4/4
Course: CARGO OPERATIONS	Semester:4th	Theoretical: 32 Hour/Week 4
Year: 11	Pre-requisite:	Practical: Nil
Goal: At the end of the course, the student should have a broad knowledge of procedure, precautions, preparation for cargo operation, cargo gears, handling, stowage and safety measures		
GENERAL OBJECTIVES:		
<p>1.0 Know and understand the preparation of holds for dry cargoes.</p> <p>2.0 Know Reasons for dunnaging and separation in the hold for dry cargoes</p> <p>3.0 Know the calculation of dry cargoes.</p> <p>4.0 Understand the use and operation of hatch covers.</p> <p>5.0 Understand the carriage of coal cargoes.</p> <p>6.0 Know the procedure for the carriage of grain cargoes.</p> <p>7.0 Know the cargo plan and storage arrangements</p> <p>8.0 Know the procedure for the carriage of refrigerated cargoes.</p> <p>9.0 Know the principles of ventilation and sweat.</p> <p>10 Understand safety requirement in cargo work</p> <p>11 Know the carriage of bulk cargoes.</p> <p>12 Know Unitized cargoes</p>		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE						
COURSE: Cargo Operation			Course Code: NSC 224		Contact Hours: 4	
Course Specification: Theoretical Content			Practical Content			
Week	General Objective: 1.0 Know the preparation of holds for dry cargoes.					
	SPECIFIC LEARNING OUTCOME	TEACHERS ACTIVITIES	RESOURCE/ THEORET PRACTICALS	SPECIFIC LEARNING OUTCOMES	TEACHER'S ACTIVITIES	EVALUATION
1-3	1.1 Explain the reasons for hold preparation, i.e. nature of previous cargo, nature of next cargo. 1.2 State the method used in dunnaging holds. 1.3 Explain how to inspect a hold and where necessary, how to re-dunnage and how to dispose of hold dunnage. 1.4 Summarize the danger in using old tainted dunnage. 1.5 Describe bilge well and dunnage inspection. 1.6 Inspect spar ceiling 1.7 Outline reasons for general inspection of holds. 1.8 List items to be inspected.	Explain the reasons for hold preparation. Explain where and what to look for during hold inspection. Explain what and what to look for during hold inspection. Explain what is involved in inspection. State that bilge well and dunnages must be clean, dry and sweet-smelling. Explain why the cargo hold should be inspected prior to loading/discharging. List areas and structures to be inspected. State types of	References textbook Projectors Models Showing the Ships Holds DVDs IMO references Cargo blocks working models of derricks photographs drawing plans Simulations of dry cargo loading.	Educational Visit to Ships in port to observe loading activities. Describe bilge well through showing of models.	Supervise students educational tours Demonstrate loading of vessels using models of gen Cargo ship.	

	1.9 State the types of infestation which can occur in holds. 1.10 State the requirement for hygienic standard in cargo spaces and bilges.	insect/rodent infestation that might occur.				
General Objective: 2:0 Know Reasons for dunnaging and separation in the hold for dry cargoes.						
3-4	2.1 Explain reason for dunnaging 2.2 State the type and size of dunnage to be use i.e. materials used. 2.3 Explain reasons for parcels separation. 2.4 List the materials used in selection of cargo, i.e. tarpaulins, papers, timber, non-toxic dyes chalk, polythene sheet, etc. 2.5 Explain reasons for marking of cargo, i.e. the separation (distinction) between separate parcels of cargo, incompatible cargoes, fire barriers 2.6 Explain marking-off procedure.	Give reasons for dunnaging cargoes, and for parcel separation. Explain why it is necessary to mark cargoes.	References textbook.	Sample of dunnage used on board HP Projector DVD showing holds preparation and segregation.	Describe dunnage used. Explain reason for dunnage.	
General Objective: 3:0 Know the calculation of dry cargoes.						
4-5	3.1 Define stowage	Calculate cargo to	Reference textbook.			

	<p>factor</p> <p>3.2 Define broken stowage</p> <p>3.3 Solve problems on stowage of cargo i.e</p> <p>(i) Given capacity of hold and stowage factor of cargo, to find how much weight hold will contain.</p> <p>(ii) Given weight and stowage factor of one or more cargoes, find the capacity occupied by the cargo</p> <p>(iii) Perform the above calculations with an allowance for broken stowage.</p> <p>3.4 Determine total freight earned on the basis of the above calculations.</p> <p>3.5 Define the term full and down</p> <p>3.6 Apply the above in calculations to load a ship "full and down" taking into account capacities and weights.</p>	<p>load given S.F, and hold capacity.</p> <p>Calculate space left after loading certain quantity of cargo.</p> <p>Determine freight based on the three basic methods.</p>				
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General Objective: 4.0: Understand the use and operation of hatch covers.						
5-6	<p>4.1 Distinguish types of “steel” hatch covers.</p> <p>4.2 Explain correct method of battening down hatch covers.</p> <p>4.3 Distinguish types of hydraulic hatch covers.</p> <p>4.4 Explain special precautions to be taken with hydraulic hatch covers, i.e. prevention of oil leakage.</p> <p>4.5 Distinguish types of pontoon hatch covers.</p> <p>4.6 Describe the method of battening down pontoon type hatch covers.</p>	<p>Describes the various types of hatch covers, and methods of battening down.</p>	Reference textbook.			
General Objective 5:0 Understand the carriage of coal cargoes.						
6-7	<p>5.1 Distinguish the various types of coal carried at sea.</p> <p>5.2 Explain hazards associated with coal cargoes i.e shifting, fire and gas build up.</p> <p>5.3 Explain spontaneous</p>	<p>Explain the hazards associated with the carriage of coal and state precaution to prevent hazards.</p> <p>Describe ventilation of coal cargoes.</p>	References textbook.			

	<p>combustion.</p> <p>5.4 Explain ventilation procedure of coal.</p> <p>5.5 State precaution and procedure for loading and discharging coal.</p> <p>5.6 Explain thermometer pipes and reasons for rigging.</p> <p>5.7 Recognize the hazards contained in IMO code for safe practice for carriage of bulk cargoes.</p>	<p>Explain the hazard involved with bulk cargo carriage.</p>				
General Objective 6:0 Know the procedure for the carriage of grain cargoes.						
7-8	<p>6.1 Define “Grain” and “Grain laden” as laid down in IMO Grain Rules</p> <p>6.2 Define “Shifting board”, “feeder” soucer” trimming hatch as laid down in IMO regulation.</p> <p>6.3 State the procedures for ventilation of grains.</p>	<p>Define grain as contained in IMO Grain rules</p>	<p>References textbooks.</p>			
General Objective 7:0 Know the cargo plan and storage arrangements.						
8-9	<p>7.1 Interpret the information contained in a cargo plan.</p> <p>7.2 Sketch a representative simple plan for loading</p>	<p>Sketch a cargo plan. Interpret with student. Plan cargo distribution</p>	<p>Reference textbooks.</p>			

	<p>or off-loading a given variety of cargo.</p> <p>7.3 Plan distribution of cargo allowing for cargo weight and volume of space occupied.</p> <p>7.4 Plan distribution of cargo to avoid hogging and sagging stresses.</p> <p>7.5 Plan distribution of cargoes to minimize the use of cargo handling gear.</p> <p>7.6 Calculate the distribution of cargo allowing for cargo weight and volume of space occupied.</p> <p>7.8 Describe methods of stowing of different commodities.</p> <p>7.9 Enumerates precautions to be taken when heavy cargoes are loaded/discharged.</p> <p>7.10 Explain prevention of over-stowage of cargo.</p> <p>7.11 Plan distribution of cargo stowage for sequence of discharge.</p>	<p>Mention factors that influence same.</p> <p>Show how different types of cargoes may be stowed.</p> <p>Mention precautions necessary.</p>				
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General Objective 8:0 Know the procedure for the carriage of refrigerated cargoes.						
9-10	<p>8.0 Explain hold and locker preparation prior to loading of refrigerated cargoes</p> <p>8.2 Enumerate the types of cargo that are carried chilled.</p> <p>8.3 Enumerate the types of cargo that are frozen.</p> <p>8.4 State the areas to inspect in a cargo before after loading.</p>	<p>Explain hold preparation for refrigerated cargoes. Explain what frozen cargoes are and how to inspect them.</p>	Reference textbook.			
General Objective: 9.0 Know the procedure for the carriage of refrigerated cargoes.						
10-11	<p>9.1 Define ventilation and sweat.</p> <p>9.2 Recognize the factors involved in the control of “sweat” by ventilation.</p> <p>9.3 Describe the principle of natural ventilation.</p> <p>9.4 Describe the theory and principles of forced</p> <p>9.5 Describe some systems of forced ventilation and humidity control.</p> <p>9.6 Explain the factors involved in the removal of heat.</p> <p>9.7 Explain the factors involved in the removal of gases.</p>	<p>Define ventilation and sweat</p> <p>State what factors influence control of sweat.</p> <p>Describe the operation of forced ventilation method.</p> <p>Discuss the factors involved with the removal of heat and gases from cargoes in stove.</p> <p>Mention some cargoes which require special ventilation procedures.</p>	Reference textbook.			

	9.8 Categorize cargoes requiring special ventilation techniques.					
General Objective 10:0 Understand safety requirement in cargo work.						
11-12	10.1 List safety measures required in cargo work. 10.2 Explain the precautions to be observed on entry to tanks and other enclosed spaces.	Go through relevant chapters/selections of the “ILO Accident prevention onboard: At Sea and in Port. Or code of safe working practices for merchant seaman.	Reference textbook ILO’s Accident prevention on-Board: At sea and in Port. HMSO’s Code of Safe Working practices for Merchant Seamen			
General Objective 11:0 Know the carriage of bulk cargoes.						
12-13	11.1 Outline the general requirement of the IMO “code of safe practices for the carriage of bulk cargoes”. 11.2 State the main hazards associated with the carriage of bulk cargoes. 11.3 Explain “angle of repose” and its relevance to bulk cargoes. 11.4 Explain the term “concentrate” as applied to bulk cargoes. 11.5 Define the term “flow moisture point” and explain its relevance to bulk cargoes.	Go through relevant chapters/sections of “IMO code of Safe Practice for Solid bulk Cargoes (BC code)	Code of safe practice for solid bulk cargoes. (B.C Code).			

	<p>11.6 Define the term “moisture migration” and give examples.</p> <p>11.7 Describe the preparation of cargo holds prior to carriage of bulk cargoes.</p>					
General Objective 12:0 Know Unitized cargoes						
13-14	<p>12.1 Describe the cargoes suitable for unitization.</p> <p>12.2 Give a description of pallets and the equipment used to handle them.</p> <p>12.3 Identify different types of containers.</p> <p>12.4 Describe the equipment used to handle containers both ashore and on board ship.</p> <p>12.5 Describe the hazards involved in container carriage.</p>	<p>Categories unitized cargoes.</p> <p>Identify different types of containers using O.H.P</p> <p>Identify hazards.</p>	Reference textbook. O.H.P			

Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 225	Contact Hours/Credit Unit:2/2
Course: MARINE POLLUTION	Semester: 4th Semester	Theoretical: 32 Hour/Week
Year: 11	Pre-requisite: SSCE/OL	Practical: NO PRACTICAL
Goal: At the end of the course, the student should understand Marine environment as cause effect of pollution and preventive measures		
GENERAL OBJECTIVES:		
<p>1.0 Understand Marine Pollution</p> <p>2.0 Know sources of Marine pollution</p> <p>3.0 Know the effect of Oil Pollution</p> <p>4.0 Know the sources of Marine Pollution from ship</p> <p>5.0 Know prevention and control of Marine Pollution</p> <p>6.0 Know Tank cleaning and pumping system</p> <p>7.0 Know Legislation to prevent marine pollution</p>		

General Objective						
		THEORETICAL CONTENTS			PRACTICAL CONTENTS	
Week	General Objective: 1.0 Understand Marine Pollution					
	SPECIFIC LEARNING OUTCOME	TEACHERS ACTIVITIES	RESOURCES	SPECIFIC LEARNING OUTCOMES	TEACHER'S ACTIVITIES	EVALUATION
1-2	1.1 Define pollution. 1.2 Define marine ecosystem. 1.3 Define marine Pollution	Explain global pollution	Reference Textbooks	NIL	NIL	NIL
General Objective 2:0 Know the sources of Marine pollution						
1 - 2	2.1 Explain the various sources of marine pollution such as: 2.2 Marine Transportation e.g. Collision, grounding or explosion of crude oil tankers, oil spillage, discharge of bilges. 2.3 Cleaning of oil tanks, de-ballasting. 2.4 Fixed installations e.g. offshore oil production, terminal operation. 2.5 Anthropogenic, municipal and industrial waste, ocean dumping, atmospheric fall –out	Show slides of tanker collision or explosion.	Reference Textbooks			

	2.6	Natural input, underwater page sea.					
General Objective:3.0 Know the effect of Oil Pollution.							
3	3.1	State the impact of oil pollution on coastal activities.	Explain the effect of oil pollution on bathing, boating, angling other recreational activities.	Reference Textbooks			
	3.2	State why oil pollution is a fire and explosive risk.	Explain that oil spill in shipyards and harbour during welding is a fire risk.				
	3.3	State the impact of oil pollution on marine habitats, fisheries and marine-culture.	Explain carcinogenic, polycyclic Aromatic Hydrocarbon (PAH) of oil.				
General Objective 4.0: Know the sources of marine pollution from ships.							
4 - 6	4.1	State the sources of oily- water discharge from ship.	Explain the spill of lubricating and fuel oil, grease into bilges.	Reference Textbooks			
	4.2	State the sources of waste water.	Explain wastewater from toilet, urinals, domestic, etc.				
	4.3	Explain the spill of oil from tankers accidents e.g. collision, grounding and explosion.	Explain that chemical, gas and crude oil carriers are prone to accidents that can cause oil spillage.				
	4.4	Explain the cause of oil spillage from terminal loading.	Explain that malfunctioning of pumps and valves, and hose rupture can cause oil spillage.				
	4.5	State action to be taken during equipment failure.					
	4.6	State that the direct discharge of garbage and sewage pollute the marine					

	environment. 4.7 Explain that exhaust from marine machinery can pollute the marine atmosphere.	Explain that bacteria and virus are hazardous to human health.				
General Objective 5.0: Know prevention and control of marine pollution.						
6-7	5.1 List the precaution to Be observed when Bunkering. 5.2 Describe oil/water separation. 5.3 Describe oil-content monitoring device. 5.4 Describe sludge incinerator. 5.5 Discuss oil-water Ballast system. 5.6 Sketch and describe sewage treatment plant. 5.7 Sketch double hall and bottom of tankers.	Explain the precaution in detail during bunkering. Show slide of only-water separation and oil-monitoring circuit . Show schematic diagram of incinerator system. Explain IMO rules regarding double hull and bottom.	Reference Textbooks			
General Objective 6.0 Know Tank cleaning and pumping systems.						
7-8	6.1 List the precaution to be observed on board tankers. 6.2 Discuss precaution to be taken during tank cleaning.	Draw line diagram of pumping systems on board. Explain the use of booms, netting and chemical barriers. Show slide of different types of booms.	Reference Textbooks			

	6.3 Explain, CBT, SBT, COW, LOT, etc. 6.4 Discuss Oil clean-up Techniques.					
General Objective 7.0 Know Legislation to prevent marine pollution.						
8-9	7.1 Discuss the Annexes of MARPOL 1973/78. 7.2 Explain the Oil Pollution Act of 1990 (OPA '90). 7.3 Explain the requirement to provide reception facilities in ports. 7.4 Explain Oil Navigable waters Act of 1954.		MARPOL 73/78 Convention. Reference Textbooks.			

Programme: NATIONAL DIPLOMA NAUTICAL SCIENCE	Course Code: NSC 226	Contact Hours/Credit Unit:4/4
Course: CHART WORK II	Semester: Four	Theoretical: 2 Hour/Week
Year: 11	Pre-requisite: Chart Work I	Practical:2
Goal: At the end of the course, the student should be able to do chart work, know the position lines and positions and understand electronics charts		
GENERAL OBJECTIVES:		
<p>1.0 Know Position Lines and Positions</p> <p>2.0 Know Chart Work exercises</p> <p>3.0 Understand electronics charts</p>		

General Objective: 1.0 Know Position lines and positions.						
THEORETICAL CONTENTS				PRACTICAL CONTENTS		
WEEK	Specific Learning Outcome	Teachers Activities	Resources	Specific Learning Outcome	TEACHER'S ACTIVITIES	Evaluation
1-3	1.1 Define a position 1.2 Gives the radar distance off a charted object and plots its position circle on a chart 1.3 Plots a position on the chart from simultaneous cross bearings and from bearing and distance off 1.4 Explains the methods used to obtain simultaneous cross bearings with least error 1.5 Defines “dead reckoning position (DR)” estimated position (EP): and “ fixed position” 1.6 Plots a dead reckoning position on the chart and marks accordingly 1.7 Plots as estimated position on the chart and marks accordingly 1.8 Plots position lines – straight line, circle, hyperbola 1.9 Finds a position line by bearing horizontal angle, vertical sextant angle, and transit line	Plot position on chart	Chart Work II	Determine Radar distance of a chartered object and plot its position circle on a chart. Plot a position on a chart from simultaneous cross bearings with least error. Determine DR and EP plot position lines. Straight lines circle Hyperbola.	Guide the students through understanding various activities in determining and position lines and positions.	Chart work Lab Assessment Test Exam.

	<p>1.10 Determines a position by a combination of bearing, distance and the methods in the above objective</p> <p>1.11 Finds a position by simultaneous bearings of two objects</p> <p>1.12 Finds the distance that the ship will pass off a given point when abeam</p> <p>1.13 Constructs a position line to clear a navigational danger by a given distance.</p>					
General Objective: 2.0 Know Chart Work exercises.						
4-11	<p>2.1 Defines “course” and “distance”</p> <p>2.2 Lays off true course between two positions and marks with appropriate symbol</p> <p>2.3 Finds the distance between two positions</p> <p>2.4 Calculates the speed between two positions</p> <p>2.5 Defines ‘set’, ‘rate’, ‘drift’ and ‘leeway’ due to wind</p> <p>2.6 Describe ‘ship’s speed,</p>	<p>Plot position on chart</p> <p>Teach and explain.</p>	<p>Chart Work II</p> <p>Charts</p> <p>Chart 5011</p>		<p>Demonstrate ability to lay off courses.</p> <p>Find distances between two positions.</p>	<p>Log assessment</p> <p>Test Exam</p>

	<p>‘effective speed’, ‘course and distance made good’, ‘applied leeway’</p> <p>2.7 Finds the course and distance made good with a tidal stream or current</p> <p>2.8 Finds the course to steer, allowing for tidal stream or current</p> <p>2.9 Finds the set and rate of tidal stream or current from charts or tables</p> <p>2.10 Explains the term ‘running fix’ and uses the method to plot a position</p> <p>2.11 Finds positions by running fix in a tidal stream or current.</p> <p>2.12 Calculate the actual set and rate of tidal stream or current from DR and fixed positions</p>			<p>Demonstrate course and distance made good.</p> <p>Demonstrate the set and rate of tidal stream or currents.</p> <p>Demonstrate running fix and methods of obtaining fix.</p>	<p>Guide the students to understand.</p> <p>Set and rate.</p> <p>Tidal stream or currents.</p> <p>Obtaining fixes.</p>	
General Objective: 3.0 Understand electronics charts.						
12-13	<p>3.1 Demonstrates knowledge of electronic charts</p> <p>3.2 Describes the differences between Vector and Raster electronic charts</p> <p>3.3 Explains the major characteristics of ECDIS and ENC data such as data term and definition; data contents; date</p>	Plot position on chart	ECDTS ECD Chart Work II	<p>Demonstrate and identify Vector and Raster Charts.</p> <p>Understand loading of Charts on ECDIS.</p> <p>Understand updates of charts on ECDIS.</p>	<p>Guide students on how to use ECDIS for safe Navigation.</p> <p>How to update charts.</p> <p>How to load charts.</p>	

	structure; attribute; data quality and its accuracy					
3.4	Describes the terms and definitions used in the context of ECDIS and ENC					
3.5	Describes ECDIS and ENC display characteristics					
3.6	Explains the scope and selection of chart data display categories.					

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