NATIONAL BOARD FOR TECHNICAL EDUCATION

PLOT B, BIDA ROAD, P.M.B. 2239, KADUNA, NIGERIA

NATIONAL DIPLOMA

IN

NAUTICAL SCIENCE PROGRAMME

CURRICULUM AND COURSE SPECIFICATIONS

IN

COLLABORATION WITH

NIGERIAN MARITIME ADMINISTRATION AND SAFETY AGENCY

NIMASA TOWERS, 35, ADETOKUNBO ADEMOLA STREET, VICTORIA ISLAND, LAGOS, NIGERIA

MARCH, 2026

PREFACE

The recent review of the National Diploma (ND) and Higher National Diploma (HND) in Nautical Science curricula and course specifications marks a significant milestone in our continuous commitment to excellence in maritime education and training. This reviewed curriculum has been carefully structured to align with the requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 1978, as amended, to ensure full compliance with global standards and best practices in maritime operations.

The maritime industry is dynamic and increasingly technology-driven. As such, it is imperative that our training programmes reflect current international regulations, emerging trends, and the competencies required of modern seafarers. This review strengthens the quality, relevance, and global competitiveness of our diplomates, equipping them with the knowledge, skills and professional attitudes necessary to perform effectively and safely at sea.

The successful completion of this review process would not have been possible without the invaluable support of the Nigerian Maritime Administration and Safety Agency (NIMASA). We sincerely appreciate the Management of NIMASA for organising and sponsoring the series of workshops that brought together key stakeholders, maritime educators, industry experts and regulatory authorities. Their commitment to capacity building and standardisation in maritime education continues to play a pivotal role in advancing Nigeria's maritime sector.

We also extend our profound gratitude to all the resource persons, facilitators, and participants who contributed their expertise, experience, and insights during the workshops. Their dedication, constructive engagement, and professional input greatly enriched the review process and ensured that the revised curriculum meets both national needs and international expectations.

It is our firm belief that this updated curriculum will enhance the competence of cadets, strengthen institutional delivery and contribute significantly to safe navigation, maritime safety, and sustainable development within the global shipping industry.

We hope this reviewed curriculum will serve as a robust framework for producing highly skilled and internationally compliant maritime professionals at operational and management levels by the Nigerian Maritime Education and Training Institutions and other key stakeholders.

Prof. Idris M. Bugaje
Executive Secretary
National Board for Technical Education (NBTE),
Kaduna, Nigeria.
March, 2026

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GENERAL INFORMATION

1. PROGRAMME NOMENCLATURE

National Diploma in Nautical Science Programme.

2. PROGRAMME GOAL

The National Diploma (ND) in Nautical Science is aimed at producing middle level manpower with sound theoretical knowledge and practical skills in deck operations, navigational watchkeeping, seamanship, cargo handling, ship operations, and maritime safety.

3. OBJECTIVES OF THE PROGRAMME

At the end of the programme, the diplomates should be able to:

i. Perform as an Officer in charge of a Navigational Watch onboard ship;
ii. Assist the Chief Officer in cargo work and deck operations;
iii. Demonstrate competence in navigation, seamanship, and ship operations;
iv. Apply basic mathematical, physical, and meteorological principles to navigation;
v. Interpret nautical charts, publications, and electronic navigational information;
vi. Understand the fundamentals of ship construction, stability, and cargo operations;
vii. Apply maritime safety, security, and environmental protection procedures;
viii. Communicate effectively using standard maritime terminology;
ix. Exhibit professional discipline, teamwork, and ethical conduct onboard ships; and
x. Prepare for employment in related work environments.

4. ENTRY REQUIREMENTS

The entry requirements into National Diploma in Nautical Science programme are as follows:-

a. Five (5) GCE, WASC, SSCE, SAISSCE, 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 and Geography and 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.
b. A minimum admissible score in the Unified Tertiary Matriculation Examination (UTME) as stipulated by JAMB.

5. PROGRAMME STRUCTURE AND DURATION

The ND Nautical Science programme is structured to last for two (2) years (4 semesters) of classroom, workshop, studio, simulator and laboratory activities. The National Diploma is a two-year terminal academic programme.

The duration also incorporates 3-4 months Students' Industrial Work Experience (SIWES) which shall take place at the end of the second semester of the first year. Each semester shall be for 17 weeks, made up of as follows:

- 15 contact weeks of teaching (i.e. lectures and practical sessions etc.) and
- 2 weeks for registration and examinations

6. CURRICULUM

6.1 The curriculum of all ND programme consists of four main components. These are

a. General studies/education
b. Foundation courses.
c. Professional courses.
d. Students' Industrial Work Experience Scheme (SIWES)

6.2 The General education component shall include courses in:

- Art and Humanities – English Language and Communication. These are compulsory.
- Mathematics and Science (for non-Science based programmes)
- Social Studies – Citizenship (the Nigerian constitution) and Entrepreneurship Studies.

The courses in Citizenship Education and Entrepreneurship are compulsory. The General Education component shall account for not more than 15% of total contact hours for the programme.

6.3 Foundation Courses include Computer, Mathematics and Statistics, etc. The number of hours will vary and may account for about 10 – 15% of the total contact hours.

6.4 Professional Courses are courses, which give the student the theory and practical skills he/she needs to practice his/her field of calling at the skilled middle level.

6.5 Students' Industrial Work Experience Scheme (SIWES) shall be taken during vacation following the end of the second semester of the first year. See details of SIWES at paragraph 14.0

7. STAFFING REQUIREMENTS

7.1 Core Teaching Staff

A minimum of four (4) core teaching staff who should possess at least a HND or B.Sc. in Nautical Science or related disciplines at good grade. In addition, core lecturer should possess Management-level Certificate of Competence (Unlimited).

7.2 Technical Staff

Technical staff shall have ND, HND or BSc in Nautical Science.

7.3 Headship of the Department
The Head of Department shall have at least a First and Master's Degree in Nautical Science or related field, or Master Mariner (Unlimited). He or she shall not be less than the rank of a Senior Lecturer and registered member of relevant professional body.

7.4 Career/Academic Prospects
The diplomate would work in Maritime Industry. They can also proceed to HND and BSc programmes for further studies. Diplomates, on completion of onboard training documented in an approved Training Record Book as part the structured ND programme approved by NIMASA and NBTE, will be eligible to appear for the NIMASA examination and assessment successful passing of which will lead to the award of the operational level Certificate of Competency as an Officer in Charge of a Navigational Watch.

8. CERTIFICATION
A diplomate of this programme shall be awarded ND in Nautical Science.

9. ACCREDITATION
The National Diploma (ND) in Nautical Science shall be accredited by NBTE before the diplomates 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.

10. CONDITIONS FOR THE AWARD OF THE ND
10.1 Institutions offering accredited programmes will award the National Diploma to candidates who successfully completed the programme after passing prescribed coursework, examinations, diploma project and the Students Industrial Work Experience Scheme (SIWES). Such candidates should have completed a minimum of between 72 and 80 semester credit units depending on the programme.

10.2 National Diplomas shall be classified as follows:

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

10.3 Grading of Courses:
Courses shall be graded as follows:

MARKED RANGE	LETTER GRADE	WEIGHTING
75% and above	A	4.00
70% – 74%	AB	3.50
65% – 69%	B	3.25
60% – 64%	BC	3.00
55% – 59%	C	2.75
50% – 54%	CD	2.50
45% – 49%	D	2.25
40% – 44%	E	2.00
Below 40%	F	0.0

Pass mark for all professional courses in the curriculum is 60% in line with the International best practice while general studies and other non-professional courses remain 40% in accordance with NBTE academic guidelines.

11. GUIDANCE NOTE FOR LECTURERS

11.1 The new curriculum is drawn in unit courses. This is keeping with the provisions of the National Policy on education which stress the need to introduce the semester credit units which will enable a student who so wish to transfer the units already completed in an institution of similar standard from which he is transferring.

11.2 In designing the units, the principles of the modular system by product has been adopted; thus making each of the professional modules, when completed provide the students with technician operative skills, which can be used for employment purposes.

11.3. 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 the behavioral objectives, so that is clear to all, the special Learning objective of the student who successfully completed some of the courses or the diplomates of the programme. There is a slight departure in the presentation of the performance-based curriculum which state categorically, the special learning objective for the students, also, there is a deliberate attempt to further involve the staff of the department teaching by having another column called Teaching activities. This is to ensure that the lecturers deliver the required learning objectives. There is a third column for the Resources required for each learning objective. Each department is expected to develop its own t curriculum to facilitate learning from this minimum Guide curriculum and ensure that the resources required are available. The Academic Board of the institution may vet departmental submission on the final curriculum. Our aim is to continue to see to it that a solid internal evaluation system exists in each institution for ensuring minimum standard and quality of education in the programmes offered throughout the TVET Institutions.

11.4 The teaching of the theory and practical work should, as much as possible, be integrated. Practical exercises, especially those in professional courses and laboratory work should not be taught in isolation from the theory if possible. For each course, there should be a balance of theory to practice in the ratio 50:50 or 60:40, or the reverse.

12. PRACTICAL LOGBOOK

A practical Logbook to be kept by each student shall contain all day-to-day, weekly summary and semester summary of all the practical activities from day one to the end of the Programme. This is to be checked, marked, endorsed and recorded by the lecturers concerned at the end of every week.

13. FINAL PROJECT

Final year students in this programme are expected to carry out a project work. This could be on individual basis or group work of not more than five students per group, but reporting must be undertaken individually. The project should, as much as possible be related to the programme and core professional discipline. Project reports should be well presented and should be properly supervised. The department should make its own arrangement of schedules for project work.

14. GUIDELINES ON SIWES PROGRAMME

For the smooth operation of the SIWES, the following guidelines shall apply:

14.1 Responsibility for placement of Students.

a. Institution offering the ND programme shall arrange to place the students in industry. By the end of second semester of the first academic session, 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. The Placement Officer should discuss and agree with industry on the following
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.
    iii. The final grading of the student during the period of attachment should be weighted more on the evaluation by industry-based supervisor.

14.2 Evaluation of Student 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.

14.3 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 TVET Institutions is adopted.

14.4 The Institution based Supervisor

The institution-based supervisor should initial the logbook 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 given to them by their industry-based supervisor.

14.5 Frequency of visit

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

i. There is another visit six weeks after the first visit; and
ii. A final visit in the last month of the attachment.

14.6 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 NBTE.

14.7 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 skilled technician in his field. The SIWES should be graded on a ***fail*** or ***pass*** basis. Where a student has satisfied all other requirements but failed SIWES, s/he may only be allowed to repeat another four months SIWES at his own expense.

CURRICULUM TABLE

YEAR I – SEMESTER I

S/N	Course Code	Course Title	L	T	P	CU	CH
1.	COM 111	Introduction to Computing	2	0	2	4	4
2.	GNS 101	Use of English I	2	0	0	2	2
3.	GNS 111	Citizenship Education I	2	0	0	2	2
4.	MSQ 111	Mandatory Skills Qualifications	1	0	1	2	2
5.	FRL 111	French Language	2	0	0	2	2
6.	NSC 111	Introduction to Nautical Science	2	0	0	2	2
7.	NSC 112	Seamanship and General Ship Knowledge I	2	0	2	4	4
8.	NSC 113	Basic Mathematics for Navigation I	2	1	0	3	3
9.	NSC 114	Navigation and Nautical Physics	2	0	2	4	4
10.	NSC 115	Chartwork and Nautical Publications I	2	0	2	4	4
11.	NSC 116	Terrestrial Navigation I	2	0	2	4	4
12.	NSC 117	Introduction to Marine Meteorology	2	0	1	3	3
Total			**23**	**1**	**12**	**36**	**36**

YEAR I – SEMESTER II

S/N	Course Code	Course Title	L	T	P	CU	CH
1.	GNS 121	Citizenship Education II	2	0	0	2	2
2.	ENT 126	Introduction to Entrepreneurship I	2	0	1	3	3
3.	NSC 121	Basic Mathematics for Navigation II	2	1	0	3	3
4.	NSC 122	Terrestrial Navigation II	2	0	1	3	3
5.	NSC 123	Basic Navigation I	2	0	2	4	4
6.	NSC 124	Collision Regulations I (COLREGs)	2	0	0	2	2
7.	NSC 125	Seamanship and General Ship Knowledge II	2	0	2	4	4
8.	NSC 126	Navigational Aids and Instruments I	2	0	1	3	3
9.	NSC 127	Maritime Basic Safety Training	1	0	2	3	3
10.	NSC 128	Introduction to Marine Engineering	2	0	1	3	3
11.	NSC 129	Computer Applications in Navigation Systems I	1	0	2	3	3
12.	NSC 141	Maritime English and Communication I	2	0	0	2	2
Total			**22**	**1**	**12**	**35**	**35**

YEAR II – SEMESTER I

S/N	Course Code	Course Title	L	T	P	CU	CH
1.	ENT 216	Introduction to Entrepreneurship II	2	0	1	3	3
2.	GNS 201	Use of English II	2	0	0	2	2
3.	NSC 211	Celestial Navigation I	2	0	2	4	4
4.	NSC 212	Chartwork and Nautical Publications II	2	0	2	4	4
5.	NSC 213	Navigational Aids and Instruments II	2	0	1	3	3
6.	NSC 214	Research Methodology	1	0	1	2	2
7.	NSC 215	Watchkeeping I	2	0	0	2	2
8.	NSC 216	Collision Regulations (COLREGs) II	2	0	1	3	3
9.	NSC 217	Ship Construction and Stability I	2	0	1	3	3
10.	NSC 218	Cargo Operations I	2	0	0	2	2
11.	NSC 219	Maritime English and Communication II	2	0	0	2	2
12.	NSC 230	SIWES	0	0	4	4	4
Total			**21**	**0**	**13**	**34**	**34**

YEAR II – SEMESTER II

S/N	Course Code	Course Title	L	T	P	CU	CH
1.	NSC 221	Celestial Navigation II	2	0	2	4	4
2.	NSC 222	Marine Meteorology II	2	0	1	3	3
3.	NSC 223	Ship Construction and Stability II	2	0	1	3	3
4.	NSC 224	Cargo Operations II	2	0	0	2	2
5.	NSC 225	Marine Environmental Protection and Pollution Prevention	2	0	0	2	2
6.	NSC 226	Introduction to Maritime Law and Regulatory Compliance	2	0	0	2	2
7.	NSC 227	Emergency Response, Search and Rescue and Distress Procedures	2	0	0	2	2
8.	NSC 228	Leadership, Teamwork and Bridge Resource Management (BRM)	2	0	0	2	2
9.	NSC 229	Ship Management	2	0	0	2	2
10.	NSC 240	Project	0	0	4	4	4
Total			**18**	**0**	**8**	**26**	**26**

YEAR I SEMESTER I

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: FRENCH LANGUAGE	**COURSE CODE: FRL 111**	**CONTACT HOURS: 2 Hrs/Week**
Year: I Semester: I	**CREDIT UNIT: 2**	**THEORETICAL: 2 Hrs/Week**
	Pre-requisite:	**PRACTICAL: 0**

Goal: The course is to equip students with fundamental skills and competence that will enhance effective communication in French Language, using various modern teaching methods and furnish them with adequate oral/written expressions that would empower them to attain the required basic communication skills and competence in French language.

GENERAL OBJECTIVES

At the end of this course, the student should be able to:

1.0 Know Basic Similarities and Differences Between French and English Languages;
2.0 Know How to Greet;
3.0 Know How to Introduce Self and Others in French;
4.0 Know how to describe in French;
5.0 Know Numbers, Dates and Seasons;
6.0 Express family relationship in French;
7.0 Know professions and nationalities in French;
8.0 Know Basic Telephone Expressions;
9.0 Know Short Notices in French;
10.0 Know the Types and Components of a Ship in French;
11.0 Understand how to receive and produce French sound patterns;
12.0 Write Simple Sentences in French.

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE						
COURSE: FRENCH LANGUAGE		COURSE CODE: FRL 111	CREDIT UNIT: 2	CONTACT HOURS: 2 HRS/WEEK THEORETICAL: 2 HRS/WEEK		
YEAR: I SEMESTER: I		PRE-REQUISITE:		PRACTICAL: 0		
Course Specification: Theoretical content						
Theoretical Content				Practical Content		
WEEK	SPECIFIC LEARNING OUTCOMES	TEACHER'S ACTIVITIES	RESOURCES	SPECIFIC LEARNING OUTCOMES	TEACHER'S ACTIVITIES	RESOURCES
General Objective 1.0: Know Basic Similarities and Differences Between French and English Languages						
1	1.1 Identify genders in French. 1.2 Differentiate between 'tu' and 'vous'. 1.3 Identify "faux amis" 1.4 Identify "liaison" between words in French. 1.5 Identify "accords" in French. 1.6 Identify different "accents" French.	• Lead a discussion on the history of French language in Nigeria. • Lead a discussion on the importance of French language in the World, Nigeria and in the Maritime industry. • Explain that there are masculine and feminine genders in French for both human and non-human objects/nouns.. • Introduce definite and indefinite	• Prescribed texts as enumerated above. • White board, pictures, drawings, CDs (Audio and video).			

		articles. • State the difference between 'tu' and 'vous'. • Let the students know the existence of "faux amis" in French. • Explain the meaning of "faux amis" with examples. • Introduce "liaison" between words in French. • Introduce "accords" in French. • Identify different "accents" in French. • Identify countries where French is spoken in Africa, Europe, Asia, America, etc. • Define the word Francophone • With the use of a map, identify francophone				

		countries.				
General Objective 2.0: Know How to Greet						
2	2.1 Say the French Alphabets. 2.2 Spell names of Persons and objects in French. 2.3 Identify basic French greetings. 2.4 Greet in French formally and informally. 2.5 Greet using titles in French say other general greetings in French. 2.6 Express sentiments in French.	• Refresh students' memories of alphabets earlier learnt in English language write out the French alphabets. • Pronounce the alphabets correctly. • Expose students to the sounding of alphabets. • Use the alphabets to spell names of persons and objects. • Identify basic French greetings. • Show ways of greetings formally and informally. • Introduce official tittles in French. • Mention other ways of greeting generally in French. • Give examples of expressing	• Prescribed French texts as enumerated above. • Students in the classroom • French language • Laboratory. • Pictures of Francophone people greeting themselves.			

		Sentiments in French.				
General Objective 3.0: Know How To Introduce Self and Others in French						
3-4	3.1 Use operational verbs for introductions'appeller, être, habiter, avoir, venir de, parler, etc. 3.2 Explain how to ask identification questions (comment tu t'appelles? etc) 3.3 Respond to identification questions. 3.4 Introduce oneself orally and in writing (name, residence, age, likes and dislikes). 3.5 Introduce others (friends, family members, superiors, etc.)	• Introduce yourself to the hearing of the students. • Apply the verbs s'appeller, être, habiter, avoir, venir de, parler, etc. during the introduction. • Engage the students to do likewise • Introduce the questions, comment tu t'appelles? Comment ça va? Comment vous appellez vous?, etc. • Introduce Et toi? Moî and Et vous? • Respond to questions in Number 4 and 5 above. • Introduce yourself orally and in writing.	• Prescribed texts as enumerated above. • The board, pictures, drawings, the students themselves.			

		• Introduce friends, family members, superiors, etc.				
General Objective 4.0: Know how to describe in French						
5	4.1 Name parts of the body. 4.2 Identify places in their immediate environment (cabin, hostel, classroom, offices, the school, ship, etc). 4.3 List fruits and fruit trees. 4.4 Identify colours.	• Mention parts of the body in French • Get the students to pronounce them correctly in French • Make a list of nouns in • the students' immediate environment. • Pronounce them correctly to the hearing of the students. • Mention fruits and their fruit trees that are common to the students. • Refresh the students' previous knowledge on articles. • Introduce masculine and feminine colours	• Presence of a human being in the class • Diagram of a human being. • Pictures showing different parts of the body. • Pictures/drawing of a ship or boat. • Mention fruits and fruit trees.			

		• Introduce singular and plural colours. • Pronounce them correctly •				
General Objective 5.0: Know Numbers, Dates and Seasons						
6-7	5.1 Count in French 5.2 Tell dates and time in French. 5.3 Name seasons in French. 5.4 Tell age in French (age, date of birth, birthday) 5.5 Exchange phone numbers and address in French. 5.6 Bargain in French. 5.7 Express measurement in French. 5.8 Make short sentences on daily activities in French.	• Write number 1 – 20, both figures and words on the board • Let the students try to pronounce each number after you. • Introduce, hundred, thousand and million • Apply the numbers to tell dates in French • Apply the numbers to tell time in French. • Introduce seasons in French • Use the verb avoir to tell age • Ask the students to tell their ages following your example.	• Prescribed texts as enumerate above, calendar and clock. • Concrete objects in and around the classroom • French calendar • French birthday • Card. • Telephone • Measuring tape.			

		• Tell your date of birth & birthday. • Permit the student to do same. • Discuss how to exchange phone numbers. • Introduce expressions used in buying and selling. • Use numbers to express measurement. • Express daily activities in French using appropriate verbs, etc.				
General Objective 6.0: Express family relationship in French						
8	6.1 Name members of the family. 6.2 State relationship with members. 6.3 Describe one's family. 6.4 State information about members of the family.	• Let students know family exists in French communities. • State that family members are both masculine and feminine. • Distinguish masculine and members articles and feminine	• Photographs and pictures of different types of family. • Photographs of masculine family members. • Photographs of feminine family			

		members articles. • List the family members that belong to the nuclear family • List family members of the extended family. • Make simple sentences to give information about members of the family.	members. • Video showing family members discussing.			
GENERAL OBJECTIVE 7.0: Know professions and nationalities in French						
9	7.1 Mention professions in French. 7.2 Identify masculine and feminine professional names. 7.3 Make simple sentences with the professions. 7.4 Mention nationalities in French	• Expose students to the existence of professions in France and Francophone countries. • List masculine professions. • List feminine professions. • Distinguish between masculine and feminine professions. • Introduce masculine and feminine articles to be used with	• French /English Bilingual Dictionary. • Maps of various Countries. • Textbooks. • Pictures showing citizens of various Countries. • Pictures of people in different professions			

		the various professions • Form simple sentences orally with the professions. • Write simple sentences with the professions. • Create awareness that different Nations of the world exist in French. • State that we have masculine and feminine • Nationalities in French. • Emphasize that some Nationalities are described with masculine articles and some are described with masculine articles and some are described with feminine articles. • List the masculine Nationalities.				

		• List the feminine Nationalities. Pronounce them correctly. • Form simple sentences/statements using Nationalities.				
GENERAL OBJECTIVE 8.0 : Know Basic Telephone Expressions						
10	8.1 Exchange telephone numbers. 8.2 Initiate telephone conversation. 8.3 Respond to simple telephone conversation 8.4 Conclude a telephone conversation 8.5 Exchange messages onboard the ship and ashore.	• Remind the students of numbers in French. • Let the students know how to start interaction in French. • State the expressions that are applicable to telephone conversation: Allô? C'est qui à la ligne? Je parle avec qui? • Initiate a telephone conversation with yourFrench colleague and let the students listen.	• Different types of physical telephone. • Prescribed texts. • Pictures of people engaging in telephone conversation. • Presence of French lecturers in the classroom engaging in telephone conversation. • Pictures of passengers			

		• Terminate the telephone conversation with your colleague :- Au Revoir, Á la prochaine, etc. • Identify messages onboard the ship and ashore: A bord d'un navire Passerelle Pont Barbord. Tribord, Le compte, Rendu, Le Quart du Navire • Apply them correctly onboard the ship and ashore • Exchange massages onboard the ship and ashore.	onboard ships and ashore.			
General Objective: 9.0: Know Short Notices in French						
11	9.1 Read short notices or instructions in French. 9.2 Issue simple notices and instruction in French.	• Explain what short notices/instructions mean in English	• Excerpts from Newspapers and French journals			

	9.3 Respond to simple notices and instructions in French. 9.4 Sound alarms and alerts in French. 9.5 Make distress calls onboard and ashore.	language. • Identify imperative verbs used in issuing notices and instructions. • Issue simple notices in French. • Issue simple instruction in French. • Reply to simple notices and instructions in French. • Identify alarms and alerts in French • Make use of alarms in French • Identify distress calls onboard and ashore. • Make distress calls onboard and ashore:- i. L'homme par dessus Board ii. Ohè? iii. Va en Amèrè	showing short notices and instructions. • Prescribed texts as enumerated above. • Pictures of people issuing and responding to short notices/instructions • Presence of various types of alarms in the class. • Physical telephone in the class			
General Objective 10.0 : Know the Types and Components of a Ship in French						

12	10.1 List types of ship in French. 10.2 Enumerate parts of the ship in French. 10.3 Identify professionals onboard ship in French. 10.4 Mention departments onboard ship in French. 10.5 Mention activities onboard ship in French.	• Identify ships in French. • List the parts of the ship in French. • Mention the professionals onboard ship in French:- a. Le Capitaine b. L'Ingénieur en chezs c. Alinnenteur, etc. • List the departments onboard ship in French:- a. Le Pont b. La sale des Machines c. Dept. de la Restauration d. Poste e. Radio telégraphique. • Mention activities onboard ship in French.	• Pictures of different types of ship. • Pictures of ships showing the different parts. • Pictures of ship showing professional onboard. • Pictures of departments onboard ship. • Pictures of activities taking place in the ship.			
General Objective 11.0: Understand how to receive and produce French sound patterns						
13	11.1 Listen to short simple dictation	• Play an audio compact disc	• Audio CD. • Extracts of			

	passages in French 11.2 Read short passages in French. 11.3 Listen to short passages and answer questions on them.	(CD) that contains simple dictation passages. • Write the words listened to on the board. • Play the C.D again for the students to listen to it. • Engage the students to write down what they heard. • Read short passages for the students in French. • Answer questions from short passages.	short, simple passages from textbooks, newspapers and • Magazines. • White board. • Textbooks			
General Objective 12.0: Write Simple Sentences in French						
14-15	12.1 Answer questions using "Non" or 'Si'. 12.2 Ask questions using "comment" and "combien". 12.3 Rewrite sentences from positive to negative or interrogative and vice versa.	• Explain the use of "Oui", "Non" and "Si • Use "Oui", "Non" and "Si" in answering questions • Explain "comment"	• Prescribed texts as enumerated above. • Extracts from texts, newspapers and magazines. • The white			

	12.4 Form and use the imperative from indicative sentences. 12.5 Demonstrate three ways of asking simple questions in French	(How?) and "combien" (How much?). • Ask questions using "comment" and "combien". • Write positive and negative sentences on the board. • Read the sentences and let the students read after you • Rewrite sentences on the board, from positive to negative or interrogative and vice versa. • Introduce indicative sentences and change them to imperative sentences. • Illustrate three ways of asking simple questions in	Board. • Textbooks.			

		French:- ○ Tu parles français? ○ Tu parles français n'est-ce que tu parlesfrançais?				
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: INTRODUCTION TO NAUTICAL SCIENCE	**COURSE CODE: NSC 111**	**Contact Hours: 2 Hours/Week**
Year: I Semester: I	**Credit Units: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:-	**Practical: 0**
GOAL: This course is designed to introduce students to the maritime profession, the scope of Nautical Science, and the role of the deck officer at the operational level.		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Understand the scope and objectives of Nautical Science as a professional discipline; 2.0 Know Shipboard Organization, Hierarchy and Responsibilities; 3.0 Comprehend different Ship Types and their operational purposes; 4.0 Understand the Basic Maritime Safety Culture, Professionalism and STCW Awareness.		
COMPETENCES: • Maintain a safe navigational watch		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: INTRODUCTION TO NAUTICAL SCIENCE	**Course Code: NSC 111**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: I Semester: I	**Pre-requisite: -**	**Practical: 0**
COURSE SPECIFICATION: Theoretical		
GOAL: This course introduces students to the maritime profession, the scope of nautical science, and the role of the deck officer at the operational level.		
General Objective 1.0: Understand the scope and objectives of Nautical Science as a professional discipline		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the scope and objectives of Nautical Science as a marine professional discipline. 1.2 Discuss the key sectors of the marine industry and their inter-relationships. 1.3 Describe the career progression of a deck officer from cadet to management level. 1.4 Explain the role of Nautical Science in	• Introduce the students to Nautical Science as an interdisciplinary profession. • Show videos on the scope of Nautical Science. • Refer to online tutorial and textbooks on Nautical Science. • Give assignments to students on scope and objectives of Nautical Science. • Ask the students	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

	safe navigation and ship operations. 1.5 Summarize professional ethics and responsibilities expected of seafarers.	questions on the scope and objectives of Nautical Science.				
General Objective 2.0: Know Shipboard Organization, Hierarchy and Responsibilities						
4-6	2.1 Describe the organizational structure of a merchant ship. 2.2 Distinguish between deck, engine, and catering departments. 2.3 Explain duties and responsibilities of key shipboard officers and ratings. 2.4 Discuss shipboard hierarchy in relation to effective watchkeeping and safety. 2.5 Explain the command structure and discipline onboard merchant ships.	• Introduce students to the overall organizational structure of merchant ships. • Explain the roles and functions of the deck, engine, and catering departments. • Discuss the relationship between shipboard hierarchy, safety, and effective watchkeeping. • Explain the command structure and disciplinary protocols onboard ships. • Refer students to relevant textbooks, shipping manuals, and online resources. • Give class exercises, case studies, and	Laptop computers, smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc Ship construction diagrams, Multimedia aids etc			

		assignments on shipboard organization and officers' duties. • Ask oral and written questions to assess students' understanding of hierarchy, responsibilities, and discipline onboard.				
General Objective 3.0: Comprehend different type of ships and their operational purposes						
9-11	3.1 State major types of merchant ships. 3.2 Explain operational purposes of different vessel types. 3.3 Explain ship type, cargo characteristics and voyage patterns. 3.4 Describe ship layout and equipment by vessel type. 3.5 Discuss awareness of safety considerations peculiar to different ships.	• Introduce students to the major types of merchant ships (e.g., bulk carriers, tankers, container ships, passenger ships). • Explain the operational purposes of each vessel type using practical examples. • Illustrate ship layout and equipment across vessel types using diagrams, images, or videos. • Discuss safety considerations and	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

		hazards peculiar to specific ship types. • Refer students to textbooks, ship manuals, and online resources for further study. • Give class exercises, case studies, and assignments on ship types, layouts, and operational purposes. • Ask oral and written questions to assess students' understanding of ship types, cargo compatibility, and safety requirements.				
GENERAL OBJECTIVE 4.0: Understand the basic Maritime Safety Culture, Professionalism and STCW Awareness						
12-15	4.1 Explain the concept of maritime safety culture. 4.2 Describe professional conduct and discipline expected onboard merchant ships. 4.3 Discuss basic	• Introduce students to the concept of maritime safety culture and its importance for ship operations. • Explain the standards of professional conduct and discipline	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

	shipboard safety practices and reporting procedures. 4.4 Explain the purpose of STCW 1978, as amended. 4.5 Explain the relationship between training, certification, and safe watchkeeping.	expected of officers and ratings onboard ships. • Discuss common shipboard safety practices, reporting procedures, and emergency response protocols. • Explain the provisions and significance of Maritime Conventions • Refer students to relevant conventions manuals. • Describe how training, certification, and continuous professional development contribute to safe watchkeeping. • Give class exercises, case studies, and assignments on professional conduct, safety culture, and watchkeeping responsibilities.				

		• Ask questions to assess students' understanding of maritime safety, conduct, and certification requirements.				

Course Assessment:
Course work: 20%
Test/Assignments: 20%
Examination: 60%
Total: 100%

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: SEAMANSHIP AND GENERAL SHIP KNOWLEDGE I	**COURSE CODE: NSC 112**	**Contact Hours: 4 Hours/Week**
Year: I Semester: I	**Credit Units: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**

GOAL: This course is designed to equip students with foundational seamanship knowledge and skills, including ship terminology, basic ship construction, rope work, anchoring, mooring, and safe working practices on board, in accordance with the STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand Ship Terminologies and Parts of a Ship;
2.0 Understand Basic Ship Construction and Structural Components;
3.0 Know Ropes, Knots, Splices, Bends and Hitches;
4.0 Understand Anchoring, Mooring and Deck Safety Practices.

COMPETENCES:

- Contribute to safe navigation and ship operations.

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: SEAMANSHIP AND GENERAL SHIP KNOWLEDGE I	**Course Code: NSC 112**	**Contact Hours: 4 Hours/Week**
	Credit Unit: 4	**Theoretical: 2 Hours/Week**
Year: I Semester: I	**Pre-requisite: -**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to equip students with foundational seamanship knowledge and skills, including ship terminology, basic ship construction, rope work, anchoring, mooring, and safe working practices on board, in accordance with the STCW Code, Section A-II/1, Table A-II/1.		
General Objectives 1.0: Understand Ship Terminologies and Parts of a Ship		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the principal parts of a ship using standard Nautical terminologies. 1.2 Explain the functions of major ship structures and fittings. 1.3 Explain the following: port; starboard; for; aft and amidships. 1.4 Describe the application of	• Introduce the students to Nautical terminologies • Refer to online tutorial and textbooks on Nautical terminologies • Give assignments to students on application of seamanship terminologies • Ask the students on the Nautical terminologies.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Label parts of a ship correctly. • Use seamanship terms accurately during demonstrations.	• Practical identification drills • Question-and-answer sessions	Ship structure charts, Models and diagrams

	seamanship terminologies in oral and written communication. 1.5 Explain the importance of correct terminologies for safe shipboard operations.					
General Objective 2.0: Understand Basic Ship Construction and Structural Components						
4-7	2.1 Describe basic ship construction principles. 2.2 Explain major structural components of a ship's hull. 2.3 Explain the purpose of bulkheads, decks, and frames. 2.4 Explain the relevance of ship structure to the strength and seaworthiness. 2.5 Explain awareness of safety considerations related to ship structure.	• Introduce students to the fundamentals of ship construction using diagrams and models. • Demonstrate how bulkheads, decks, and frames contribute to hull strength and compartmentalization. • Discuss the relationship between ship structure, stability and seaworthiness. • Explain safety considerations associated with structural failure and proper maintenance. • Refer students to textbooks, ship construction manuals, and online learning	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc Ship construction diagrams Multimedia aids etc	• Identify structural components from diagrams. • Identify basic construction features of a ship.	• Guided practical explanations • Group exercises	• Shipboard organization charts • Sample muster lists etc

		resources. • Give class exercises, practical sketches, and assignments to identify ship structures. • Ask questions to assess students understanding of ship construction principles and safety implications.				
General Objective 3.0: Know Ropes, Knots, Splices, Bends and Hitches						
8-11	3.1 List the different types of ropes used onboard ships. 3.2 Explain the characteristics of natural and synthetic fibre ropes. 3.3 Discuss the uses of natural and synthetic fibre ropes. 3.4 Describe common knots, splices, bends, and hitches. 3.5 Describe rope selection to specific deck operations. 3.6 Discuss safety	• Introduce students to the different types of ropes used onboard ships. • Explain the properties and characteristics of natural versus synthetic ropes. • Discuss the applications of various rope types in deck operations. • Demonstrate common knots, bends, and splices using rope samples. • Explain how to select the appropriate rope for specific tasks	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Tie common knots and bends correctly. • Carry out basic splicing under supervision.	• Hands-on rope work • Instructor-guided practice	Ropes and seamanship tools, Illustrated manuals, etc.

	precautions when handling ropes.	such as mooring, towing, or cargo handling. • Discuss safety procedures and precautions when handling ropes onboard. • Refer students to seamanship textbooks, rope manuals, and online tutorials. • Give class exercises and assignments on rope identification, knot tying, and selection for different operations. • Ask questions to assess the students understanding of rope types, applications, and safe handling practices.				
GENERAL OBJECTIVE 4.0: Understand Anchoring, Mooring and Deck Safety Practices						
12-15	4.1 Explain the principles of anchoring and mooring. 4.2 Discuss anchoring and mooring equipment.	• Introduce students to the principles and purposes of anchoring and mooring. • Refer students to	Laptop Computers, Smart board, Projector, Writing Materials,	• Identify anchoring and mooring equipment correctly.	• Guide the student to carry out: - Practical simulations	Anchor and mooring diagrams Safety

	4.3 Describe basic anchoring and mooring arrangements. 4.4 Discuss safe working practices during anchoring, mooring and deck operations. 4.5 Discuss the hazards associated with anchoring and mooring and deck operations.	seamanship textbooks, safety manuals, and online tutorials. • Give class exercises and assignments on anchoring and mooring arrangements and safety procedures. • Ask questions to assess the students understanding of anchoring principles, equipment, and safe deck operations.	White board, Markers, Multi-media resources etc	• Demonstrate safe deck behaviour during simulated operations.	- Safety drills	manuals

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: BASIC MATHEMATICS FOR NAVIGATION I	**COURSE CODE: NSC 113**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: I Semester: I	**Pre-requisite:**	**Practical:**

GOAL: This course is designed to equip students with mathematical knowledge, understanding, and problem-solving skills required for basic navigation and shipboard calculations, including arithmetic, algebra, ratios, percentages, and introductory trigonometry, as applied to distance, speed, time, and position calculations, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand the laws of indices and their application in simplifying algebraic expressions;
2.0 Understand theories of logarithms, surds and their applications in manipulating expression;
3.0 Understand principles underlying the construction of charts and graphs;
4.0 Know the different methods of solving quadratic equations;
5.0 Understand permutations and combinations;
6.0 Understand set theory;
7.0 Know Distance, Speed and Time Calculations;
8.0 Understand the properties of arithmetic and geometric progression;
9.0 Understand the binomial and its application in the expansions and approximations;
10.0 Understand the basic concepts and manipulation of vectors and their applications;
11.0 Know the concept of linear simultaneous equations with two unknown variables;
12.0 Understand the concept of trigonometry functions and apply them in solving problems.

COMPETENCES:

- Apply mathematical knowledge and numerical skills to solve basic navigation and shipboard calculations

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: BASIC MATHEMATICS FOR NAVIGATION I	**Course Code: NSC 113**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: I Semester: I	**Pre-requisite: -**	**Practical: 1 Hour/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to equip students with mathematical knowledge, understanding, and problem-solving skills required for basic navigation and shipboard calculations, including arithmetic, algebra, ratios, percentages, and introductory trigonometry, as applied to distance, speed, time, and position calculations, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
General Objectives 1.0: Understand the laws of indices and their application in simplifying algebraic expressions.		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1	1.1 Define indices. 1.2 State the laws of indices. 1.3 Solve simple problems using the laws of indices.	• Define indices. • State the laws of indices. • Solving simple problems using the laws of indices. • Organise tutorials for students to solve problems on Indices. • Mark students' exercises.	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc	.		
General Objective 2.0: Understand theories of logarithms, surds and their applications in manipulating expression.						

2-3	2.1 Define logarithms. 2.2 State the basic laws of logarithms. 2.3 Solve simple logarithms problems. 2.4 Define natural logarithms and common logarithms. 2.5 Define characteristics and mantissa. 2.6 Read the logarithmic table for given numbers. 2.7 Simplify numerical expressions using logarithms tables. 2.8 Apply logarithm in solving non-linear equations. 2.9 Define surds. 2.10 Reduce a surd into its simplest form. 2.11 Solve various problems on surds.	• Explain the basic laws of logarithms. • Discuss how to solve simple logarithms problems. • Define natural logarithms and common logarithms. • Explain characteristics and mantissa. • Demonstrate the use of the logarithm table. • Explain the use of the logarithm table in simplifying numerical expressions. • Define surds. • Demonstrate the reduction of surds into its simplest form. • Solve simple problems on surds. • Ask the students to perform	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

		sample calculations involving 2.1-2.11 of the specific learning outcome and grade them. • Observe, instruct and guide the students in the exercises. • Supervise the students' work. • Correct any error in the students' definitions and assignments.				
General Objective 3.0: Understand principles underlying the construction of charts and graphs						
4	3.1 Construct graphs of functions such as $y = ax^n + b$ for n=1,2. $y = ax^k$ 3.2 Apply knowledge from 3.1 in the determination of laws from experimental data.	• Explain graphs of functions. • Apply knowledge from 3.1 in the determination of laws from experimental data. • Ask the students to perform sample calculations involving 3.1-3.2 of the specific learning	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

		outcomes and grade them • Organise tutorials for students to solve problems on charts and graphs. • Supervise the students' exercise. • Correct any error in the students' assignments				
General Objective 4.0: Know the different methods of solving quadratic equations.						
5	4.1 Solve quadratic equations by factorization. 4.2 Solve quadratic equations by method of completing squares. 4.3 Solve quadratic equations by general formula. 4.4 Determine the roots of given quadratic equations. 4.5 Form quadratic equations from given roots.	• Explain how to solve quadratic equations using factorization method. • Explain how to solve quadratic equations by method of completing and by general formula. • Demonstrate formulation of quadratic equations from given roots. • Prepare lecture notes for the students. • Ask the students to	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

		perform sample calculations involving 4.1-4.5 of the specific learning outcome and grade them • Organise tutorials for students to solve problems using different methods of quadratic equations. • Supervise the students' exercise.				
General Objective 5.0: Understand permutations and combinations						
6	5.1 Define permutation. 5.2 State examples of permutations. 5.3 Establish the theorem ${}^{n}P_{r} = \frac{n!}{(n-r)!}$ 5.4 Define combination. 5.5 State examples of combination. 5.6 Establish the theorem ${}^{n}C_{r} = \frac{n!}{(n-r)!r!}$ 5.7 Establish ${}^{n}C_{r} = {}^{n}C_{n-r}$	• Define permutation. • Illustrate permutation with examples. • Establish the theorem ${}^{n}P_{r} = \frac{n!}{(n-r)!}$ • Explain combination. • Illustrate the idea	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

		of combination with examples. • Establish the theorem $^{n}C_{r} = \frac{n!}{(n-r)!r!}$ • Show that $^{n}C_{r} = {}^{n}C_{n-r}$ • Ask the students to perform sample calculations involving 4.1-4.5 of the specific learning outcomes and grade them. • Organise tutorials for students to solve permutations and combinations problems. • Correct any error in the students' exercise. • Observe and Guide the students in the exercises. • Supervise the students' work				

General Objective 6.0: Understand set theory						
	6.1 Define sets, subsets, and null sets. 6.2 Define union, intersection and complement of sets. 6.3 Draw Venn diagrams to demonstrate the concepts in 6.2 above. 6.4 Calculate the size or number of elements in a given set. 6.5 Solve word problems on set.	• Explain set theory. • List and define types of sets. • Demonstrate representation of sets using Venn diagrams. • Prepare lecture notes for the students. • Ask the students to perform sample calculations involving 6.1-6.5 of the specific learning outcomes and grade them • Organise tutorials for students to solve set problems.	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			
General Objective 7.0: Know Distance, Speed and Time Calculations						
7	7.1 Explain the relationship between distance, speed, and time in navigation. 7.2 Describe the calculation of distance, speed, and time using standard	• Introduce the concepts of distance, speed, and time in maritime navigation.	Laptop, Computers, Smart/white board, Projector, Textbook,	.		

	maritime units. 7.3 Explain the conversion between different units of speed and distance used in navigation. 7.4 Describe the application of distance, speed, and time calculations to basic passage and watchkeeping scenarios. 7.5 Discuss the importance of accuracy in navigation calculation.	• Explain standard maritime units with practical navigation examples. • Demonstrate calculations and unit conversions on the Smart/White Board. • Relate calculations to basic passage planning and watchkeeping situations. • Refer students to relevant textbooks and online navigation tutorials. • Give class exercises and assignments on distance, speed, and time calculations. • Organise tutorials for students to	Lecture note, Calculator, Charts etc			

		solve distance, speed and time calculations				
General Objective 8.0: Understand the properties of arithmetic and geometric progression						
8-9	8.1 Define arithmetic progressions (AP). 8.2 Obtain the formula for n^{th} term and the first n terms of an AP. 8.3 Solve problems on A.P 8.4 Define a geometric progression (GP). 8.5 Obtain the formula for the n^{th} term and the first n terms of a geometric progression. 8.6 State examples of 8.5 above. 8.7 Define Arithmetic Mean (AM) and Geometric Mean (GM) 8.8 Define convergence of series. 8.9 Define divergence of series.	• Define arithmetic progressions (AP). • Obtain the formula for nth term and the first n terms of an AP. • Describe how to solve problems on AP. • Define a geometric progression (GP). • Explain how to obtain the formula for the nth term and the first n terms of a geometric progression. • Organise tutorials for students to solve arithmetic and geometric progression problems. • Define Arithmetic Mean (AM) and Geometric Mean	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

		(GM). • Define convergence of series. • Define divergence of series. • Ask the students to perform sample. calculations involving 8.1-8.5 of the specific learning outcome and grade them.				
General Objective 9.0: Understand the binomial theorem and its application in the expansions and in approximations.						
10-11	9.1 Explain the method of mathematical induction. 9.2 Prove the binomial theorem for a positive integral index. 9.3 Expand expressions of the forms $(x+y)^2$, $(x\pm1)^5$, applying binominal theorem. 9.4 Find the coefficient of a particular term in the expansion of simple binomial expressions.	Explain the method of mathematical induction. State and prove the binomial theorem for a positive integral index. Show the expansion of expressions of the forms $(x+y)^2$, $(x\pm1)^5$, etc and applying binominal theorem.	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

	9.5 Find the middle terms in the expansion of binomial expression. 9.6 State the binomial theorem for a rational index. 9.7 Expand expressions of the form: $(1+x)^{-1}, (1\pm x)^{½}$, $(1\pm x)^{-⅓}$ applying binomial theorem 9.8 Expand and approximate expressions of the type $(1.001)^n, (0.998)^n$, $(1+x)^{½}, (1\pm x)^{⅓}$ to a stated degree of accuracy	• Find the coefficient of a particular term in the expansion of simple binomial expressions. • Show how to find the middle terms in the expansion of binomial expression. • State the binomial theorem for a rational index. • Demonstrate the expansion of expressions of the form: $(1+x)^{-1}, (1\pm x)^{½}$, $(1\pm x)^{-⅓}$ applying binomial theorem. • Guide the student to expand and				

		approximate expressions of the type $(1.001)^n, (0.998)^n,$ $(1+x)^{1/2}, (1\pm x)^{1/3}$ to a stated degree of accuracy				
General Objective 10.0: Understand the basic concepts and manipulation of vectors and their applications.						
12-13	10.1 State the definitions and representations of vectors. 10.2 Identify vector quantities. 10.3 Define a position vector. 10.4 Define unit vector. 10.5 Explain scalar multiple of a vector. 10.6 List the characteristics of parallel vectors. 10.7 Compute the modulus of any given vector up to 2 and 3 dimensions. 10.8 State the parallelogram law for addition and subtraction of vectors 10.9 Apply the parallelogram law in solving problems.	• Explain vectors and its representations. • Define a position vector. • Define unit vector. • Explain scalar multiple of a vector. • List the characteristics of parallel vectors. • Demonstrate computation of the modulus of any given vector up to 2 and 3 dimensions. • State the parallelogram	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

	10.10 Explain the concept of components of a vector and the meaning of orthogonal components. 10.11 Resolve a vector into its orthogonal components. 10.12 List characteristics of coplanar localized vectors. 10.13 Define the resultant or composition of coplanar vectors. 10.14 Compute the resultant of coplanar forces acting at a point using algebraic and graphical methods. 10.15 Apply the techniques of resolution and resultant to the solution of problems involving coplanar forces. 10.16 Apply vector techniques in solving problems involving relative velocity. 10.17 State the scalar product of two vectors. 10.18 Compute the scalar	law for addition and subtraction of vectors • Apply the parallelogram law in solving problems. • Explain the concept of components of a vector and the meaning of orthogonal components. • Resolve a vector into its orthogonal components. • List characteristics of coplanar localized vectors. • Define the resultant or composition of coplanar vectors. • Compute the resultant of coplanar forces acting at a point using algebraic				

	product of given vectors. 10.19 Define the cross product of the vector product or two vectors. 10.20 Calculate the direction ratios of given vectors. 10.21 Calculate the angle between two vectors using the scalar product.	and graphical methods. • Apply the techniques of resolution and resultant to the solution of problems involving coplanar forces. • Apply vector techniques in solving problems involving relative velocity. • State the scalar product of two vectors. • Compute the scalar product of given vectors. • Define the cross product of the vector product or two vectors. • Calculate the direction ratios of given vectors. • Calculate the angle between two vectors				

		using the scalar product. • Organise tutorials for students to solve basic vectors problems.				
General Objective 11.0: Know the concept of linear simultaneous equations with two unknown variables.						
14	11.1 Explain the concept of equation. 11.2 List different types of equations: linear; quadratic; cubic. etc. 11.3 State examples of linear simultaneous equations in two unknowns and simultaneous equations with at least one quadratic equation. 11.4 Apply algebraic and graphical methods in solving two simultaneous equations involving a linear equation and a quadratic equation. 11.5 Define a determinant of ^{nth} order. 11.6 Apply determinants of order 2 and 3 in solving simultaneous	• Explain the concept of equation. • List different types of equations: linear, quadratic, cubic, etc. • Give examples of linear simultaneous equations in two unknowns and simultaneous equations with at least one quadratic equation. • Apply algebraic and graphical methods in solving two simultaneous equations involving a linear	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

	linear equation.	equation and a quadratic equation. • Define a determinant of nth order. • Apply determinants of order 2 and 3 in solving simultaneous linear equation.				
General Objective 12.0: Understand the concept of trigonometric functions and apply them in solving problems.						
15	12.1 Define the basic trigonometric ratios, sine, cosine and tangent of an angle. 12.2 Derive the other trigonometric ratio: cosecant; secant and cotangent using the basic trigonometric ratios in 12.1 above. 12.3 Derive identities involving the trigonometric ratios. 12.4 Derive compound angle formulae for sin (A+B), Cos (A+B) and Tan (A+B).	• Define the basic trigonometric ratios. • Derive the reciprocal of basic trigonometric ratios. • Derive special identities involving the trigonometric ratios: $Cos^2\theta+Sin^2\theta = 1$, $Sec^2\theta = 1 + tan^2\theta$, etc. • Derive compound angle formulae for Sine, Cosine,	Laptop, Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts etc			

		and Tangent.				

Course Assessment:
Course work: 20%
Test/Assignments: 20%
Examination: 60%
Total: 100%

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: NAVIGATION AND NAUTICAL PHYSICS	**COURSE CODE: NSC 114**	**Contact Hours: 4 Hours/Week**
Year: I Semester: I	**Credit Units: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**

GOAL: This course is to equip students with the basic principles that underpin marine navigation and ship operations, including motion, forces, buoyancy, stability fundamentals, magnetism, optics, and the working principles and limitations of basic navigational instruments, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand Motion, Forces and Ship Movement;
2.0 Know the Buoyancy and Basic Stability Concepts;
3.0 Know Magnetism and Compass Principles;
4.0 Understand Waves and Navigational Instruments;
5.0 Understand Optics and Navigational Instruments.

COMPETENCES:

- Use physical and hydrodynamic principles to maintain seaworthiness of a ship

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: NAVIGATION AND NAUTICAL PHYSICS	**Course Code: NSC 114**	**Contact Hours: 4 Hours/Week**
	Credit Unit: 4	**Theoretical: 2 Hours/Week**
Year: I Semester: I	**Pre-requisite:**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is to equip students with the basic principles that underpin marine navigation and ship operations, including motion, forces, buoyancy, stability fundamentals, magnetism, optics, and the working principles and limitations of basic navigational instruments, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
General Objectives 1.0: Understand Motion, Forces and Ship Movement		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain basic concepts of motion as applied to ships. 1.2 Describe the forces acting on a vessel at sea. 1.3 Explain the concept of moment of inertia. 1.4 Explain radius of gyration for different bodies. 1.5 Define torque of a body about an axis. 1.6 Define angular momentum of a body about an axis. 1.7 State the application	• Introduce students to basic ship motion concepts and forces acting at sea. • Explain acceleration, resistance, and inertia in the context of ship movement. • Demonstrate the effect of wind, waves, and currents on ship handling. • Relate physical	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Interpret ship motion scenarios using simplified models. • Identify forces acting on a vessel under varying operational conditions.	• Scenario-based exercises • Guided discussions	Physics charts, Ship motion diagrams, Practical Manual, etc.

	of angular momentum and torque in navigation. 1.8 Explain the phenomenon of surface tension. 1.9 Calculate the surface tension using appropriate equation. 1.10 Explain the importance of adhesive and cohesive forces. 1.11 Explain the following types of motions i.e. simple, periodic and harmonic. 1.12 Explain the expression for calculating the oscillation of period of simple and compound pendulums, and elastic string. 1.13 Calculate the velocities of bodies in periodic and simple harmonic motion.	forces to safe navigation practices using examples or simulations. • Refer students to textbooks, online resources, and videos on ship dynamics. • Give assignments and class exercises on ship motion scenarios. • Ask questions to assess students' understanding of forces affecting on ships.				

	1.14 Explain how acceleration, resistance, and inertia. relates to ship motion. 1.15 Describe the effect of environmental forces on ship handling. 1.16 Discuss how physical forces affect safe navigation.					
General Objective 2.0: Know Buoyancy and Basic Stability Concepts						
4-6	2.1 Define density and relative density 2.2 State Archimedes' principles and its relevance to ship flotation. 2.3 Define buoyancy and stability. 2.4 Explain the principle of buoyancy and flotation. 2.5 Calculate buoyant force acting on a body. 2.6 Describe how a ship floats and maintains equilibrium.	• Introduce students to the principle of buoyancy using demonstrations or models. • Explain how a ship floats and maintains equilibrium with practical examples. • Demonstrate basic stability concepts, including key terms, using diagrams or ship models. • Relate buoyancy and stability to ship safety and seaworthiness through case studies or videos.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Interpret simple buoyancy demonstrations. • Identify stability concepts using diagrams.	• Demonstration exercises • Group explanations	Stability diagrams, Training models.

	2.7 Define basic stability terms used in seamanship and navigation. 2.8 Describe the relationship between buoyancy, stability, and ship safety or seaworthiness. 2.9 Discuss stability-related hazards on the sea.					
General Objective 3.0: Know Magnetism and Compass Principles						
7-9	3.1 Explain the concept of magnetism. 3.2 Explain the principles of magnetism. 3.3 Explain the concept and types of magnetic field. 3.4 Describe the Earth's magnetic field and its relevance to navigation. 3.5 Explain the working principle of the magnetic compass.	• Introduce students to the principles of magnetism using demonstrations or simple experiments. • Explain the application of magnetism to the operation of magnetometer. • Refer students to textbooks, online tutorials, and instructional videos on magnetism and compasses. • Give assignments and class exercises on compass use and	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify compass components. • Interpret compass behavior under simple conditions. • Carry out Gyro compass operation and maintenance.	• Instrument observation • Practical demonstrations	Magnetic compass, Diagrams and charts, Practical manual, Students logbooks etc.

	3.6 State the function of magnetic compass. 3.7 Describe the factors affecting compass accuracy. 3.8 Discuss compass limitations and errors.	limitations. • Ask questions to assess students' understanding of magnetism and compass principles.				
GENERAL OBJECTIVE 4.0: Understand Waves and Navigational Instruments						
10-12	4.1 Define the term waves. 4.2 Explain common characteristics of waves. 4.3 State different types of waves. 4.4 Explain sound waves, electromagnetic waves etc. 4.5 Explain the relationship between frequency, period and wavelength. 4.6 Explain Doppler effect. 4.7 Explain the electromagnetic spectrum in relation to wave	• Introduce the concept of waves using simple diagrams and everyday examples related to navigation. • Introduce the concept of waves and their characteristics using charts and illustrations. • Illustrate wave principles (frequency, wavelength, propagation) with reference to marine navigation. • Present a list of navigational instruments that operate based on wave principles. • Use pictures, models,	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify navigational instruments and their functions. • Interpret instrument readings under supervision. • Use navigational instruments that rely on waves on measurements or detection of objects.	• Hands-on instrument exercises • Guided practice	Doppler log, Sonar diagrams, Practical manual, Students logbooks etc.

	length and frequency. 4.8 Distinguish between emission and absorption of waves. 4.9 Discuss principles of waves relevant to navigation. 4.10 List the navigational instruments that rely on waves. 4.11 State the functions of navigational instruments that rely on waves	or actual instruments to show how waves are applied in navigation equipment. • Explain Attenuation of waves • Demonstrate, where possible, the basic operation of selected navigational instruments relying on waves. • Relate each instrument to its navigational function and practical application on board ships. • Guide students through short exercises matching instruments with their functions. • Summarize key points and conduct review questions to reinforce understanding.				
GENERAL OBJECTIVE 5.0: Understand Optics and Navigational Instruments						
13-15	5.1 Define the term optics. 5.2 Explain the	• Introduce the concept of optics using simple	Laptop Computers, Smart board,	• Identify navigational	• Hands-on instrument	Periscope, Telescope,

	importance of reflection and refraction on position of celestial bodies. 5.3 Discuss the application of reflection and refraction to the operational principles of sextant. 5.4 Determine the focal length using appropriate formular. 5.5 Discuss the magnifying action of lenses. 5.6 Explain the working principles of the following optical instruments: Sextant, Telescope and Periscope. 5.7 Explain basic principles of optics relevant to navigation 5.8 List the navigational instruments that	diagrams and everyday examples related to navigation. • Present the basic principles of optics (reflection, refraction, lenses, mirrors) as applied to navigational practice. • Present a list of navigational instruments that operate based on optics principles. • Use pictures, models, or actual instruments to show how optics are applied in navigation equipment. • Demonstrate, where possible, the basic operation of selected navigational instruments relying on optics.	Projector, Writing Materials, White board, Markers, Multi-media resources etc	instruments and their functions. • Interpret instrument readings under supervision. • Use Navigational instruments to measure angular distance, to view celestial bodies and obstructed environment.	exercises, • Guided practice	Sextant, Practical manual, Logbooks etc.

	rely on optics. 5.9 State the functions of navigational instruments that rely on optics.	• Relate each instrument to its navigational function and practical application on board ships. • Guide students through short exercises matching instruments with their functions. • Summarize key points and conduct review questions to reinforce understanding.				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: CHARTWORK AND NAUTICAL PUBLICATIONS I	**Course Code: NSC 115**	**Contact Hours: 4 Hours/Week**
Year: I Semester: I	**Credit Unit: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**
GOAL: This course is designed to enable students acquire foundational knowledge of nautical charts and publications including chart symbols, scales, projections, chart corrections, and the use of official nautical publications, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Understand the Fundamentals of Nautical Charts and Chart Symbols; 2.0 Understand Chart Scales, Projections, Measurement and Position Plotting; 3.0 Know Chart Corrections and Notices to Mariners; 4.0 Understand Nautical Publications and Basic Passage Plotting,		
COMPETENCES: • Know the charts and nautical publications.		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE						
Course Title: CHARTWORK AND NAUTICAL PUBLICATIONS I			**Course Code: NSC 115**		**Contact Hours: 4 Hours/Week**	
			Credit Unit: 4		**Theoretical: 2 Hours/Week**	
Year: I Semester: I			**Pre-requisite:**		**Practical: 2 Hours/Week**	
COURSE SPECIFICATION: Theoretical and Practical						
GOAL: This course is designed to enable students acquire foundational knowledge of nautical charts and publications including chart symbols, scales, projections, chart corrections, and the use of official nautical publications, in accordance with STCW Code, Section A-II/1, Table A-II/1.						
General Objective 1.0: Understand the Fundamentals of Nautical Charts and Chart Symbols						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the importance of nautical charts. 1.2 Describe different types of nautical charts. 1.3 Explain common chart symbols and abbreviations. 1.4 Describe the significance of colours, lines, and symbols on charts. 1.5 Discuss the role of charts in safe navigation.	• Introduce students to nautical charts and their purpose in navigation. • Explain different types of charts (e.g., coastal, general, electronic) with examples. • Demonstrate common chart symbols, abbreviations and their interpretation. • Explain the	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify chart symbols correctly. • Locate information on a nautical chart.	Guide students to identify Practical chart	Admiralty charts,Chart symbols, manuals, etc

		significance of colours, lines, and symbols using chart examples. • Refer students to textbooks, online tutorials, and chart manuals. • Give assignments and class exercises on chart reading and interpretation. • Ask questions to assess students' understanding of charts and their role in navigation.				
General Objective 2.0: Understand Chart Scales, Projections, Measurement and Position Plotting						
4-7	2.1 Explain chart scales and their navigational significance. 2.2 Describe the differences between large-scale, small-scale and plan charts. 2.3 Describe common chart projections used in navigation. 2.4 Explain how distances and directions are	• Introduce students to chart scales and projections using sample nautical charts. • Explain large-scale and small-scale charts with practical navigation examples.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Determine directions using chart tools. • Measure distances and directions on nautical charts.	• Hands-on chartwork practice	• Parallel rulers • Dividers • Charts

	measured on nautical charts. 2.5 Discuss correct procedures for chart measurements in navigation.	• Demonstrate common chart projections using diagrams and charts. • Discuss position fixing methods or techniques such as: three-points fixing, running fixes and optimal geometry. • Show how to measure distances and directions on charts using dividers and rulers. • Relate correct chart measurement procedures to safe navigation practices. • Refer students to relevant textbooks, chart manuals, and online tutorials. • Give class exercises and assignments on				

		chart scale interpretation and measurement. • Ask questions to assess students' understanding of chart scales and measurements.				
General Objective 3.0: Know Chart Corrections and Notices to Mariners						
8-11	3.1 Explain the need for keeping nautical charts up to date. 3.2 Describe the purpose of Notices to Mariners. 3.3 State different types of chart corrections. 3.4 Explain how basic chart corrections are applied. 3.5 Discuss the risks associated with the use of charts that are not updated.	• Introduce students to the importance of up-to-date charts in safe navigation. • Explain Notices to Mariners and their role in chart correction. • Describe the various types of chart corrections with examples. • Demonstrate basic chart correction procedures on sample charts. • Relate uncorrected charts to navigation risks using practical scenarios.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Carry out simple chart corrections. Record corrections appropriately.	Supervised correction exercises	• Notices to Mariners • Sample charts

		• Refer students to chart correction manuals, textbooks, and online resources. • Give class exercises and assignments on chart updating and corrections. • Ask questions to assess students' understanding of chart correction procedures.				
GENERAL OBJECTIVE 4.0: Understand Nautical Publications and Basic Passage Plotting						
12-15	4.1 Describe major nautical publications used onboard ships. 4.2 Explain the purpose of sailing directions, tide tables, and lists of lights. 4.3 Explain how navigational information is extracted from nautical publications. 4.4 Describe the application of publication data to basic passage planning.	• Introduce students to common nautical publications used onboard ships. • Explain the purpose and contents of sailing directions, tide tables, and lists of lights. • Demonstrate how to extract relevant navigational information from publications.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Use nautical publications to support chartwork. • Plot simple courses under supervision.	• Guide students to perform Practical chart plotting exercises	Sailing Directions , Tide Tables, Lists of Lights, Practical manual etc.

	4.5 Discuss readiness for advanced chartwork and navigation courses.	• Relate publication data to basic passage planning using practical examples. • Refer students to nautical publications and online resources. • Give assignments on the use of nautical publications. • Ask questions to assess students' understanding and readiness for advanced navigation tasks.				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: TERRESTRIAL NAVIGATION I	**COURSE CODE: NSC 116**	**Contact Hours: 4 Hours/Week**
Year: I Semester: I	**Credit Units: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**
GOAL: This course is designed to equip students with competence in terrestrial navigation, including dead reckoning, estimated position, bearings, distances, and visual position fixing, enabling them to determine the ship's position accurately, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Understand Principles of Terrestrial Navigation; 2.0 Understand Dead Reckoning and Estimated Position; 3.0 Know Bearings, Distances and Position Fixing; 4.0 Know Visual Navigation and Position Determination.		
COMPETENCES: • Determine position of the ship		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: TERRESTRIAL NAVIGATION I	**Course Code: NSC 116**	**Contact Hours: 4 Hours/Week**
	Credit Unit: 4	**Theoretical: 2 Hours/Week**
Year: I Semester: I	**Pre-requisite:**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to equip students with competence in terrestrial navigation, including dead reckoning, estimated position, bearings, distances, and visual position fixing, enabling them to determine the ship's position accurately, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
General Objectives 1.0: Understand the Principles of Terrestrial Navigation		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the concept and scope of terrestrial navigation. 1.2 Describe the relationship between chartwork and terrestrial navigation. 1.3 Describe navigational elements used in position fixing. 1.4 Explain the importance of terrestrial navigation for safe watchkeeping. 1.5 Discuss the limitations of terrestrial navigation.	• Introduce students to the concept and scope of terrestrial navigation. • Explain the relationship between chartwork and terrestrial navigation using examples. • Describe common navigational elements used for position fixing. • Relate terrestrial navigation techniques to safe watchkeeping	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify navigational elements on charts. • Relate terrestrial navigation principles to practical scenarios.	• Chart-based discussions	Charts Navigation manuals

		practices. • Discuss limitations of visual navigation using practical sea or coastal scenarios. • Refer students to relevant textbooks, charts, and online navigation resources. • Give class exercises and assignments on basic terrestrial navigation concepts and applications. • Ask questions to assess students' understanding of terrestrial navigation and its limitations.				
General Objective 2.0: Understand Dead Reckoning (DR) and Estimated Positions (ER)						
4-7	2.1 Define dead reckoning and estimated position. 2.2 Explain the principles of dead reckoning in navigation. 2.3 Explain how dead reckoning positions are plotted on nautical charts. 2.4 Describe the plotting	• Introduce students to the principles of dead reckoning and estimated position. • Explain the differences between dead reckoning position and estimated position. • Demonstrate the plotting of dead	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Plot DR and EP accurately. • Perform practical to apply corrections due to wind and current.	• Supervised chart plotting	Charts, Parallel rulers, Dividers, etc.

	of estimated positions considering external factors such as wind and current. 2.5 Discuss errors associated with dead reckoning and estimated positions.	reckoning positions on sample nautical charts. • Show how external factors such as wind, current, and steering errors affect estimated positions. • Discuss the effect of wind and current. (set and drift, leeway) • Discuss common sources of error in DR and EP using practical navigation examples. • Refer students to navigation textbooks, chartwork manuals, and online resources. • Give class exercises and assignments on plotting DR and EP positions. • Ask questions to assess students' understanding of DR, EP, and associated errors.				

General Objective 3.0: Know Bearings, Distances and Position Fixing						
8-11	3.1 Define bearing. 3.2 Explain types of bearing; True, Relative, Magnetic, and Compass bearings. 3.3 Explain the relevance of bearings in position fixing. 3.4 Explain how bearings and distances are measured on nautical charts. 3.5 Describe how ship position is fixed using bearings and distances. 3.6 Discuss the importance of accuracy in fixing positions.	• Introduce students to the concept and use of bearings in marine navigation. • Explain true, magnetic, and compass bearings at an introductory level. • Demonstrate the measurement of bearings and distances on charts using parallel rulers, dividers, and protractors. • Show how bearings and distances are applied to fix ship positions on nautical charts. • Discuss the relationship between true bearing and relative bearing • Explain line of position, range, distance, sextant angle and transit line.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Plot position lines correctly. • Fix ship position using two or more bearings.	• Practical chart plotting exercises	Charts Plotting instruments, Practical manuals etc.

		• Discuss the effects of inaccurate measurements on position fixing and navigational safety. • Refer students to navigation textbooks, chartwork manuals, and relevant online learning resources. • Give class exercises and assignments on bearing measurement and position fixing. • Ask oral and written questions to assess students' understanding of bearings and accuracy requirements.				
GENERAL OBJECTIVE 4.0: Know Visual Navigation and Position Determination						
12-15	4.1 Describe visual references used in terrestrial navigation. 4.2 Explain how navigational information is	• Introduce students to common visual references used in terrestrial navigation such as landmarks,	Laptop Computers, Smart board, Projector, Writing Materials,	• Use visual references to determine position. • Plot visual fixes accurately.	• Guide students to perform Scenario-based chart exercises	Charts, Coastal photographs, Practical manuals, etc.

	interpreted from visual aids. 4.3 Describe the application of visual position fixing techniques. 4.4 Explain the limitations of visual navigation in conditions of restricted visibility. 4.5 Discuss the importance of visual fixing methods and electronics navigation methods.	lighthouses, buoys, and beacons. • Explain how visual aids provide navigational information for determining position. • Demonstrate basic visual position fixing techniques using charts, diagrams, and coastal scenarios. • Discuss the effects of poor visibility, weather, and human limitations on visual navigation. • Relate visual navigation skills to the transition to coastal and electronic navigation systems. • Refer students to navigation textbooks, sailing directions, and relevant online learning resources.	White board, Markers, Multi-media resources etc			

		• Give class exercises and assignments on identifying and using visual navigational aids. • Ask questions to assess students' understanding and preparedness for advanced navigation studies.				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: INTRODUCTION TO MARINE METEOROLOGY	**COURSE CODE: NSC 117**	**Contact Hours: 3 Hours/Week**
Year: I Semester: I	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
Pre-requisite:		**Practical: 1 Hour/Week**

GOAL: This course is designed to enable students understand basic marine meteorological principles, including atmospheric pressure, wind systems, clouds, and weather charts, and be able to interpret meteorological information in order to support safe navigation, voyage planning, and watchkeeping, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand Basic Meteorological Principles and Atmospheric Conditions;

2.0 Know Wind Systems, Clouds and Weather Phenomena;

3.0 Comprehend the Interpretation of Weather Charts and Meteorological Information;

4.0 Understand Weather Impact on Navigation and Voyage Planning.

COMPETENCES:

- Ability to use and interpret information obtained from shipboard meteorological instruments to support the planning of passage and determine position.

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: INTRODUCTION TO MARINE METEOROLOGY	**Course Code: NSC 117**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: I Semester: II	**Pre-requisite: -**	**Practical: 1 Hour/Week**
COURSE SPECIFICATION: Theoretical and Practical		
General Objectives 1.0: Understand Basic Meteorological Principles and Atmospheric Conditions		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Define the term meteorology 1.2 State different applications of meteorology. 1.3 Explain the scope and importance of marine meteorology. 1.4 Describe the structure and composition of the atmosphere. 1.5 Explain the use of various Shipborne meteorological instruments to measure weather elements onboard ship. 1.6 Discuss air temperature, humidity, density and how they	• Introduce the students to the scope and importance of marine meteorology. • Differentiate Meteorology and climatology. • Describe the weather elements and explain the importance of monitoring weather changes onboard. • Describe the layers of the atmosphere and their thermal composition. • Explain inversion layer, Lapse rate, dry adiabatic lapse rate, saturated adiabatic	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify weather elements including cloud types and their significance, Pressure system, wind, etc. • Identify different weather instruments. • Demonstrate the use of the following instruments: - Psychrometer - Thermometer - Hygrometer - Barometer - Barograph - Anemometer, etc.	• Guide students to carryout Diagram interpretation exercises	Meteorology Laboratory, Charts Diagrams etc.

	affect atmospheric stability. 1.7 Explain atmospheric pressure and its variation. 1.8 Relate pressure changes to weather development. 1.9 Discuss the meteorological influences on navigation safety.	lapse rate • Explain how weather changes affect safe navigation of vessel and cargoes.		• Identify pressure systems on weather charts. Interpret basic atmospheric conditions.		
General Objective 2.0: Understand Wind Systems, Clouds and Weather Phenomena						
4-6	2.1 Explain the formation and characteristics of wind systems. 2.2 Explain land and sea breeze and their effects on coastal navigation. 2.3 State different types of clouds and their weather significance. 2.4 Describe common marine weather phenomena. 2.5 Relate wind and cloud observations to weather forecasting. 2.6 Discuss weather hazards and their effects on ships and cargoes	• Describe the wind system over the ocean. • Differentiate between true and apparent wind • Explain land and sea breeze and their effects on coastal navigation.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify cloud types correctly. • Associate cloud patterns with expected weather.	Guide students to perform Visual identification drills	Cloud charts, Weather photographs, Beaufort scale etc.
General Objective 3.0: Interpret Weather Charts and Meteorological Information						

7-10	3.1 Explain the purpose and contents of weather charts. 3.2 Interpret symbols and information on meteorological charts. 3.3 Discuss pressure systems, fronts, and wind patterns. 3.4 Extract relevant information for navigation planning. 3.5 Explain weather chart limitations and update requirements.	• Lectures • Worked examples	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Interpret basic weather charts. • Identify areas of adverse weather.	• Guide students to perform Chart analysis exercises	• Weather charts, Forecast bulletins etc
GENERAL OBJECTIVE 4.0: Understand Weather Impact on Navigation and Voyage Planning						
11-15	4.1 Describe the impact of weather on ship handling and safety. 4.2 Explain the application of meteorological information to voyage planning. 4.3 Explain navigational decision-making using weather forecasts. 4.4 Explain the role of weather monitoring during watchkeeping. 4.5 Explain the procedures in communicating severe	• Case-based lectures Guided discussions Discuss advances meteorology and ocean navigation technologies.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Analyse weather data to take basic Navigation decisions. decisions based on weather data. • Monitor weather conditions during simulated watches.	• Supervise scenario-based exercises	Voyage planning examples Forecast data

	weather in line with SOLAS Regulation.					

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

YEAR I SEMESTER II

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: BASIC MATHEMATICS FOR NAVIGATION II	**COURSE CODE: NSC 121**	**Contact Hours: 3 Hours/Week**
Year: I Semester: II	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Tutorial: 1 Hour/Week**

GOAL: This course is to provide students with a comprehensive understanding of spherical trigonometry and calculus, and to equip them with the skills to apply these mathematical principles in solving navigational problems.

GENERAL OBJECTIVES:

By the end of this course, the students should be able to:

1.0 Understand the concepts of spherical trigonometry;
2.0 Understand how to solve a spherical triangle using various formulas;
3.0 Know how to calculate the vertices and areas of spherical triangles;
4.0 Understand differential calculus and its applications in navigation;
5.0 Understand the second derivative and its application in the optimization of a quantity;
6.0 Understand integral calculus and its applications in navigation;
7.0 Comprehend the use of spherical trigonometry and calculus to solve navigation problems.

COMPETENCES:

- Determine position of the ship.

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE						
Course Title: BASIC MATHEMATICS FOR NAVIGATION II			**Course Code: NSC 122**		**Contact Hours: 3 Hours/Week**	
			Credit Unit: 3		**Theoretical: 2 Hours/Week**	
Year: I Semester: II			**Pre-requisite:**		**Tutorial: 1 Hour/Week**	
COURSE SPECIFICATION: Theoretical and Tutorial						
GOAL: This course is to provide students with a comprehensive understanding of spherical trigonometry and calculus, and to equip them with the skills to apply these mathematical principles in solving navigational problems.						
General Objective 1.0: Understand the concepts of spherical trigonometry.						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities (Theoretical)**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities (Practical)**	**Resources**
1-2	1.1 Define a sphere. 1.2 State examples of sphere. 1.3 Explain the concepts of great circles and small circles in navigation. 1.4 Describe spherical angles and poles of great circles. 1.5 Describe spherical triangles. 1.6 Explain oblique, right-angled, and quadrantal spherical triangles. 1.7 Illustrate spherical	• Lecture with diagrams, board illustrations, and guided discussion • Illustrate spherical triangles and identify their types on charts and globes • Guide plotting of spherical triangles on globes and charts	Globe, Charts, Lecture Notes, Projector, Computer, Whiteboard and Marker Navigational Charts, Markers, Rulers Etc.			

	triangles to explain their basic properties using charts and globes.					
General Objective 2.0: Understand how to solve a spherical triangle using various formulas						
3-4	2.1 Explain the cosine and sine formulae for oblique spherical triangles. 2.2 Describe the Haversine formula and its advantages in navigation. 2.3 Explain the four-part formula and its application. 2.4 Apply Napier's rules to solve right-angled and quadrantal triangles. 2.5 Solve spherical triangle problems using all formulae listed in 2.1 to 2.4 above.	• Lecture with worked examples, board demonstrations • Organize tutorial to solve spherical triangle problems using formulae • Supervised exercises applying formulae to chart problems	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			
General Objective 3.0: Know how to calculate the vertices and areas of spherical triangles						
5-6	3.1 Define a vertex. 3.2 Calculate the vertices of spherical triangles using Napier's rules. 3.3 Apply the calculations to navigational plotting on charts.	• Lecture, problem-solving sessions, and group • Organize tutorial classes plot vertices and areas of spherical triangles Discussion	Globe, navigational charts, projector, charts, calculators, rulers			

	3.4 Solve celestial navigation problems involving spherical triangles. 3.5 Demonstrate theoretical knowledge with practical exercises using globes and charts.	Hands-on plotting and calculation exercises				
General Objective 4.0: Understand differential calculus and its applications in navigation						
7-8	4.1 Explain calculus and its types 4.2 Define limits and illustrate with examples. 4.3 Explain differentiation as an incremental change of a function. 4.4 Differentiate functions from first principles. 4.5 Apply sum, difference, product, quotient, and chain rules. 4.6 Differentiate algebraic, trigonometric, logarithmic, exponential, hyperbolic, parametric and	• Lecture with worked examples, board illustrations • Solve navigation problems using differential calculus • Organize tutorial classes to solve differentiation problems on white board or worksheets • Show guided exercises on differentiation	Textbooks, lecture notes, projector Calculators, lecture notes, worksheets etc.			

	implicit functions.					
General Objective 5.0: Understand the second derivative and its application in the optimization of a quantity						
9–10	5.1 Determine second derivatives and interpret their significance. 5.2 Identify turning points. 5.3 Classify maxima and minima. 5.4 Distinguish between average and instantaneous rates of change. 5.5 Apply differentiation to kinematics problems. 5.6 Solve practical technological and navigational problems (e.g. fuel optimization) using derivatives.	• Lecture, worked examples, discussion of real-life applications. • Organize tutorial classes to solve applied marine and engineering problems using derivatives. • Supervise problem-solving sessions	Textbooks, charts, Calculators, lecture notes etc.			
General Objective 6.0: Understand integral calculus and its applications						
11–13	6.1 Define integration. 6.2 Explain the relationship between integration and differentiation. 6.3 Distinguish between indefinite and definite integrals. 6.4 Integrate algebraic,	• Lecture, board demonstrations, examples. • Organize tutorial to apply integration to solve practical problems. • Hands-on exercises and guided problem-	Textbooks, lecture notes, projector Calculators, charts, rulers etc.			

	logarithmic, trigonometric and exponential functions. 6.5 Apply integration to calculate areas, volumes, arc lengths, centre of gravity, and moments of inertia. 6.6 Solve practical marine problems using integration techniques.	solving				
General Objective 7.0: Comprehend the use of spherical trigonometry and calculus to solve navigation problems						
14–15	7.1 Combine spherical trigonometry and calculus to solve complex navigational problems. 7.2 Apply mathematical reasoning to solve celestial plotting problems. 7.3 Solve integrated shipboard calculations. 7.4 Interpret results accurately for safe marine operations. 7.5 Demonstrate competence in applying mathematical concepts in real-world	• Case studies • Group discussions, and lecture • Organize tutorial solve integrated problems combining trigonometry and calculus.	Charts, globes, lecture notes, projector calculators etc.			

	marine contexts.					

Course Assessment:
Course work: 20%
Test/Assignments: 20%
Examination: 60%
Total: 100%

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: TERRESTRIAL NAVIGATION II	**COURSE CODE: NSC 122**	**Contact Hours: 3 Hours/Week**
Year: I Semester: II	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 1 Hour/Week**

GOAL: This course is designed to equip students with terrestrial and coastal navigation competence, including multiple position-fixing methods, running fixes, set and drift, tides and currents, enabling them to determine and monitor the ship's position accurately and navigate safely in coastal waters, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand various Terrestrial Position Fixing methods;
2.0 Understand Running Fixes and Relative Motions;
3.0 Understand Set, Drift, Tides and Currents;
4.0 Understand Safe Navigation in Coastal Waters.

COMPETENCES:

- Determine position of the ship

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: TERRESTRIAL NAVIGATION II	**Course Code: NSC 122**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: I Semester: II	**Pre-requisite:**	**Practical: 1 Hour/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to equip students with terrestrial and coastal navigation competence, including multiple position-fixing methods, running fixes, set and drift, tides and currents, enabling them to determine and monitor the ship's position accurately and navigate safely in coastal waters, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
General Objectives 1.0: Understand various Terrestrial Position Fixing methods		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain various principles of terrestrial navigation. 1.2 Describe how a ship's position is fixed using simultaneous bearings. 1.3 Explain the term 'cocked hat' and how to resolve it. 1.4 Explain the use of transits and leading lines in coastal position fixing. 1.5 Discuss the accuracy of different terrestrial fixing methods. 1.6 Explain common errors associated with coastal position fixing.	• Introduce students to advanced terrestrial navigation concepts and their application in coastal waters. • Discuss factors affecting the accuracy of various position-fixing methods. • Explain common sources of error in coastal	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Plot fixes using two or more position lines. • Assess fix reliability.	Supervise chart plotting exercise.	Nautical charts, Plotting instruments, etc.

		navigation, including observational and chart-related errors. • Relate accurate position fixing to safe navigation and effective watchkeeping. • Refer students to standard navigation textbooks, chartwork manuals, and instructional resources. • Give class exercises and assignments on theoretical aspects of terrestrial position fixing. • Ask oral and written questions to assess understanding of fixing methods, accuracy, and errors.				
General Objective 2.0: Understand Running Fixes and relative motions						

4-7	2.1 Explain the concept and purpose of running fixes in navigation. 2.2 Describe how running fix techniques are applied using successive bearings. 2.3 Explain how ship movement between observations is interpreted for position fixing. 2.4 Discuss the limitations and sources of error associated with running fixes. 2.5 Explain the importance of time–distance relationships in running fix calculations.	• Introduce students to the concept of running fixes and their relevance in terrestrial navigation. • Explain the principles behind using successive bearings to obtain a running fix. • Describe how a ship's course, speed, and time interval affect running fix accuracy. • Discuss limitations of running fixes, including errors due to speed changes and bearing inaccuracies. • Relate time–distance relationships to practical navigation and watchkeeping responsibilities. • Use diagrams and	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Plot running fixes accurately. • Interpret vessel movement between fixes.	• Guide students to perform practical chart plotting exercises	• Charts • Worked examples

		chart illustrations to explain running fix concepts. • Refer students to navigation textbooks, chartwork manuals, and learning resources. • Give class exercises and assignments on theoretical aspects of running fixes. • Ask oral and written questions to assess understanding of running fix principles and limitations.				
General Objective 3.0: Know Set, Drift, Tides and Currents						
8-11	3.1 Explain the concepts of set and drift in marine navigation. 3.2 Describe the calculation of set and drift using basic navigation data. 3.3 Explain how tidal and current information is interpreted from nautical publications. 3.4 Describe the application of	• Introduce students to the concepts of set and drift and their relevance to navigation. • Explain the causes of tidal streams and ocean currents affecting vessel movement. • Relate tidal effects	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Apply set and drift corrections on charts. • Use tidal data in navigation calculations and position fixing.	• Supervise chart exercises	Charts, Sailing directions, Practical manual, Student's logbook, etc.

	tidal and current corrections to position fixing. 3.5 Discuss the effects of tides and currents on coastal navigation safety.	to navigational safety, including grounding and collision risks. • Use diagrams, charts, and illustrations to explain set, drift, and correction concepts. • Refer students to navigation textbooks, nautical publications, and online learning resources. • Give class exercises and assignments on theoretical set and drift problems. • Ask oral and written questions to assess students' understanding of tidal effects and safety implications.				
GENERAL OBJECTIVE 4.0: Understand Safe Navigation in Coastal Waters						
12-15	4.1 Explain the application of terrestrial navigation techniques in coastal waters.	• Explain the application of terrestrial navigation	Laptop Computers, Smart board, Projector,			

	4.2 Describe how navigational hazards are interpreted using nautical charts and publications. 4.3 Explain how position fixing, tides and currents are integrated into navigation decision-making. 4.4 Discuss the importance of continuous position monitoring during coastal navigation. 4.5 Describe the relevance of coastal navigation skills as preparation for electronic and radar-assisted navigation.	methods in coastal navigation scenarios. • Describe common coastal navigational hazards using charts, sailing directions, and notices to mariners. • Relate coastal navigation practices to the transition toward electronic and radar-assisted navigation systems. • Use charts, diagrams, and case studies to illustrate coastal navigation decision-making. • Refer students to relevant navigation textbooks, nautical publications, and training manuals. • Give class exercises and assignments on	Writing Materials, White board, Markers, Multi-media resources etc			

		theoretical coastal navigation scenarios. • Ask oral and written questions to assess understanding of coastal navigation principles and safety awareness.				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: BASIC NAVIGATION I	**COURSE CODE: NSC 123**	**Contact Hours: 4 Hours/Week**
Year: I Semester: II	**Credit Unit: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**
GOAL: This course is designed to equip students with integrated navigation knowledge and techniques including piloting, dead reckoning (DR), estimated position (EP), and chart-based decision-making, in order to support safe watchkeeping and passage execution at the operational level, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Understand the Principles of Piloting; 2.0 Understand Dead Reckoning (DR) and Estimated Position (EP); 3.0 Understand Integrated Chartwork and Navigational Decision-Making; 4.0 Comprehend Navigational Support for Safe Watchkeeping.		
COMPETENCES: • Plan and conduct a passage		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: BASIC NAVIGATION I	**Course Code: NSC 123**	**Contact Hours: 4 Hours/Week**
	Credit Unit: 4	**Theoretical: 2 Hours/Week**
Year: I Semester: II	**Pre-requisite:**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to equip students with integrated navigation knowledge and techniques including piloting, dead reckoning (DR), estimated position (EP), and chart-based decision-making, in order to support safe watchkeeping and passage execution at the operational level, in accordance with STCW Code, Section A-II/1, Table A-II/1..		
General Objectives 1.0: Understand the Principles of Piloting		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the principles and purpose of piloting in coastal and restricted waters. 1.2 Describe visual references commonly used for piloting. 1.3 Discuss the techniques of conducting piloting using landmarks, buoys, and transits. 1.4 Explain how	• Introduce students to the concept and importance of piloting in navigation. • Explain visual references such as landmarks, buoys, beacons, and transits with examples. • Demonstrate piloting techniques using sample charts and illustrations. • Show how charted features correspond	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Use visual references to support navigation decisions. • Plot piloting information on charts.	• Guide students to supervised chartwork exercises	Practical manual, Student's logbook, etc.

	charted features are interpreted for piloting purposes. 1.5 Explain the limitations and hazards associated with piloting. 1.6 Describe the importance of tides and tidal prediction	to real-world references in coastal waters. • Refer students to relevant textbooks, pilotage guides, and online tutorials. • Give class exercises and assignments on interpreting visual references and charted features. • Ask oral and written questions to assess students' understanding of piloting principles and limitations.				
General Objective 2.0: Understand Dead Reckoning (DR) and Estimated Position (EP)						
4-7	2.1 Describe the procedures for maintaining dead reckoning (DR) plots accurately. 2.2 Explain how estimated positions (EP) are determined considering external factors. 2.3 Discuss the integration of speed, course,	• Introduce students to the concept of dead reckoning and estimated positions. • Explain step-by-step procedures for maintaining accurate DR plots. • Demonstrate how speed, course, time, wind, and current influence EP using sample charts. • Show continuous	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Plot DR and EP correctly. • Update plots based on navigational changes.	• Supervise plotting practice	Practical manual, Student's logbook, etc.

	time, wind, and current into position estimation. 2.4 Explain the importance of continuous monitoring of DR and EP during navigation. 2.5 Explain errors affecting dead reckoning and estimated positions.	monitoring techniques and how updates are applied to DR and EP plots. • Discuss common sources of error in DR and EP, such as steering deviations, current, and wind. • Refer students to navigation textbooks, chartwork manuals, and online tutorials				
General Objective 3.0: Understand Integrated Chartwork Navigational Decision-Making						
8-11	3.1 Explain how chartwork is integrated into real-time navigation decisions. 3.2 Describe the application of navigational information from multiple sources. 3.3 Discuss how navigational hazards are identified during	• Introduce students to the integration of chartwork with real-time navigation scenarios. • Demonstrate identification of navigational hazards using sample charts and simulated situations. • Show how to adjust navigation plans when unexpected conditions arise	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Take chart-based navigation decisions. • Update charts in response to navigation inputs.	• Scenario-based chart exercises	

	passage execution. 3.4 Explain how navigation plans are adjusted based on situational changes. 3.5 Discuss bridge team coordination in navigation.	(currents, weather, traffic). • Refer students to textbooks, passage planning guides, and online navigation tutorials. • Give exercises and assignments that simulate real-time navigation decision-making. • Ask oral and written questions to assess understanding of hazard identification and navigation adjustments.				
GENERAL OBJECTIVE 4.0: Comprehend Navigational Support for Safe Watchkeeping						
12-15	4.1 Explain the role of navigation in safe watchkeeping. 4.2 Describe how navigation supports watchkeeping operations. 4.3 Discuss methods to monitor ship position and progress during watch.	• Introduce students to the role of navigation in maintaining safe watchkeeping. • Demonstrate techniques for monitoring ship position and progress using charts and logs. • Show methods of effective communication of navigational information among	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Maintain navigation plots during simulated watches. • Support navigational decision-making in exercises.	• Simulate navigation exercises	

	4.4 Explain effective communication of navigation information to the bridge team.	bridge team members • Assess readiness for radar and electronic navigation studies. • Refer students to relevant textbooks, bridge watchkeeping manuals, and online resources. • Give exercises and assignments on monitoring, reporting, and decision-making during watch. • Ask oral and written questions to assess understanding of navigation's role in safe watchkeeping.				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: COLLISION REGULATIONS (COLREGS) I	**COURSE CODE: NSC 124**	**Contact Hours: 2 Hours/Week**
Year: I Semester: II	**Credit Units: 2**	**Theoretical: 2 Hour/Week**
	Pre-requisite:	**Practical: 0**

GOAL: This course is designed to equip the students with knowledge of International Regulations for Preventing Collisions at Sea (COLREGs), including steering and sailing rules, lights, shapes, and sound signals, in order to support safe navigational watchkeeping and collision avoidance, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand the concept of COLREGs and General Provisions;
2.0 Understand Steering and Sailing Rules (Rules 5–19);
3.0 Know the meanings of Lights and Shapes in Collision Avoidance and Watchkeeping;
4.0 Comprehend Sound Signals, Collision Avoidance and Watchkeeping Support.

COMPETENCES:

- Maintain a safe navigational watch.
- Know International Regulations for Preventing Collisions at Sea (COLREGs).

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: COLLISION REGULATIONS (COLREGS) I	**Course Code: NSC 124**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2 Hours/Week	**Theoretical: 2 Hours/Week**
Year: I Semester: II	**Pre-requisite:**	**Practical: 0**
COURSE SPECIFICATION: Theoretical		
GOAL: This course is designed to equip the students with knowledge of International Regulations for Preventing Collisions at Sea (COLREGs), including steering and sailing rules, lights, shapes, and sound signals, in order to support safe navigational watchkeeping and collision avoidance, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
General Objective 1.0: Understand the concept of COLREGs and General Provisions		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the purpose and legal status of the International Regulations for Preventing Collisions at Sea (COLREGs). 1.2 Describe the structure, parts, and scope of the collision regulations. 1.3 Explain key definitions and terms used in COLREGs. 1.4 Describe the general responsibilities of vessels under the collision regulations.	• Introduce students to the background and objectives of the COLREGs. • Explain the legal status of COLREGs and their application to vessels at sea. • Describe the structure and scope of the rules using the official COLREG framework. • Explain key definitions and terms with reference to practical navigation	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

	1.5 Discuss the importance of compliance with COLREGs for safety at sea.	situations. • Relate COLREG compliance to accident prevention and maritime safety culture. • Use diagrams, simplified scenarios, and case examples to illustrate rule application. • Refer students to the COLREGs handbook, navigation textbooks, and relevant training manuals. • Give class exercises and assignments based on theoretical collision-avoidance situations. • Ask oral and written questions to assess understanding of COLREG principles and safety awareness.				
General Objective 2.0: Understand Steering and Sailing Rules (Rules 5–19)						

4-7	2.1 Explain the principles of safe speed and the need for a proper lookout. 2.2 Describe the application of steering and sailing rules in crossing, head-on, and overtaking situations. 2.3 Discuss the responsibilities of stand-on and give-way vessels. 2.4 Explain the rules applicable in restricted visibility at an introductory level. 2.5 Describe watchkeeping duties under COLREGs and their importance for safe navigation.	• Introduce students to the principles of safe speed and the importance of maintaining a proper lookout. • Discuss watchkeeping duties under COLREGs, emphasizing compliance and safety at sea. • Use simplified case studies, charts, and illustrations to show rule applications. • Refer students to the COLREGs handbook, navigation textbooks, and online tutorials. • Give class exercises and assignments on theoretical steering and sailing scenarios. • Ask questions to assess students' understanding of rules and their application for safe watchkeeping.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			
General Objective 3.0: Know the meaning of Lights and Shapes in Collision Avoidance and Watchkeeping						

8-11	3.1 Describe the navigation lights required for different vessel types. 3.2 Explain the purpose of lights and shapes as prescribed under COLREGs. 3.3 Discuss how vessel status can be distinguished using lights and shapes. 3.4 Explain the interpretation of lights and shapes during night and day navigation. 3.5 Describe the collision risks arising from misinterpretation of lights and shapes.	• Introduce students to the different navigation lights required for various vessel types using diagrams and pictures. • Demonstrate interpretation of lights at night and shapes during the day using case scenarios or charts. • Discuss collision risks that may result from misinterpretation of lights and shapes. • Refer students to COLREGs manuals, navigation textbooks, and online visual resources. • Give class exercises and assignments on identifying vessel lights and shapes in hypothetical navigation situations. • Ask questions to assess students' understanding and ability to interpret	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

		lights and shapes safely.				
GENERAL OBJECTIVE 4.0: Know Sound Signals, Collision Avoidance and Watchkeeping Support						
12-15	4.1 Explain the use of sound signals as prescribed under COLREGs. 4.2 Describe how sound signals are interpreted in various navigational situations. 4.3 Discuss the application of COLREG rules in collision avoidance scenarios using sound signals. 4.4 Explain how compliance with sound signal rules supports safe watchkeeping. 4.5 Explain the role of sound signals in radar-assisted collision avoidance.	• Introduce students to the different types of sound signals and their meanings using diagrams, audio clips, or videos. • Demonstrate examples of collision scenarios and show how rules are applied using sound signals. • Discuss the importance of following sound signal rules for safe watchkeeping. • Relate sound signal compliance to radar-assisted navigation and collision avoidance. • Refer students to COLREGs manuals, navigation textbooks, and online sound signal resources. • Give class exercises and assignments on identifying and applying sound	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

		signals in hypothetical navigation situations. • Ask questions to assess students' understanding of sound signal interpretation and rule compliance.				
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: SEAMANSHIP AND GENERAL SHIP KNOWLEDGE II	**COURSE CODE: NSC 125**	**Contact Hours: 4 Hours/Week**
Year: I Semester: II	**Credit Unit: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**

GOAL: This course is to equip students with enhanced seamanship competence, including advanced deck operations, shipboard maintenance routines, cargo handling awareness, and safe working practices, enabling them to contribute effectively to safe navigation and cargo operations at the operational level, in accordance with STCW Code, Section A-II/1, Table A-II/1

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand Seamanship Practices;
2.0 Know Deck Operations and Maintenance Routines;
3.0 Understand Cargo Handling and Operational Safety;
4.0 Comprehend Operational Safety, Efficiency and Shipboard Discipline;
5.0 Understand Ship manoeuvring and handling.

COMPETENCES:

- Contribute to safe navigation and cargo operations.

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: SEAMANSHIP AND GENERAL SHIP KNOWLEDGE II	**Course Code: NSC 125**	**Contact Hours: 4 Hours/Week**
	Credit Unit: 4	**Theoretical: 2 Hours/Week**
Year: I Semester: II	**Pre-requisite: -**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
General Objective 1.0: Understand Seamanship Practices		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain seamanship practice and its importance onboard. 1.2 Describe safe methods of working aloft and overside. 1.3 Explain proper handling of ropes, wires, and deck equipment. 1.4 Explain the importance of teamwork during deck operations. 1.5 Discuss the hazards associated with seamanship tasks: i Mooring ii Anchoring iii Rigging of Derick iv Container lashing	• Introduce to the students to seamanship practise. • Explain the applications of the principles of seamanship. • Explain safe working practice aloft and over the side.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Demonstrate safe handling of deck equipment. • Apply correct seamanship practice under supervision. • Demonstrate team work during deck operations.	• Practical demonstrations • Divide the students into groups to perform practical	Seamanship manuals, Deck equipment, Practical manual, Student's logbook, etc.

	and securing v Opening and closing of hatch cover, etc. 1.6 Explain the hazards associated with entry into enclosed spaces.					
General Objective 2.0: Understand Deck Operations and Maintenance Routines						
4-6	2.1 Describe routine deck operations carried out onboard ships. 2.2 Explain planned maintenance systems for deck equipment. 2.3 Explain common defects in deck fittings and structures. 2.4 Explain application of basic shipboard maintenance procedures. 2.5 Describe record-keeping for maintenance tasks.	• Introduce the students to routine deck operations.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Carry out basic deck maintenance tasks. • Identify defects during inspections.	• Supervise maintenance practice	Maintenance logs, Shipboard manuals, Seamanship workshop etc.
General Objective 3.0: Comprehend Operational Safety, Efficiency and Shipboard Discipline						
7-9	3.1 Explain safe working practice in deck operations. 3.2 Explain the importance of operational discipline onboard ships. 3.3 Discuss risk	• Lectures • Safety briefings • Evaluate readiness for seamanship and cargo courses.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers,	• Participate safely in simulated deck operations. Apply safety procedures consistently.	Practical simulations	Practical assessment, Risk assessment forms, SOPs etc.

	assessment in deck work. 3.4 Describe importance of efficient and safe shipboard operations.		Multi-media resources etc			
General Objective 4.0: Understand Cargo Handling and Operational Safety						
10-11	4.1 Describe the term 'cargo operations'. 4.2 Explain basic cargo types and their handling characteristics. 4.3 Identify hazards associated with cargo handling. 4.4 Discuss the importance of safe working practices during cargo operations. 4.5 Relate cargo safety to ship stability and seaworthiness.	• Describe the basic types of cargo, characteristics and handling techniques. • Discuss unsafe conditions during cargo operations. • Explain hazards associated with cargos.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Demonstrate safe cargo operation practice.	Scenario-based exercises	Cargo handling diagrams, Safety guidelines, Ship models, Practical manual, etc.
GENERAL OBJECTIVE 5.0: Understand Ship manoeuvring and handling						
12-15	5.1 Explain the effects of deadweight, draught, trim, speed, and under-keel clearance on a ship's turning circle and stopping distance. 5.2 Describe the effects of wind and current on	• Illustrate ship manoeuvring principles using diagrams, graphs, and ship handling case studies. • Demonstrate, using models or simulators, the	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media	• Use a bridge simulator or ship model to observe turning circles at different speeds. • Observe and record changes in maneuverability. • Practice standard	• Guide the student to: • Use a bridge simulator or ship model to observe turning circles at different	Ship handling models, Bridge simulator, Nautical charts, Videos and case studies, IMO/STCW

	ship manoeuvring and handling. 5.3 Explain manoeuvres and procedures for the rescue of a person overboard. 5.4 Discuss the effects of squat, shallow-water, and similar hydrodynamic effects on ship handling. 5.5 Describe proper procedures for anchoring and mooring in accordance with accepted maritime practice. 5.6 Explain steering control system. 5.7 Discuss the operational procedures and change over from manual and automatic control and vice versa. 5.8 Explain the adjustment of controls for optimum performance.	effects of draught, trim, speed, and under-keel clearance on turning circles and stopping distances. • Explain the influence of wind and current on ship handling through practical examples and scenario-based discussions. • Demonstrate standard manoeuvres for man-overboard (MOB) situations using charts, videos, or bridge simulator exercises. • Illustrate squat and shallow-water effects using diagrams, videos, or simulation software. • Demonstrate anchoring and mooring procedures, including safety precautions, using ship plans, models, or practical demonstrations.	resources etc	MOB maneuvers (Williamson turn, Anderson turn) using simulator or ship model. • Identify mooring equipment and line. arrangements. • Practice correct mooring procedures and communication signals.	speeds. • Observe and record changes in maneuverability • Practice standard MOB maneuvers (Williamson turn, Anderson turn) using simulator or ship model. • Identify mooring equipment and line arrangements. • Practice corrects mooring procedures and communication signals.	reference materials.

		• Explain steering control system • Discuss the operational procedures and change over from manual and automatic control and vice versa. • Explain the adjustment of controls for optimum performance. • Organize simulator or practical exercises where students practice manoeuvring, anchoring, and mooring procedures. • Assess students through questioning, tests, and practical or simulator-based demonstrations.				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: NAVIGATIONAL AIDS AND INSTRUMENTS I	**COURSE CODE: NSC 126**	**Contact Hours: 3 Hours/Week**
Year: I Semester: II	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 1 Hour/Week**

GOAL: This course introduces navigational aids and instruments used on board ships, including compasses, logs, echo sounders, radar and visual aids to navigation.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand Basic Navigational Aids and Instruments;
2.0 Understand operational principles and components of Compasses;
3.0 Understand Speed, Depth and Distance Measuring Instruments;
4.0 Know Radar Concepts and Visual Aids to Navigation;
5.0 Understand the operational principles and application of satellite-based position fixing systems.

COMPETENCES:

- Use navigational equipment

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: NAVIGATIONAL AIDS AND INSTRUMENTS I	**Course Code: NSC 126**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: I Semester: II	**Pre-requisite: -**	**Practical: 1 Hour/Week**
COURSE SPECIFICATION: Theoretical and Practical		
General Objectives 1.0: Understand Basic Navigational Aids and Instruments		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the role of navigational aids and instruments in safe navigation. 1.2 Describe the basic principles underlying electronic navigation systems. 1.3 Discuss the use of electronic navigational aids to determine the ship's position 1.4 Distinguish between traditional and electronic navigation aids. 1.5 Discuss the operation of selected electronic systems of position fixing and navigation (e.g. GPS, Radar, Echo	• Introduce the students to the roles of navigational aids and instruments in safe navigation. • Explain the differences between traditional and electronics navigational aids. • Discuss the operation of selected electronic systems of position fixing and navigation (e.g. GPS, Radar, Echo	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify navigational instruments • Match instruments to their functions. • Demonstrate the use of navigational instruments.	• Identification of drills	Instruments charts, Practical manual etc

	Sounder). 1.6 Explain redundancy and cross-checking instruments and their importance. 1.7 Discuss human error in instrument use.	Sounder).				
General Objective 2.0: Understand operational principles and components of Compasses						
4-6	2.1 Describe a compass. 2.2 State different types of compasses. 2.3 Explain the operating principles of the compasses. 2.4 State compass components and mounting arrangements. 2.5 Describe common compass errors. 2.6 Explain the role of compasses in position fixing and steering. 2.7 State limitations of compass.	• Lectures • Give assignments and Class work Compass demonstrations	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify compass parts correctly. • Observe compass behavior under normal conditions. • Use different compass to find direction	• Instrument observation exercises	Practical assessment, Magnetic compass Diagrams, etc.
General Objective 3.0: Understand Speed, Depth and Distance Measuring Instruments						
7-9	3.1 Explain the purpose of logs and echo sounders. 3.2 Describe basic operating principles of speed and depth	• Lectures Worked examples • Explain the basic operating principles of echo sounders.	Laptop Computers, Smart board, Projector, Writing Materials,	• Interpret depth and speed readings. • Identify unsafe conditions from instrument data	• Instrument reading exercises	Echo sounder diagrams, Log displays Simulator.

	measuring instruments. 3.3 Interpret readings from logs and echo sounders. 3.4 Discuss limitations and errors affecting readings. 3.5 Relate instrument readings to navigation safety.		White board, Markers, Multi-media resources etc	using simulators. • Demonstrate ability to operate the equipment and apply the information correctly		
General Objective 4.0: Know Radar Concepts and Visual Aids to Navigation						
10-12	4.1 Explain basic Radar concepts and purpose. 4.2 Discuss how to set up the radar. 4.3 Describe the consequences of blind sector on radar interpretation in collision avoidance. 4.4 Explain extraction and interpretation of radar data. 4.5 Discuss Radar inaccuracies and how to overcome them. 4.6 Explain visual aids to navigation (buoys, beacons, lights). 4.7 Explain how navigational aids support position fixing	• Explain the operational principles in Radar equipment. • Explain common errors and limitations in Radar and visual aids.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify visual aids to navigation. • Fix position with the support of navigational aids. • Relate radar information to visual observations.	• Scenario-based discussions	Radar concept diagrams, IALA buoyage charts.

	and collision avoidance. 4.8 Discuss radar and visual aid limitations. 4.9 Explain the importance of combining instrument data with lookout duties.					
General Objective 5.0: Understand the operational principles and application of satellite-based position fixing systems.						
13-15	5.1 Outline the components of common electronic navigation systems. 5.2 Discuss the operational principles of satellite-based position fixing systems. 5.3 Give examples of satellite-based position fixing systems such as; Global positioning system (GPS); Galileo; Glonass, Iridium, Thuraya, etc. 5.4 Explain the application and integration of satellite-based position fixing systems. 5.5 State the advantages	• Introduce the topic using electronic charts in navigation scenarios with simulation. • Explain key principles using simplified block diagrams of electronic navigation systems. • Demonstrate the working principles of systems such as GPS, Radar, and Echo Sounder using videos, simulations, or manuals. • Guide students through class discussions on the importance of electronic fixing in	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Observe installed electronic navigation equipment (GPS, Radar, Echo Sounder, AIS) on a ship or simulator. • Obtain ship's position using a GPS receiver or simulator. • Record latitude, longitude, course, and speed. • Use Radar or Radar simulator to identify targets. • Practice obtaining	• Observation of Navigation Bridge Equipment • GPS Position Fixing Exercise • Radar Fixing Practice • Echo Sounder Depth Measurement • Guide practical discussion on accuracy and reliability of electronic fixing	Navigation bridge simulator, GPS receiver, Radar simulator, Nautical charts, NAV equipment manuals, Multimedia videos etc.

	and limitations of satellite-based position fixing system.	modern navigation. • Organize group activities where students identify components and functions of electronic navigation equipment. • Summarize lessons by highlighting key principles, advantages, and limitations of electronic systems of navigation.		position fixes using radar ranges and bearings. • Observe depth readings from an echo sounder. • Compare electronic position fixes with charted positions.	• Comparison Exercise	

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: MARITIME BASIC SAFETY TRAINING	**COURSE CODE: NSC 127**	**Contact Hours: 3 Hours/Week**
	Credit Units: 3	**Theoretical: 1 Hour/Week**
Year: I Semester: II	**Pre-requisite:**	**Practical: 2 Hours/Week**

GOAL: This course is to equip students with mandatory basic safety training skills essential in survival, fire prevention, firefighting, and personal safety and social responsibility required for shipboard emergencies. in accordance with STCW Code, Section A-VI/1, Table A-VI/1 and Section A-VI/6-1, Table A-VI/6-1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Know Personal Survival Techniques (PST);
2.0 Comprehend Fire Prevention and Firefighting;
3.0 Understand Elementary First Aid (EFA);
4.0 Know Personal Safety and Social Responsibilities (PSSR);
5.0 Understand security awareness.

COMPETENCES:

- Survive at sea in the event of ship abandonment.
- Minimize the risk of fire and maintain a state of readiness to respond to emergency situations involving fire.
- Take immediate action upon encountering an accident or other medical emergency.
- Comply with emergency procedures.
- Contribute to the enhancement of maritime security through heightened awareness**.**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: MARITIME BASIC SAFETY TRAINING	**Course Code: NSC 127**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 1 Hour/Week**
Year: I Semester: II	**Pre-requisite: -**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is to equip students with mandatory basic safety training skills essential in survival, fire prevention, firefighting, and personal safety and social responsibility required for shipboard emergencies. in accordance with STCW Code, Section A-VI/1, Table A-VI/1 and Section A-VI/6-1, Table A-VI/6-1.		
General Objectives 1.0: Know Personal survival techniques		

THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-2	1.1 Explain the types of life-saving appliances normally carried on ships. 1.2 Explain the various equipment in survival craft. 1.3 Discuss the principles concerning survival. 1.4 Explain the location of personal life-saving appliances.	• Identify the types of life-saving appliances normally carried on ships. • Identify the various equipment in survival craft. • Explain the principles concerning survival. • Identify the location of personal life-saving appliances.	Computers, Smart/white board, Projector, Textbook, Lecture note etc	• Practical drills • Hands-on exercise	• Guide students in drills. • Guide student's hands-on exercise.	Swimming pool, Swimming kits, etc.
General Objective 2.0: Comprehend fire prevention and fire-fighting.						

2-4	2.1 Explain shipboard firefighting Organization. 2.2 Identify the location of firefighting appliances and emergency escape routes. 2.3 Explain the elements of fire and explosion (the fire triangle) 2.4 Explain the types and sources of ignition 2.5 Explain flammable materials, fire hazards and spread of fire. 2.6 Explain the need for constant vigilance. 2.7 Identify actions to be taken on board ship in case of fire emergency. 2.8 Explain fire, smoke detection and automatic alarm systems. 2.9 Classify fire and applicable extinguishing agents. 2.10 Identify firefighting equipment and its	• Discuss the shipboard fire-fighting Organization. • Know the location of firefighting appliances and emergency escape routes. • Discuss the elements of fire and explosion (the fire triangle) • Discuss the types and sources of ignition. • Explain flammable materials, fire hazards and spread of fire. • Explain the need for constant vigilance. • Identify actions to be taken on board ship in case of fire emergency. • Explain fire, smoke detection and automatic alarm systems. • Classify fire and	Computers, Smart/white board, Projector, Textbook, Lecture note etc	Practical drills Hands-on exercise	Guide students in drills. Guide student's hands-on exercise.	Fire bay Fire extinguishers

	location onboard.	applicable extinguishing agents. • Identify fire-fighting equipment and its location on board.				
General Objective 3.0: Understand Elementary First Aid.						
5-6	3.1 Explain the needs to assess casualties and threats to own safety. 3.2 Describe body structure and functions. 3.3 Explain immediate measures to be taken in cases of emergency. 3.4 Explain different types of emergency response techniques. 3.5 Explain common hazards and how to avoid them. 3.6 List the responsibilities of a first aider.	• Assessment of needs of casualties and threats to own safety. • Appreciation of body structure and functions. • Discuss immediate measures to be taken in cases of emergency including the ability to position casualty etc • Apply resuscitation techniques, • Control bleeding • Apply appropriate measures of basic shock management, • Apply appropriate measures in event of burns and scalds, including accidents caused by electric current,	Computers, Smart/white board, Projector, Textbook, Lecture note etc	• Demonstrate emergency response techniques.	• Guide students in drills. • Guide student's hands-on exercise.	First aid box, Practical manuals, PPE, etc.

		• Rescue and transport a casualty • Improvise bandages and use materials in the emergency kit.				
General Objective 4.0: Know personal safety and social responsibilities.						
7-11	4.1 Explain types of emergencies which may occur, such as collision, fire, foundering. 4.2 Discuss the knowledge of shipboard contingency plans for response to emergencies. 4.3 Explain emergency signals and specific duties allocated to crew members in the muster list; muster stations; correct use of personal safety equipment. 4.4 Explain the action to be take in case of emergency, including fire, collision, etc. 4.5 Explain the action to take on hearing emergency alarm	• Discuss the types of emergencies which may occur, such as collision, fire, Foundering. • Discuss the knowledge of shipboard contingency plans for response to emergencies, • Explain emergency signals and specific duties allocated to crew members in the muster list; muster stations; correct use of personal safety equipment. • Discuss the action to take on discovering potential emergency, including fire, collision, foundering, and ingress of water into the ship.	Computers, Smart/white board, Projector, Textbook, Lecture note etc	• Perform emergency response techniques involving, fire, founding, etc. • Set-up emergency alarm system.	• Guide students in drills. • Guide student's hands-on exercise.	IMO circulars, PPE, Fire extinguishers, Sand bucket, Muster point, etc.

	signals. 4.6 Explain the knowledge of escape routes and internal communication and alarm systems. 4.7 Explain the basic knowledge of the impact of shipping on the marine environment and the effects of operational or accidental pollution on it. 4.8 Describe basic environmental protection procedures. 4.9 Describe the basic knowledge of complexity and diversity of the marine environment. 4.10 Explain importance of obtaining adequate rest. 4.11 Explain the effects of sleep, schedules, and the circadian rhythm on fatigue. 4.12 Explain the effects of physical stressors on Seafarers.	• Enumerate the action to be taken on hearing emergency alarm signals, value of training and drills. • Discuss knowledge of escape routes and internal communication and alarm systems. • Discuss the impact of shipping on the marine environment and the effects of operational or accidental pollution on it. • Discuss basic environmental protection procedures. • Describe basic knowledge of complexity and diversity of the marine environment. • Explain the importance of obtaining the necessary rest. • Explain the effects of sleep, schedules, and the circadian				

	4.13 Describe the effects of environmental stressors in and outside the ship and their impact on seafarers. 4.14 Explains the effects of schedule changes on seafarer fatigue. 4.15 Explain the principles of, and barriers to, effective communication between individuals and teams within the ship. 4.16 Explain the need to establish and maintain effective communications. 4.17 Outline the importance of maintaining good human and working relationships aboard ship. 4.18 Discuss basic teamwork principles and practice, including conflict resolution. 4.19 Explain the Social responsibilities;	rhythm on fatigue. • Explain the effects of physical stressors on Seafarers. • Discuss the effects of environmental stressors in and outside the ship and their impact on seafarers. • Discuss the effects of schedule changes on seafarer fatigue. • Discuss the principle of, and barriers to, effective communication between individuals and teams within the ship. • Ability to establish and maintain effective communications. • Explain the importance of maintaining good human and working relationships aboard ship. • Explain the basic team working principles and				

	employment conditions, individual rights and obligations; dangers of drug and alcohol Abuse.	practice, including conflict resolution. • Discuss the Social responsibilities; employment conditions, individual rights and obligations; dangers of drug and alcohol abuse.				
General Objective 5.0: Understand security awareness						
12-15	5.1 Explain basic knowledge of maritime security terms and definitions, including elements that may relate to piracy and armed robbers. 5.2 Explain international maritime security policy and responsibilities of Governments, companies and persons. 5.3 Discuss maritime security levels and their impact on security measures and procedures aboard ship and in port facilities.	• Discuss basic working knowledge of maritime security terms and definitions, including elements that may relate to piracy and armed robbery. • Describe basic knowledge of international maritime security policy and responsibilities of Governments, companies and persons. • Explain maritime security levels and their impact on security measures and procedures	Laptop Computers Smart/white board Projector, Textbook, Lecture note, IMO circulars.			

	5.4 Explain basic knowledge of security reporting procedures. 5.5 Explain security-related contingency plans. 5.6 Discuss techniques used to circumvent security measures. 5.7 Describe potential security threats, including elements that may relate to piracy and armed robbery. 5.8 State weapons, dangerous substances and devices and awareness of the damage they can cause. 5.9 Discuss handling of security-related information and security-related communications. 5.10 Describe the need for training, drill and exercise requirements under relevant conventions,	aboard ship and in port facilities. • Discuss security reporting procedures. • Explain basic knowledge of security-related contingency plans. • Explain basic knowledge of techniques used to circumvent security measures. • Describe potential security threats, including elements that may relate to piracy and armed robbery.				

	codes and IMO circulars, including those relevant for anti-piracy and anti-armed robbery.					

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: INTRODUCTION TO MARINE ENGINEERING	**COURSE CODE: NSC 128**	**Contact Hours: 3 Hours/Week**
Year: I Semester: II	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 1 Hour/Week**

GOALS: This course is designed to enable students acquire the fundamental knowledge of marine engineering systems relevant to deck officers, including propulsion systems, auxiliary machinery, fuel systems and basic engine room operations for effective and safe ship operations in accordance with the STCW Code, Section A - II/1, Table A - II/1.

GENERAL OBJECTIVES:

On completion of this course the student should be able:
1.0 Understand the concept of marine engineering and ship propulsion;
2.0 Understand marine auxiliary machinery and shipboard Systems;
3.0 Understand marine fuel systems and engine room operations;
4.0 Understand Bridge and Engine room cooperation and operational safety.

COMPETENCES:

- Contribute to safe operation of the ship

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: INTRODUCTION TO MARINE ENGINEERING	**Course Code: NSC 128**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: II Semester: I	**Pre-requisite:**	**Practical: 1 Hour/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to enable students acquire the fundamental knowledge of marine engineering systems relevant to deck officers, including propulsion systems, auxiliary machinery, fuel systems and basic engine room operations for effective and safe ship operations in accordance with the STCW Code, Section A - II/1, Table A - II/1.		
General Objective 1.0: Understand the concept of marine engineering and ship propulsion.		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the scope of marine engineering in ship operations. 1.2 Describe the basic principles of ship propulsion. 1.3 Identify major components of propulsion systems. 1.4 Explain how propulsion affects ship maneuvering and speed. 1.5 Explain deck- engine coordination during maneuvering.	• Use propulsion system diagram to show components of the system. • Ask students to identify components on the diagram.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify propulsion components from diagrams. • Relate propulsion concepts to navigation scenarios.	• Supervise students activities during practical class.	Propulsion system diagrams , Multimedia aids etc.
General Objective 2.0: Understand marine auxiliary machinery and shipboard Systems						

4-7	2.1 Explain common auxiliary systems supporting navigation and safety. 2.2 Describe the functions of pumps, generators, and compressors. 2.3 Explain the role of auxiliary systems in ship safety. 2.4 Discuss the departmental interdependency of the deck and engine department in the use of auxiliary machinery.	• Enumerate common auxiliary systems supporting navigation and safety. • Explain basic functions of selected systems.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify auxiliary machinery of ship.	• Supervise and guide • Identification practice	Auxiliary system diagrams Engine room schematic diagram
General Objective 3.0: Understand marine fuel systems and engine room operations						
8-11	3.1 Identify the types of fuel used in ship propulsion 3.2 Explain basic ship fuel systems and fuel handling principles. 3.3 Describe fuel supply and transfer operations. 3.4 Identify safety considerations related to fuel systems. 3.5 Explain basic engine room routines and watchkeeping. 3.6 Discuss emergency procedures involving engineering systems. 3.7 State the effect of emission on the environments (Nitrogen oxide and	• Use fuel system diagram to explain fuel handling system. • List and discuss safety considerations • Recall safe fuel handling practices. • Explain the IMO regulation regarding the fuel quality	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	Demonstrate ability to recognize fuel system components.	• Discuss emergency procedures involving engineering systems.	Fuel system diagrams, Safety manuals, Marine Engineering workshop etc.

	Sulphur oxide)					
GENERAL OBJECTIVE 4.0: Understand Bridge and Engine room cooperation and operational safety						
12-15	4.1 Explain the importance of bridge - engine room communication. 4.2 Describe information exchange between bridge and engine room. 4.3 Support safe ship operations through interdisciplinary awareness. 4.4 Explain engine - related limitations affecting navigation decisions. 4.5 Discuss ship operations and safety.	• Give examples of bridge and engine room information exchange. • Guide discussions on engine related limitations affecting navigation decisions. • Class discussion exercise	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Carry out bridge-engine room communication to exchange information.	• Use role - play simulations to demonstrate brigde - engine room information exchange.	Bridge - engine communication examples, Operational checklists etc.
Course Assessment: Course work: 10% Test/Assignments: 10% Practical: 40% Examination: 40% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: COMPUTER APPLICATIONS IN NAVIGATION SYSTEMS I	**COURSE CODE: NSC 129**	**Contact Hours: 3 Hour/Week**
Year: I Semester: II	**Credit Units: 3**	**Theoretical: 1 Hour/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**

GOAL: This course is designed to equip students with foundational digital literacy and computer application skills relevant to modern shipboard navigation in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

On completion of this course, students should be able to:

1.0 Understand the foundational digital literacy;
2.0 Understand Computer Applications and Data Management;
3.0 Understand Computers Software use in Navigation and Maritime;
4.0 Understand electronic chart and Digital Navigation Concepts.

COMPETENCES:

- Use computer applications to support navigation.

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: COMPUTER APPLICATIONS IN NAVIGATION I	**Course Code: NSC 129**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 1 Hour/Week**
Year: 1 Semester: II	**Pre-requisite:**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
General Objectives 1.0: Understand the foundational digital literacy		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1–3	1.1 Discuss basic computer hardware and software components. 1.2 Explain fundamental computer operations. 1.3 Explain basic operating system functions. 1.4 Explain safe and responsible use of computers. 1.5 Explain the relevance of digital literacy to modern ship operations.	• Explain the basic computer hardware and software components. • Explain the fundamentals of computer operations. • Explain basic operating system functions. • Discuss the use of computers applications in navigation. • Explain the relevance of digital literacy to ship operation.	Laptops, Smart board, Desktop computers, Online and multimedia presentation etc.	• Identify the basic computer hardware and software components. • Use of computers applications in navigation.	• Hands-on computer practice. • Identify the relevance of digital literacy to ship operation	Laptops, Smart board, Desktop computers, Online and multimedia presentation etc.
General Objective 2.0: Understand Computer Applications and Data Management						

4-6	2.1 Explain the uses of basic word processing and spreadsheet applications. 2.2 Explain the role of digital data in navigation. 2.3 Explain how to organize and store navigational data electronically. 2.4 Discuss data accuracy and integrity. 2.5 Relate data management to safe navigation practices. 2.6 Discuss data protection and cyber security policies. 2.7 Discuss the concept of troubleshooting in computer.	• Boot a word processing and spreadsheet applications. • Explain the role of digital data in navigation. • Organise and store navigation data using word processor and spreadsheet application. • Create awareness of data accuracy and integrity. • Relate data management to safe navigation. • Discuss the process of identifying, analysing and resolving software related problem.	Laptops Desktops computers Smart and white board Sample navigation dataset etc.	• Enter and retrieve navigation-related data. • Store files using appropriate naming and folder structures.	• Guide students to perform Hands-on computer practice	Software computer laboratory etc.
General Objective 3.0: Understand Computers Software use in Navigation and Maritime						
7-9	3.1 Explain the role of computers in modern ship navigation. 3.2 Discuss maritime software used onboard	• Discuss the role of computers in modern ship navigation. • Enumerate maritime software used	Laptops Desktops computers Smart and white board	• Navigate basic maritime software interfaces. • Identify key functions within	Guided software practice	Software Computer laboratory, Smart and white board

	ships, such as: ECDIS, GPS, ARPA Radar, Loadicator, etc. 3.3 Describe the basic functions of navigation-related software. 3.4 Explain advantages and limitations of computer-based navigation. 3.5 Explain human-machine interaction issues.	onboard ships such as: ECDIS, GPS, ARPA Radar, Loadicator, etc. • Explain the relevance of navigational software. • Discuss the advantages and limitations of computer-based navigation. • Explain human-computer interaction in navigation.	Sample navigation dataset etc.	navigation software. • Use Maritime Software onboard ship.		Navigation software demos, Videos etc.
GENERAL OBJECTIVE 4.0: Electronic Chart and Digital Navigation Concepts						
10-12	4.1 Explain the concept of electronic charts. 4.2 Distinguish between paper charts and electronic chart systems. 4.3 Identify basic components of electronic chart displays. 4.4 Explain the limitations and risks of electronic navigation. 4.5 Explain the need for proper training and procedures when	• Discuss the concept of electronic charts. • Differentiate between paper charts and electronic chart systems. • Enumerate the basic components of electronic chart displays. • Describe the limitations and risks of electronic navigation.	Laptops Desktops computers Smart and white board Sample navigation dataset etc.	• Identify electronic chart features. • Demonstrate basic interaction with electronic chart displays (simulated).	• Simulate electronic chart exercises	Simulated electronic chart systems, ECDIS Writing materials, Charts etc.

	using electronic aids.	• Explain the need for proper training and procedures when using electronic aids.				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: MARITIME ENGLISH AND COMMUNICATION I	**COURSE CODE: NSC 141**	**Contact Hours: 2 Hours/Week**
Year: I Semester: II	**Credit Unit: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite: -	**Practical: 0**

GOAL: This course is to equip students with English language skills for maritime communication. Emphasis is placed on maritime terminology, shipboard communication, safety messages, and introduction to IMO Standard Marine Communication Phrases (SMCP) to meet STCW language requirements.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand basic Maritime English for safe and effective shipboard communication;
2.0 Understand IMO Standard Marine Communication Phrases (SMCP);
3.0 Understand effective oral and written communication skills;
4.0 Understand the application of SMCPs to promote safe and efficient operations onboard**.**

COMPETENCES:

- Apply written and oral English language effectively in shipboard communication

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE						
Course Title: MARITIME ENGLISH AND COMMUNICATION I			**Course Code: NSC 141**		**Contact Hours: 2 Hours/Week**	
			Credit Unit: 2		**Theoretical: 2 Hours/Week**	
Year: I Semester: II			**Pre-requisite:**		**Practical: 0**	
COURSE SPECIFICATION: Theoretical						
GOAL: This course is to equip students with English language skills for maritime communication. Emphasis is placed on maritime terminology, shipboard communication, safety messages, and introduction to IMO Standard Marine Communication Phrases (SMCP) to meet STCW language requirements.						
General Objective 1.0: Understand basic Maritime English for safe and effective shipboard communication						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-4	1.1 Explain the importance of English as the working language at sea. 1.2 Identify common maritime terms used onboard ships. 1.3 Use basic maritime vocabulary correctly in context. 1.4 Explain shipboard instructions given in English. 1.5 Explain the role of clear communication in accident	• Lectures • Listening exercises. • Coordinate Role-play scenarios.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

	prevention. 1.6 Identify basic Standard Marine Communication Phrases (SMCP) used in routine shipboard situations. 1.7 Explain simple Standard Marine Communication Phrases (SMCP) correctly in controlled situations. 1.8 Discuss standardized communication procedures. 1.9 Explain the role of SMCP in preventing misunderstandings at sea.					
General Objective 2.0: Understand IMO Standard Marine Communication Phrases (SMCP)						
5-8	2.1 Discuss the standard marine communication phrases for routine onboard operations 2.2 Explain appropriate standard (SMCP) messages related to safety, navigation, and ship operations. 2.3 Discuss Communication	• Introduce SMCP vocabulary and phrases, highlighting their purpose and relevance in routine and emergency maritime communication • Demonstrate proper pronunciation and intonation of SMCP phrases to ensure	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

	during ship-to-ship and ship-to-shore exchanges, using SMCP for reporting, requests, and instructions. 2.4 Explain safety and emergency phrases during drills and actual emergencies. 2.5 Discuss the use of SMCP during drills and emergencies 2.6 Explain the uses of SMCP for coordinating onboard teamwork, including giving orders, acknowledging commands, and reporting observations. 2.7 Explain the uses of correct pronunciation and phrasing to avoid misunderstandings in international maritime communication. 2.8 Interpret urgent and critical information clearly using SMCP, ensuring compliance	clear and unambiguous communication. • Organize role-playing exercises for emergency situations, such as fire, man-overboard, or collision, requiring correct use of SMCP phrases. • Use multimedia tools or audio recordings of real-life maritime communication to expose learners to authentic • Provide feedback and correction on learners' use of SMCP, focusing on accuracy, clarity, and appropriate responses.				

	with IMO communication standards.					
General Objective 3.0: Understand effective oral and written communication skills						
9-12	3.1 Explain maritime-specific vocabulary and terminologies accurately in both oral and written communication. 3.2 Demonstrate clear oral communication during shipboard operations, including bridge, engine, and deck coordination. 3.3 Explain how to prepare accurate written reports and log entries according to standard maritime documentation practices. 3.4 Interpret appropriately ship-to-ship and ship-to-shore communications, using Standard Marine Communication Phrases (SMCP). 3.5 Deliver instructions	• Introduce maritime vocabulary and terminologies, guiding students on correct usage in operational and safety contexts. • Conduct oral communication drills, such as bridge orders, safety briefings, and watchkeeping exchanges, to build speaking confidence and clarity. • Facilitate role-play and simulation exercises, allowing students to practice shipboard communication in routine and emergency scenarios. • Demonstrate proper pronunciation and intonation, especially for Standard Marine Communication Phrases (SMCP) and	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

	and briefings effectively to crew members during routine operations and emergency situations. 3.6 Discuss the application of professional tone, clarity, and conciseness in maritime emails, messages, and official correspondence. 3.7 Demonstrate active listening skills to accurately understand orders, instructions, and operational communications onboard. 3.8 Explain the use of cultural communication strategies to coordinate and collaborate with a multinational crew. 3.9 Respond appropriately to feedback and clarification requests	common maritime terms. • Use audio-visual and digital tools (videos, recordings, simulators) to expose students to real-life maritime communication situations. • Assign written tasks, including logbook entries, incident reports, emails, and notices, and demonstrate correct formatting and language. • Lead group discussions and briefings, encouraging students to express ideas clearly and listen actively to others. • Provide corrective feedback and guided revisions on students' spoken and written work to improve accuracy and professionalism.				

	to ensure operational safety and efficiency.					
GENERAL OBJECTIVE 4.0: Understand the application of SMCPs to promote safe and efficient operations onboard						
13-15	4.1 Describe shipboard safety rules, regulations, and procedures in accordance with maritime standards. 4.2 Describe maritime terminologies and Standard Marine Communication Phrases (SMCP) accurately during routine and emergency operations. 4.3 Communicate clearly and effectively with crew members to support safe navigation and shipboard activities. 4.4 Respond appropriately to emergency situations, including alarms, drills, and evacuation procedures using SMCPs 4.5 Work effectively as part of a team,	• Explain shipboard safety rules, regulations, and codes, linking them to daily onboard operations. • Teach and practice Standard Marine Communication Phrases (SMCP) to ensure clear and standardized communication. • Demonstrate correct operational procedures for deck, bridge, and engine room activities. • Conduct practical drills and simulations for routine operations and emergency situations (fire, abandon ship, man overboard). • Supervise group work and teamwork exercises, emphasizing	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

	showing cooperation and responsibility during onboard tasks. 4.6 Explain how to maintain accurate operational and safety records, such as logbooks, checklists, and reports using SMCPs.	cooperation, roles, and responsibilities onboard. • Assign and assess written tasks, such as logbook entries, safety reports, and incident records.				
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

YEAR II SEMESTER I

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: CELESTIAL NAVIGATION I	**COURSE CODE: NSC 211**	**Contact Hours: 4 Hours/Week**
Year: II Semester: I	**Credit Unit: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**
GOAL: This course is designed to equip students with knowledge and understanding of basic celestial position fixing principles by observation of celestial bodies.		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Understand Celestial Sphere and Principles of Celestial Navigation; 2.0 Know Time Systems and Nautical Almanac usage; 3.0 Understand Celestial Position Fixing concepts and Operational Limitations.		
COMPETENCES: • Determine position of the ship.		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: CELESTIAL NAVIGATION I	**Course Code: NSC 211**	**Contact Hours: 4 Hours/Week**
	Credit Unit: 4	**Theoretical: 2 Hours/Week**
Year: II Semester: I	**Pre-requisite:**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to equip students with knowledge and understanding of basic celestial position fixing principles by observation of Celestial bodies.		
General Objective 1.0: Understand Celestial Sphere and Principles of Celestial Navigation		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-5	1.1 Explain the concept and purpose of celestial navigation. 1.2 Describe the celestial sphere and its components. 1.3 Identify principal celestial bodies used for navigation. 1.4 Explain basic astronomical terminology used in celestial navigation. 1.5 Describe the role of celestial navigation as a backup positioning method.	• Introduce the students to the solar system and explain the sun's apparent motion round the earth. • Describe the rotation and revolution of the earth. Describe the motion of the moon around the earth • Define each of the astronomical terminologies. • Introduce the students to celestial bodies and how to identify them. • Explain the basic	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify celestial reference points on diagrams. • Use Navigation Instrument to view celestial bodies for navigation practice.	• Basic celestial navigation calculations and diagram interpretation exercises	Celestial sphere diagrams, Navigation texts, Audio-visual etc.

		principles of using celestial bodies for navigation.				
General Objective 2.0: Know Time Systems and Nautical Almanac						
6-10	2.1 Explain time systems used in celestial navigation. 2.2 Discuss different navigation time references. 2.3 Identify the contents and structure of the nautical almanac. 2.4 Identify required data from the nautical almanac. 2.5 Discuss the accuracy and discipline in time-based navigation calculations.	• Explain why the mean sun is used for time keeping. • Introduce students to the time system. GMT/UT, LAT, Zone Time and Sidereal Time • Demonstrate the use of the Nautical Almanac to identify required data for navigation including planetary, moon, star and sun data with hour angles 'd' and 'v' correction.	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Extract celestial data correctly from the almanac. • Apply time data to navigation exercises.	• Supervise almanac practice. • Give assignments and class exercises on the use of nautical almanac	Nautical almanac, time conversion tables, Laptop computers, smart board, Projector etc.
GENERAL OBJECTIVE 3.0: Understand Celestial Position Fixing concepts and Operational Limitations						
11-15	3.1 Explain how to determine ship's position using celestial observations. 3.2 Discuss the plotting of celestial position lines. 3.3 Discuss the interpretation of	• Introduce students to how to use the observations of the sun, moon, stars (including Polaris) and planets in position fixing. • Explain the use of	Laptop Computers, Smart board, Projector, Writing Materials, White board, Markers, Multi-media	• Plot basic celestial fixes accurately. • Compare celestial fixes with DR/EP positions. • Use sextant to determine the ship's position	Guide students to perform practical calculations and plotting exercises	Charts, Celestial plotting tools, Laptop computers, smart board, Projector etc.

	celestial fixes in relation to other navigation methods. 3.4 Explain limitations of celestial navigation in near-coastal operations.	sextant in determining the ship position • Refer students to textbooks, online tutorials, and instructional videos on the use of celestial bodies in determining ship's position at sea. • Give class exercises and assignments on various methods of basic calculations on the use of celestial observations for position fixing. • Discuss advances in celestial and ocean navigation. • Ask oral and written questions to assess understanding and	resources etc			

		safe application of celestial navigation to position fixing				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: CHARTWORK AND NAUTICAL PUBLICATIONS II	**COURSE CODE: NSC 212**	**Contact Hours: 4 Hours/Week**
Year: II Semester: I	**Credit Units: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**
GOAL: This course introduces students to the understanding on how to develop complete passage plans, including planning, appraisal, execution, monitoring		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Comprehend information on charts and interpret them; 2.0 Understand the principles of Passage Planning in accordance with the IMO Framework; 3.0 Know applications of Chart Corrections and Nautical Publications; 4.0 Understand the stages of Planning and Execution of Passages; 5.0 Understand Passage Monitoring, Updating and Position Determination.		
COMPETENCES: • Plan and conduct a passage and determine position		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: CHARTWORK AND NAUTICAL PUBLICATIONS II	**Course Code: NSC 212**	**Contact Hours: 4 Hours/Week**
	Credit Unit: 4	**Theoretical: 2 Hours/Week**
Year: II Semester: I	**Pre-requisite:**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course introduces students to the understanding on how to develop complete passage plans, including planning, appraisal, execution, monitoring		
General Objective 1.0: Comprehend information on charts and interpret them.		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the reading and interpreting the charts. 1.2 Discuss the information on the charts. 1.3 Explain chart's instruments and their uses. 1.4 Describe fixing ships' position using coordinates. 1.5 Explain the terms: variation, deviation, and compass error. 1.6 Explain how to extract and update	• Read and interpret the chart. • Explain the information on the charts • Discuss charts instruments and their uses • Describe fixing ships' position using coordinates • Explain the terms: variation, deviation, and compass error. • Explain how to extract and update variation. • Explain how to	Nautical charts, Nautical Publications, parallel rule, divider, 2B pencil, smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc.	• Use charts instruments • Correct and update of charts	• Guide students to use charts instruments	Charts, Practical manual, Logbook etc.

	variation. 1.7 Explain the dangers of using pirated charts (Paper and ENC)	correct variation. • Explain how to read compass to take bearing. • Discuss correction and updating of charts and nautical publication. • Explain the dangers of using pirated charts				
General Objectives 2.0: Understand the principles of Passage Planning in accordance with the STCW Code, Section A-II/1.						
4-7	2.1 Explain the purpose and importance of passage planning. 2.2 Describe the stages of passage planning (appraisal, planning, execution, monitoring). 2.3 Identify information required at the appraisal stage. 2.4 Explain the relationship between passage planning and safe watchkeeping. 2.5 Explain legal and	• Guide the students through understanding all the various activities involved in safe passage planning. • Demonstrate all the stages of passage planning (appraisal, planning, execution, monitoring). • Explain all the critical factors that must be considered when planning a passage. • Refer students to textbooks, online resources, and videos on passage planning.	Nautical Charts, Nautical Publications, Parallel Rule, Divider, 2B Pencil, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Etc.	• Identify required planning data from given scenarios. • Outline passage planning stages correctly.	• Group passage planning exercises. • Give assignments and class exercises on passage planning • Ask oral and written questions to assess understanding of passage planning	Nautical charts, Nautical Publications, parallel rule, divider, 2B pencil, smart board, Projector etc.

	professional responsibilities in passage planning.					
General Objective 3.0: Know applications of Chart Corrections and Nautical Publications						
8-10	3.1 Explain the accurate application of permanent, temporary, and preliminary chart corrections. 3.2 Describe the use of Notices to Mariners for chart updating. 3.3 Explain the integration of information from nautical publications into passage plans. 3.4 Explain chart and publication correction status. 3.5 Discuss the risks associated with outdated navigation charts and nautical publications.	• Explain the importance of chart corrections with reference to accuracy, safety, compliance with regulations. • Explain the role of nautical publications such as Notices to Mariners, Sailing Directions, List of Lights, Tide Tables, etc. in passage planning. • Show students how to apply chart corrections step by step using Notices to Mariners and demonstrate how to update a chart manually using pencil corrections, symbols, and annotations. • Use real-world examples of accidents caused by	Nautical Charts, Nautical Publications, Parallel Rule, Divider, 2B Pencil, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Etc.	• Carry out complete chart corrections. • Record corrections correctly on charts and logs.	• Supervise correction and updating exercises • Introduce students to digital chart correction systems (ECDIS) and compare with paper chart methods. • Guide students through the structure of key publications such as Admiralty Sailing Directions, List of Radio Signals.	Nautical charts, Nautical Publications, parallel rule, divider, 2B pencil, smart board, Projector, Simulator, Audiovisual etc.

		outdated charts/publications to emphasize relevance.				
General Objective 4.0: Understand the stages of Planning and Execution of Passages						
11-13	4.1 Explain detailed passage plans using appropriate charts. 4.2 Identify navigational hazards along the intended route. 4.3 Describe safety margins and contingency planning. 4.4 Explain the integration of tidal, meteorological, and traffic information into passage plans. 4.5 Discuss bridge team responsibilities during execution.	• Begin with a discussion on why passage planning is critical (safety, efficiency, compliance with COLREGs and SOLAS). • Show how to use charts and nautical publications to extract necessary information and select routes. • Demonstrate plotting a passage on a chart (paper or ECDIS). • Explain the importance of teamwork and monitoring tools (radar, GPS, logbook entries) during passage execution.	Nautical Charts, Nautical Publications, Parallel Rule, Divider, 2B Pencil, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Etc.	• Plot complete routes on charts. • Annotate charts with relevant navigation information.	• Practical route-plotting exercises. • Walk through a sample voyage plan step by step, highlighting decision points. • Share real-world examples of successful and failed voyages to highlight the importance of proper planning.	Nautical charts, Nautical Publications, parallel rule, divider, 2B pencil, smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc.
GENERAL OBJECTIVE 5.0: Understand Passage Monitoring, Updating and Position Determination						

14-15	5.1 Discuss passage progress using appropriate position-fixing methods. 5.2 Explain chart updating and passage plans during voyage execution. 5.3 Discuss deviations from planned tracks and how to take corrective action. 5.4 Discuss the integration of DR, EP, and fixes into voyage monitoring. 5.5 Discuss the significance of radar- and ECDIS-assisted passage planning.	• Explain the three pillars passage planning during execution (Passage Monitoring, updating and continuous Position Determination) • Show how to monitor a passage using paper charts and ECDIS in plotting fixes at intervals. • Explain how to determine the ship's position by use of electronic navigational aids	Nautical Charts, Nautical Publications, Parallel Rule, Divider, 2B Pencil, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Etc.	• Monitor and update passage plans accurately. • Record navigational data correctly during simulated passages.	• Scenario-based chartwork • Lead a discussion on comparing traditional methods (paper charts, celestial) with modern electronic systems.	• Written examination • Practical passage monitoring assessment

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: NAVIGATIONAL AIDS AND INSTRUMENTS II	**COURSE CODE: NSC 213**	**Contact Hours: 3 Hours/Week**
Year: II Semester: I	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 1 Hour/Week**
GOAL: This course is to enable students to understand the use of Radar, ARPA, ECDIS, and integrated bridge equipment for collision avoidance and safe navigation.		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Understand Radar Theory and Basic Radar Operations; 2.0 Know Radar Plotting and Collision Avoidance; 3.0 Understand ARPA and Target Tracking Systems; 4.0 Understand Passage Monitoring, Updating and Position Determination.		
COMPETENCES: • Use Radar, ARPA and ECDIS to maintain safe navigation		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: NAVIGATIONAL AIDS AND INSTRUMENTS II	**Course Code: NSC 213**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: II Semester: I	**Pre-requisite:**	**Practical: 1 Hour/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is to enable students to understand the use of Radar, ARPA, ECDIS, and integrated bridge equipment for collision avoidance and safe navigation.		
General Objectives 1.0: Understand Radar Theory and Basic Radar Operations.		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the principles of Radar operation. 1.2 Identify main components of marine Radar systems. 1.3 Explain Radar display features and controls. 1.4 Describe basic Radar images and echoes. 1.5 Discuss factors affecting Radar performance and accuracy. 1.6 Explain Radar	• Explain basic Radar theory. How the Radar works by transmitting radio waves and receiving echoes from objects. • Explain the concepts of range, bearing, pulse, frequency, and reflection. • Explain Radar limitations: blind sectors, clutter, false echoes.	Bridge Simulator with Radar, Arpa and ECDIS capabilities, Writing Materials, White board, Markers, Multi-media resources etc.	• Operate basic radar controls correctly. • Interpret simple radar targets.	• Simulator-based demonstrations	Radar, ARPA and ECDIS simulator, Audio-visual etc.

	limitations and errors. 1.7 Explain the detection of false echoes, sea return, racons and SARTs, etc.					
General Objective 2.0: Know Radar Plotting and Collision Avoidance						
4-7	2.1 Explain the purpose of Radar plotting. 2.2 Describe manual radar plotting. 2.3 Explain relative motion, Closest Point of Approach (CPA) and Time of Closest Point of Approach (T CPA). 2.4 Explain the application of Radar information in collision avoidance. 2.5 Discuss COLREG application using Radar information.	• Begin with a short discussion on why Radar plotting is vital or collision avoidance. • Explain the principles of Radar plotting in terms of Relative motion vs. true motion, CPA and TCPA, and Manual plotting vs. ARPA. • Discuss how radar supports compliance with COLREGs. • Use diagrams to illustrate how target vectors are plotted and interpreted.	Radar/ARPA, Writing Materials, White board, Markers, Multi-media resources etc.	• Plot Radar targets accurately. • Interpret collision risk situations.	• Supervised plotting exercises	Radar, ARPA, Simulator, Audiovisual, Writing Materials,
General Objective 3.0: Understand ARPA and Target Tracking Systems						
8-11	3.1 Explain the principles of Automatic Radar Plotting Aids	• Begin with a discussion on the importance of	Radar/ARPA, Writing	• Acquire and track targets using ARPA. Interpret	• Various simulator-based ARPA	Radar, ARPA, Simulator,

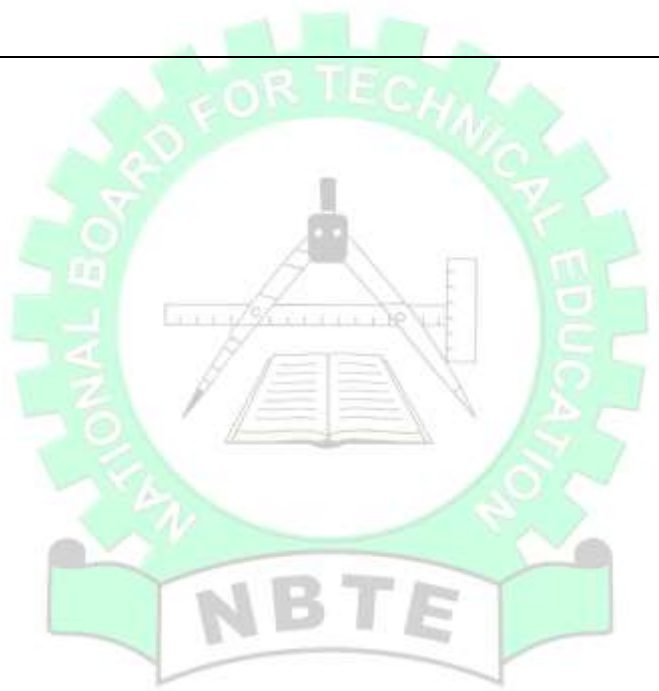
	(ARPA) operations. 3.2 Identify ARPA tracking functions and displays. 3.3 Discuss the correct interpretation of ARPA target data. 3.4 Identify limitations and potential errors of ARPA. 3.5 Identify the danger of over-reliance on ARPA.	ARPA in modern navigation • Explain the advantages that ARPA provide compared to manual Radar plotting. • Describe target tracking systems with regards to automatic acquisition vs. manual acquisition and explain the interpretation of various ARPA target data. • Explain limitations, errors and hazard of over-reliance on ARPA (e.g., small targets, interference, incorrect inputs).	Materials, White board, Markers, Multi-media resources etc.	CPA and TCPA data. • Use of operational warnings and system tests • Simulate Trial Manoeuvres and Guard zones.	exercises to: acquiring and tracking targets, read CPA/TCPA values, set collision alarms and switch between relative and true motion displays. • Use diagrams or animations to illustrate how ARPA calculates and displays target movement.	Audiovisual Writing Materials etc.
GENERAL OBJECTIVE 4.0: Understand Passage Monitoring, Updating and Position Determination						
12-15	4.1 Explain the principles and functions of Electronic Chart Display and Information system (ECDIS).	• Begin with a discussion on the operating principles, function, and importance of ECDIS in modern navigation.	ECDIS, Projector, Writing Materials, White board, Markers, Multi-media	• Plan and monitor routes using ECDIS. • Perform setting of safety perimeter and alarm of ECDIS	• Various simulator-based navigation exercises. • Show students an	ECDIS, Simulator, Projector, Writing Materials

	4.2 Describe the use of ECDIS for route planning and monitoring. 4.3 Discuss the setting and interpretation of safety parameters and alarms. 4.4 Explain limitations and errors associated with ECDIS. 4.5 Describe the integration of radar, ARPA, and ECDIS information for safe navigation. 4.6 Discuss situational awareness while using ECDIS including: Safe water and proximity of hazards, set and drift, chart data and scale selection, suitability of route, contact detection and management, and integrity of sensor.	• Explain the functions of ECDIS for Passage Monitoring, Updating with automatic integration of Notices to Mariners and chart corrections, and Position Determination. • Explain the interpretation of various ECDIS target data. • Clarify advantages and limitations (accuracy, over-reliance, need for proper training). • Use diagrams or flowcharts to show how ECDIS links with other bridge systems.	resources etc.		ECDIS unit or simulator • Demonstrate how to load and update charts. • Show how to monitor a vessel's progress along a planned route, • Explain how alarms are triggered when deviating from the route or entering danger zones • Demonstrate how position is determined using GPS inputs and cross-checked with radar or visual	etc,

					bearings.	

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**



PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: RESEARCH METHODOLOGY	**COURSE CODE: NSC 214**	**Contact Hours: 2 Hours/Week**
Year: II Semester: I	**Credit Units: 2**	**Theoretical: 1 Hours/Week**
	Pre-requisite:	**Practical: 1 Hour/Week**

GOAL: This course is to equip students with essential research skills and methodologies for identifying and investigating shipboard and navigation-related problems. It enables the students to collect and interpret data, review relevant literatures, and prepare structured research proposals and reports.

GENERAL OBJECTIVES:

At the end of this course, the students should be able to:

1.0 Understand the scientific approach to research and the nature of research problems;
2.0 Understand how to identify and formulate research problems;
3.0 Know how to design a research study, including hypothesis formulation, validation, and variables;
4.0 Understand Literature Review and apply appropriate sampling techniques;
5.0 Know how to collect, analyze, and interpret research data using suitable tools and techniques, including data analytic software;
6.0 Know how to prepare structured research proposals and report findings effectively.

COMPETENCES:

- Perform scientific enquiry in Nautical Science

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE						
Course Title: RESEARCH METHODOLOGY		**Course Code: NSC 214**		**Contact Hours: 2 Hours/Week**		
		Credit Unit: 2		**Theoretical: 1 Hour/Week**		
Year: II Semester: I		**Pre-requisite:**		**Practical: 1 Hour/Week**		
COURSE SPECIFICATION: Theoretical and Practical						
GOAL: This course is to equip students with essential research skills and methodologies for identifying and investigating shipboard and navigation-related problems. It enables the students to collect and interpret data, review relevant literatures, and prepare structured research proposals and reports.						
General Objectives 1.0: Understand the scientific approach to research and the nature of research problems						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-2	1.1 Explain the meaning and importance of research in Nautical Science. 1.2 Describe the characteristics of scientific research. 1.3 Differentiate research from routine operational inquiry. 1.4 Discuss research ecosystem.	• Lecture, class discussion with examples from navigation and ship operations. • Use real-life situations aboard ships where research can improve operations. • Case study discussion, group activity.	Nautical journals, ship operation reports etc.			
General Objective 2.0: Understand how to identify and formulate research problems.						

3-5	2.1 Define a research problem. 2.2 Identify research problems related to maritime and related fields. 2.3 Explain how to identify research gap in maritime and related fields. 2.4 Prioritize problems based on relevance and feasibility.	• Brainstorming, guided discussion, examples from ship incidents. • Select research problems for mini-study Group exercises, peer discussion.	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources, Incident Reports, Ship Logs Etc			
General Objective 3.0: Understand research design, including hypothesis formulation, validation, and variables						
6-8	3.1 Explain the meaning and types of hypotheses in research. 3.2 Formulate testable hypotheses (e.g., effect of fatigue on bridge watchkeeping). 3.3 Identify independent, dependent, and control variables in nautical studies.	• Lecture, real-life examples from shipboard operations. • Formulate hypotheses and identify variables for a chosen shipboard problem. • Group exercises, guided practice.	Textbooks, slides, ship operation data Worksheets, ship logs, navigation scenarios etc.			
GENERAL OBJECTIVE 4.0: Understand literature review and apply appropriate sampling techniques.						

9-11	4.1 Explain the importance of reviewing research literature. 4.2 Conduct literature search on maritime and related field.. 4.3 Explain sample and sampling techniques suitable for maritime and related field. 4.4 Select sampling method for a small-scale study.	• Lecture, demonstration, library/online search. • Conduct a mini literature review and select sampling method maritime and related field. • Practical library/online search, group work study.	Library, online databases, journals, IMO reports, ship operation manuals etc.	• Conduct literature search on multi-media resources.	• Guide students to use to download papers.	Computers, Multi-media resources. Practical manuals etc.
General Objective 5.0: Know how to collect, analyze, and interpret research data using suitable tools and techniques.						
12-13	5.1 Explain data collection methods for research (Questionnaires, interviews, logs, surveys, and instruments). 5.2 Explain data analysis techniques applicable to maritime and related field. 5.3 Interpret results from data analysis.	• Lecture with examples from bridge or deck operations. • Demonstration, guided practice. • Explain data collection from bridge simulators or ship logs and perform basic analysis.	SPSS, Excel, navigation data Bridge simulator, Excel, SPSS, ship logs	• Use software package to collect, process and analyse data.	• Guide students to collect data. • Assist student to use software package.	Computer, Data, Practical manual etc.
General Objective 6.0: Understand application of basic research methods to prepare structured research proposals and report findings.						
14-15	6.1 Outline components of research proposal. 6.2 Prepare a structured	• Lecture, review of sample nautical research reports.	Sample proposals,	• Write a research proposal.	• Guide students to	Computer, Data,

	research proposal on maritime and related field problems. 6.3 Present research findings in written and oral form relevant to maritime and related field.	• Prepare a mini research proposal and present findings to class. • Guide project work, peer review.	evaluation rubric, bridge simulator data etc.		research proposal.	Practical manual etc.

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: WATCHKEEPING I	**COURSE CODE: NSC 215**	**Contact Hours: 2 Hours/Week**
Year: II Semester: I	**Credit Units: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**

GOAL: This is course is designed to equip students with knowledge and skills for continuous safe navigation, maintain situational awareness, detect hazards early, enforce standards, and prevent collisions or groundings.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand the Principles of Safe Navigational Watchkeeping;

2.0 Understand Bridge Resource Management (BRM) Concepts;

3.0 Comprehend Situational Awareness, Decision-Making and Fatigue Management;

4.0 Understand Integrated Bridge Operations and Safe Watchkeeping Practice;

5.0 Understand transmitting and receiving of information by visual signalling.

COMPETENCES:

- Maintain a safe navigational watch

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: WATCHKEEPING I	**Course Code: NSC 215**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: II Semester: I	**Pre-requisite: -**	**Practical: 0**
COURSE SPECIFICATION: Theoretical		
General Objectives 1.0 Understand the Principles of Safe Navigational Watchkeeping		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Evaluation**
1-3	1.1 Explain the purpose and principles of safe navigational watchkeeping. 1.2 Explain the content, application, and intent of the International Regulations for Preventing Collisions at Sea (COLREGs), 1972, as amended. 1.3 Describe the principles to be observed in keeping a proper navigational watch. 1.4 Discuss the use of	• Introduction to Watchkeeping Principles: • Define the purpose: continuous safe navigation, collision avoidance, and early hazard detection. • Explain the relationship between watchkeeping, ship safety, and legal accountability, Rules, Standards, and Regulations:	STCW Code (Watchkeeping standards), COLREGs (Rules 5, 6, 7, 8, 19), Bridge Resource Management (BRM) manuals, Watchkeeping logs, checklists, and SMS extracts, Accident and near-miss reports etc.			

	ship routing systems in accordance with the General Provisions on Ships' Routing. 1.5 Explain the principles governing ship reporting systems. 1.6 Describe the procedures for ship reporting and Vessel Traffic Services (VTS) operations in accordance with international guidelines. 1.7 Describe the duties and responsibilities of the Officer of the Watch. 1.8 Identify factors affecting safe watchkeeping. 1.9 Discuss common errors in watch keeping and their effects.	• Teach STCW minimum watchkeeping standards, COLREGs (Rules 5, 6, 7, 8), and company SMS policies. • Emphasize master's responsibility and chain of command during watches. • Discuss fatigue, distraction, complacency, and authority gradient. • Introduce error patterns and human reliability in watchkeeping. • Explain use of logbooks, position fixes, alarms, and bridge resource management (BRM). • Highlight routine checks, lookout duties, and equipment				

		monitoring. • Analyze collisions, groundings, and near misses caused by watchkeeping failure. • Encourage discussion on what preventive actions could have been				
General Objective 2.0: Understand Bridge Resource Management (BRM) Concepts						
4-6	2.1 Explain the concept and objectives of BRM. 2.2 Identify human factors affecting bridge performance. 2.3 Explain the importance of teamwork on the bridge. 2.4 Apply effective communication principles in bridge operations. 2.5 Discuss authority and leadership on the bridge. 2.6 Explain the procedure for taking and handing over of watches.	• Define BRM: systematic use of all bridge resources people, procedures, and equipment to reduce errors. • Emphasize its role in preventing collisions, groundings, and navigational errors. • Discuss fatigue, authority gradient, overconfidence, tunnel vision, and communication barriers. • Introduce the concept of shared	STCW Code (management and operational level BRM competence), Bridge Resource Management (BRM) manuals and training guides, Human factors and maritime psychology texts, Accident reports illustrating bridge team errors, Whiteboard and encounter diagrams etc.			

		situational awareness and its importance in decision-making. • Explain OOW, lookout, helm, and master responsibilities in a BRM framework. • Discuss delegation, handover/takeover procedures, and chain of command. • Introduce structured decision-making tools: decision trees, checklists, and contingency planning. • Discuss risk assessment and hazard identification in real-time navigation • Analyze bridge team failures and successes from maritime accident reports.				

		• Discuss how BRM principles could have prevented incidents. • Explain the procedure for taking and handing over of watches.				
General Objective 3.0: Comprehend Situational Awareness (SA), Decision-Making and Fatigue Management						
7-9	3.1 Explain situational awareness and its elements. 3.2 Identify factors leading to loss of situational awareness. 3.3 Apply structured decision-making techniques. 3.4 Explain causes and effects of fatigue on watchkeeping. 3.5 Apply fatigue management strategies in watch schedules.	• Define SA as the continuous perception, comprehension, and projection of maritime environment and vessel status. • Discuss levels of SA and consequences of degraded awareness. • Explain structured decision-making: identify hazards, evaluate options, select actions, implement, and review outcomes. • Introduce the interplay of human judgment, risk	STCW Code (watchkeeping, human factors, and rest hours), Human factors in navigation textbooks, Case study reports of accidents influenced by fatigue or poor decision-making, Whiteboard or slides for SA diagrams and decision flowcharts etc.			

		assessment, and rule compliance. • Explain physiological and cognitive impacts of fatigue on SA and decision-making. • Teach STCW rest requirements, watchkeeping schedules, and company fatigue policies. • Discuss early recognition of fatigue signs in self and team members. • Discuss stress, workload, authority gradient, overconfidence, and complacency affecting decisions. • Show links between poor SA, delayed or incorrect decisions, and accidents. • Analyze collisions, groundings, or near misses caused by reduced situation				

		awareness (SA) or fatigue. • Encourage discussion on alternative decisions and fatigue mitigation.				
GENERAL OBJECTIVE 4.0: Understand Integrated Bridge Operations and Safe Watchkeeping Practice.						
10-12	4.1 Explain how to maintain a safe navigational watch in simulated conditions. 4.2 State the application of BRM principles during routine and emergency situations. 4.3 Discuss effective communication among bridge team members. 4.4 Integrate navigational information from multiple sources. 4.5 Describe operational watchkeeping duties onboard ships. 4.6 Explain the importance of timely documentation in watchkeeping.	• Explain the concept: coordinated use of all bridge systems (radar, ARPA, ECDIS, AIS, communication) for safe navigation. • Emphasize the role of bridge team members in integrating technology and decision-making. • Discuss continuous monitoring, lookout duties, position verification, and alarm management. • Simulate multi-vessel encounters, environmental challenges, and system failures. • Students must apply integrated bridge	STCW Code (watchkeeping and integrated bridge competence), COLREGs and company SMS guidelines, Human factors and Bridge Resource Management (BRM) manuals, Accident reports and case studies, Whiteboard or slides for integrated bridge diagrams and watchkeeping workflows etc.			

		resources to maintain situational awareness and prevent collisions. • Conduct watch handover/takeover drills emphasizing clarity, completeness, and responsibility. • Instructors monitor supervisory behavior and intervention when errors occur. • Explain the importance of timely documentation. Such as: Bridge logbook, Master's night order book, Master's standing order, GMDSS logbook, Radar logbook, etc. • Evaluate students' situational awareness, decision-making, communication, and adherence to safe watchkeeping practices. • Discuss lessons learned and				

		improvements for integrated operations.				
GENERAL OBJECTIVE 5.0: Understand transmitting and receiving of information by visual signalling.						
13-15	5.1 Define Visual Signaling. 5.2 Explain the principles and purposes of visual signaling in maritime communication. 5.3 Discuss the International Code of Signals (ICS) and its application in ship-to-ship and ship-to-shore communication. 5.4 Discuss uses of the International Code of Signals to transmit and interpret standard visual signals. 5.5 Explain transmission and reception by Morse light, the distress signal SOS in accordance with: i Annex IV of the *International Regulations for Preventing Collisions at Sea (COLREGs), 1972, as amended*, and	• Explain the concept, importance, and limitations of visual signaling using charts and illustrations. • Introduce and interpret the International Code of Signals, highlighting signal flags, single-letter meanings, and distress signals. • Demonstrate the use of visual signaling equipment such as signal flags, Aldis lamp, or signaling torch. • Conduct practical exercises where students practice transmitting and receiving Morse light signals, including the SOS distress signal.	Laptop computers, smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc			

	ii Appendix 1 of the *International Code of Signals*. 5.6 Discuss transmission and interpretation of single-letter visual signals as specified in the *International Code of Signals*.	• Organize drills for visual signaling of single-letter signals using flags and Morse light. • Guide students in decoding and encoding messages using the International Code of Signals. • Assess students through practical demonstrations, oral questioning, and scenario-based signaling exercises.				
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: COLLISION REGULATIONS (COLREGs) II	**COURSE CODE: NSC 216**	**Contact Hours: 3 Hours/Week**
Year: II Semester: I	**Credit Unit: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 1 Hour/Week**

GOAL: This course is designed to equip students with competences to apply International Regulations for Preventing Collisions at Sea (COLREGs) confidently in complex traffic situations, including restricted visibility and radar-assisted environments.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand the interpretation of COLREG;
2.0 Understand COLREG in Restricted Visibility;
3.0 Understand Radar-Assisted Collision Avoidance and COLREG Integration;
4.0 Comprehend Judgment, Decision-Making and Watchkeeping Application.

COMPETENCES:

- Maintain a safe navigational watch

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: COLLISION REGULATIONS (COLREGs) II	Course Code: NSC 216	Contact Hours: 3 Hours/Week
	Credit Unit: 3	Theoretical: 2 Hours/Week
Year: II Semester: I	Pre-requisite:	Practical: 1 Hour/Week
COURSE SPECIFICATION: Theoretical/ Practical		
General Objective 1.0: Understand the interpretation of COLREG		

THEORETICAL CONTENT				PRACTICAL CONTENT		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Describe COLREG rules in complex navigation scenarios. 1.2 Explain ambiguous situations using COLREG intent. 1.3 Demonstrate professional judgment consistent with safe watchkeeping.	• Discuss COLREGs as a decision system, not a rulebook. • Analyze rules in interacting with clusters, not isolation. For example: Rules 5, 6, 7, and 8 as a perception–assessment–action chain; Rules 15–17 as a negotiation system; Rules 18 and 19 as modifiers • Justify chosen actions using COLREG	COLREGs Convention (latest consolidated edition) with official diagrams NIMASA-approved syllabus and examination guidelines STCW Code (collision avoidance competence sections)	• Identify governing rules in complex situations. • Simulate complex traffic scenarios using radar plots, ARPA data, or table-top models.	• Set up complex traffic scenarios using simulators, radar plots, ARPA data, or table-top models. • Integrate bridge teamwork and communication into practicals. Students verbalize intentions and	Radar and ARPA simulators, Radar plotting equipment, COLREG scenario cards, Desktop navigation or collision-avoidance software that allows replay and debriefing etc.

					interpret others' actions, reinforcing that COLREGs are social rules as much as legal ones.	
General Objective 2.0: Understand COLREG in Restricted Visibility						
4-6	2.1 Explain COLREGs requirements in restricted visibility. 2.2 State Rule 19 in Radar-assisted navigation. 2.3 Interpret sound signals and Radar information correctly. 2.4 Discuss the risks associated with reduced visibility. 2.5 Demonstrate conservative and safe decision-making.	• Define restricted visibility precisely fog, mist, falling snow, heavy rain, sandstorms and stress that Rule 19 applies regardless of whether vessels are in sight of one another	COLREG Convention (latest edition) with official diagrams, NIMASA syllabus and examination guidance, STCW Code watchkeeping competence sections etc.	• Apply Rule 19 correctly in simulated scenarios. Analyse radar information to identify collision risks	• Set up restricted-visibility scenarios using simulators, radar plotting exercises, or table-top models where visual cues are removed or degraded. • Radar-based assessment of targets bearing stability, CPA, multiple contacts and require verbal articulation of	Radar and ARPA simulators, Radar plotting equipment, COLREG scenario cards, Desktop navigation or collision-avoidance software that allows replay and debriefing etc.

					risk assessment.	
General Objective 3.0: Understand Radar-Assisted Collision Avoidance and COLREG Integration						
7-10	3.1 Discuss radar and ARPA information with COLREG requirements. 3.2 Explain CPA (Closest Point of Approach) and TCPA (Time to Closest Point of Approach) for collision risk. 3.3 Determine appropriate avoiding actions using radar information. 3.4 Discuss COLREGs consistently with Radar observations. 3.5 Discuss Radar limitations and over-reliance risks	• Describe Radar as an aid, not an authority • Explain Radar principles relevant to collision avoidance range, bearing, relative motion, true motion, limitations, errors, and blind sectors always tying each concept to how it affects compliance with Rules 5, 6, 7, and 8. • Instill COLREG integration	International Regulations for Preventing Collisions at Sea (COLREGs), STCW Code (Radar and ARPA competence sections), NIMASA training syllabus and assessment guidelines etc.	• Plot radar targets accurately. • Perform correct collision avoidance manoeuvres.	• Radar plotting exercises (manual or ARPA-based) where students track targets, determine CPA/TCPA, and verbally declare whether a risk of collision exists. • Multiple-target scenario • Restricted visibility radar scenarios	Marine Radar or Radar simulator, ARPA simulation software or screenshots, Radar plotting sheets and manoeuverin g boards etc.
GENERAL OBJECTIVE 4.0: Comprehend Judgment, Decision-Making and Watchkeeping Application						
11-15	4.1 Demonstrate sound judgment in collision avoidance situations.	• Defining professional judgment in watchkeeping: the	STCW Code (Watchkeeping competence	• Handle complex collision scenarios	• Describe realistic watchkeepin	Bridge or radar simulators

	4.2 Explain taking early and substantial action in compliance with COLREGs. 4.3 Describe intentions clearly to other vessels and bridge team. 4. 4 Support the Officer of the Watch in maintaining safe navigation.	ability to assess incomplete information, prioritize risks, and act early in accordance with COLREGs • Explain watchkeeping environment, bridge team roles, lookout requirements, fatigue, workload, visibility, traffic density, and environmental factors	sections), COLREGs Convention (Rules 5–8, 19 emphasized), Watchkeeping Manual, Bridge Resource Management (BRM) training manuals, Accident and near-miss investigation reports, Whiteboard and encounter diagrams for live analysis etc.	effectively. • Demonstrate correct timing of avoiding actions.	g scenarios using simulators, Radar exercises, or table-top setups. • Verbalize situational awareness at intervals, traffic pictures, risks, and intentions. • Introduce ambiguity and stressors: multiple targets, poor visibility, equipment distractions, or time pressure.	(full mission or desktop), Radar plotting sheets and maneuvering boards, COLREG scenario cards for rapid decision drills, Sound signal audio recordings, Logbook templates for watchkeeping records, Replay and debrief tools (simulator playback or screenshots) etc.

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: SHIP CONSTRUCTION AND STABILITY I	**COURSE CODE: NSC 217**	**Contact Hours: 3 Hours/Week**
Year: II Semester: I	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 1 Hour/Week**

GOAL: This course is designed to enable the students acquire knowledge on ship construction, stability principles, stability calculations, and assess conditions on seaworthiness, in order to support safe ship operations and cargo work activities.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand ship construction and ship structure;

2.0 Understand Stability Fundamentals and Load Line;

3.0 Know Stability Calculation and applications;

4.0 Understand the effects of Loading and Unloading Cargo Operations on Ship Stability;

5.0 Understand seaworthiness Assessment and Operational Application.

COMPETENCES:

- Monitor loading, stowage, securing and unloading cargoes

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE: SHIP CONSTRUCTION AND STABILITY I	**Course Code: NSC 217**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: II Semester: I	**Pre-requisite: -**	**Practical: 1 Hour/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GENERAL OBJECTIVE 1.0: Understand ship construction and ship structure.		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Evaluation**
1-3	1.1 Explain the principal structural members of a ship, including the keel, frames, decks, bulkheads, and shell plating etc. 1.2 Explain the functions of each principal structural member in maintaining the ship's strength and integrity. 1.3 Discuss the use of proper names for the various parts of a ship, including bow, stern, midships, bulkhead, superstructure, and compartments.	• Present ship diagrams, models, or multimedia presentations highlighting principal structural members. • Explain the function of each member in supporting strength, stability, and safety. • Discuss how structural members affect ship stability, cargo safety, and emergency response (e.g., damage control). • Ask questions on the functions of structural members. • Organise short written tests on naming and	Laptop computers, smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Use a model ship to identify structural members. • Label parts on ship general arrangement drawings. • Identify structural members relevant to watertight integrity and stability.	• Guide the students to:use a model ship to identify structural members. • Identify structural members relevant to watertight integrity and stability. • Shipboard observation: On a training vessel, Ship models,	IMO Manuals, IMO Medical Guide, STCW Code Reference, Simulator and Training Equipment, Visual signaling diagrams and flag charts etc.

	1.4 Relate structural members to cargo stowage, machinery spaces, and living quarters.	describing ship parts.			Audio visuals or during a virtual tour, students locate and describe principal structural members.	
General Objectives 2.0: Understand Stability Fundamentals and Load Line						
4-6	2.1 Explain key concepts of buoyancy and intact stability. 2.2 Explain the purpose and importance of load line regulations. 2.3 Describe freeboard and reserve buoyancy. 2.4 Explain load line compliance to seaworthiness. 2.5 Describe the operational risks associated with overloading.	• Introduce buoyancy, centre of gravity, centre of buoyancy, and metacentric height using sketches, simple models, and everyday analogies (floating boxes, weights moved across a deck). • Draw a floating vessel, show shifts in G and B, construct the metacentric point, and explain initial stability versus range of stability. • Discuss the assignment of load line. • Guide students	Laptop computers, smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Identify load line markings correctly. • Perform activities to relate loading condition to freeboard. • Carry out basic intact stability calculations using practical data	• Lead step-by-step practical calculations linked to what students just observed	Practical manuals, simulators, Ship model etc.

		through basic GM calculations, moments of the keel, free surface correction, and simple trim effects.				
General Objective 3.0: Know Stability Calculation and applications						
7-8	3.1 Explain Metacentric height (GM) and its significance to ship stability. 3.2 Explain basic intact stability calculations. 3.3 Outline stability data and results. 3.4 Recognise stability conditions under different loading scenarios. 3.5 Discuss the interpretation of the GZ curve.	• Derive stability formulas from physical principles • Work calculations on the board, step by step, with units written at every stage. • Integrate calculations with operational interpretation • Discuss the interpretation of the GZ curve.	Laptop computers, smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Extract correct stability data from ship particulars and hydrostatic tables and state displacement, KB, BM, and KM for a given draught. • Calculate KG and GM for a given loading condition using weights, moments, and displacement.	Setting up realistic loading scenarios using ship models, stability software, or prepared data sheets.	
General Objective 4.0: Understand the effects of Loading and Unloading Cargo Operations on Ship Stability						
9-11	4.1 Explain the effects of cargo weight and distribution on stability. 4.2 Describe the impact of free surface effect. 4.3 Assess stability risks during cargo	• Classify loading and unloading operational factors that influence stability of cargo distribution. • Explain cause-and-effect relationships	Laptop computers, smart board, Projector, Writing Materials, White board,	• Calculate the effect of cargo loading, unloading and stowage on ship stability and explaining the resulting change	• Create controlled loading and unloading operational scenarios using ship models,	Ship construction drawings, Load line diagrams and stability curves, Physical ship

	operations. 4.4 Discuss the application of stability principles to support cargo handling decisions. 4.5 Identify stability-related accidents	using sketches and stability diagrams. • Link operational factors to regulatory limits and seamanship practice	Markers, Multi-media resources etc	in heel, trim, and GM. • Identify unsafe stability conditions arising from loading unloading and stowage operations and propose appropriate corrective actions, supported by recalculation and observation.	stability software, or prepared data sets. • Demonstrate operational risk factors such as free surface effect, cargo shift, wind heeling moments. • Adopt decision-making exercises.	models and tank models, Refer students to stability and ship construction textbook etc.
GENERAL OBJECTIVE 5.0: Understand seaworthiness Assessment and Operational Application						
12-15	5.1 Explain overall seaworthiness using stability information. 5.2 Discuss stability considerations during voyage planning. 5.3 Recognize unsafe stability conditions and take preventive actions. 5.4 Discuss seaworthiness deficiencies relating to loading and unloading condition, stability status, freeboard, watertight integrity,	• Explain the concept and scope of seaworthiness. • Explain assessment criteria using regulations and standards. • Link seaworthiness to professional responsibility and liability. • Explain readiness for further stability and cargo courses.	Laptop computers, smart board, Projector, Writing Materials, White board, Markers, Multi-media resources etc	• Conduct seaworthiness assessment of a vessel using provided data, documents, or simulation, following a logical and systematic procedure. • Identify seaworthiness deficiencies relating to loading and	• Set up seaworthiness assessment scenarios. These may include loading conditions near limits, minor structural defects, slack tanks, equipment unavailability, or weather	Stability reports, Operational checklists, Simulators, Practical manuals, Students' logbook, etc.

	and operational readiness,			unloading condition, stability status, freeboard, watertight integrity, and operational readiness, and explain why each deficiency affects safety.	deterioration. • Guide students through systematic inspection and data review.	
Course Assessment: Course work: 10% Test/Assignments: 10% Practical: 40% Examination: 40% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: CARGO OPERATIONS I	**COURSE CODE: NSC 218**	**Contact Hours: 2 Hours/Week**
Year: II Semester: I	**Credit Unit: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**
GOAL: This course is designed to equip students with knowledge and skills for safe, efficient, and compliant handling of cargo while loading, on stowage and unloading to maintain ship stability, structural integrity, and regulatory compliance.		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Understand cargo types and characteristics; 2.0 Understand stowage principles and planning; 3.0 Understand Cargo Securing and Cargo Care; 4.0 Understand Safe Cargo Operations and Operational Responsibilities.		
COMPETENCES: • Monitor loading, stowage, securing and unloading of cargoes		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: CARGO OPERATIONS I	**Course Code: NSC 218**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: II Semester: I	**Pre-requisite: -**	**Practical: 0**
COURSE SPECIFICATION: Theoretical		
General Objectives 1.0: Understand cargo types and characteristics		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Evaluation**
1-3	1.1 Explain the scope and importance of cargo operations. 1.2 State major categories of shipborne cargo. 1.3 Describe basic characteristics of common cargo types. 1.4 Relate cargo characteristics to handling and stowage requirements. 1.5 State hazards associated with different cargoes.	• Introduce students to categories of cargo: dry bulk, liquid bulk, containers, break bulk, project cargo, and hazardous cargo (IMDG-coded). • Discuss subtypes within categories (e.g., coal, grain, cement for dry bulk; crude oil, chemicals for liquid bulk) and why classification matters. • Explain cargo characteristics: • Explain behaviour during transport:	Textbooks and reference material, Laptop, Visual aids, Diagrams of cargo types and stowage arrangements, Photographs or videos of cargo operations and incidents etc.			

		shifting, settling, liquefaction potential, temperature sensitivity				
General Objective 2.0: Understand stowage principles and planning						
4-6	2.1 Explain principles of safe and efficient cargo stowage. 2.2 Describe factors influencing stowage decisions. 2.3 Explain the relationship between cargo stowage and ship stability. 2.4 Summarize simple cargo stowage plans. 2.5 Explain consequences of improper stowage.	• Explain the purpose of stowage: safety, stability, efficiency, and cargo integrity. • Explain Stowage Principles: Weight distribution: avoid excessive trim or list. • Cargo compatibility: segregation of incompatible or hazardous cargo. • Accessibility: allow for safe loading/unloading and emergency access. • Securing cargo: lashings, dunnage, and containers' locking devices. • Preventing damage: account for cargo type, moisture	Cargo handling and stowage textbooks (e.g., *Ship Operations for the Mariner*, *Cargo Work for Maritime Students*), IMO model courses and STCW references, Visual aids: Diagrams of holds, container stacks, and bulk cargo arrangements, Charts showing weight distribution, stability curves, and GM impact etc.			

		sensitivity, and shifting potential.				
General Objective 3.0: Understand Cargo Securing and Cargo Care						
7-10	3.1 Explain the purpose of cargo securing. 3.2. Identify common cargo securing methods and equipment. 3.3 Explain the applications of basic cargo securing principles. 3.4 Explain cargo care requirements during a voyage. 3.5 List the risks from inadequate securing and poor cargo care.	• Demonstrate before/after images of improperly vs. properly secured cargo • Outline regulatory framework (CSS Code, SOLAS Chapter VI) • Present real cargo damage case studies with financial losses to establish relevance • Cover cargo care requirements by type (ventilation, temperature, humidity monitoring) • Discuss the use of relevant cargo securing Codes and Manuals in ensuring the safe cargo operation.	Sample lashing equipment (chains, shackles, tensioners, lashing bars), Cargo securing manual examples from different vessel types, Videos of cargo shift incidents and proper securing procedures, Lashing arrangement diagrams and stowage plans, etc.			
GENERAL OBJECTIVE 4.0: Understand Safe Cargo Operations and Operational Responsibilities						
11-15	4.1 Discuss safe loading and unloading operations. 4.2 Explain handling of different kinds of Cargo and their safety	• Present major cargo operation accidents (Herald of Free Enterprise, MOL Comfort, MSC Napoli, Xpress Pearl, Hanjin	ISM Code (Chapter 5 on Master's Responsibility & Resources), SOLAS Chapter			

	implications (Grain, bulk liquid, heavy lift, container, etc.) 4.3 Identify hazards during cargo operations. 4.4 Explain the importance of safety procedures during cargo handling. 4.5 Discuss effective communicate during cargo operations.	Colombo, etc) highlighting human error and responsibility failures • Discuss financial, legal, and human costs of unsafe cargo operations • Demonstrate readiness for advanced cargo and stability courses. • Map the hierarchy of responsibility from Master to cargo officer to crew	VI (Carriage of Cargoes) extracts, ILO/IMO Code of Practice for Cargo Handling in Ports, Sample company Safety Management System (SMS) cargo procedures, ISGOTT guidelines (if covering tanker operations) etc.			
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: MARITIME ENGLISH AND COMMUNICATION II	**COURSE CODE: NSC 219**	**Contact Hours: 2 Hours/Week**
Year: II Semester: I	**Credit Unit: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**

GOAL: This course is to equip students with competence in Maritime English to enhance communication clearly, accurately, and confidently in routine shipboard, port, and safety-related operations, using Standard Maritime Communication Phrases (SMCPs) to support safe and efficient ship operations.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand Standard Maritime Communication Phrases
2.0 Understand the International Code of Signals, and effective bridge, ship-to-ship, and ship-to-shore communication.
3.0 Understand safe and effective communication on board ships
4.0 Know communication skills for routine, operational, and emergency situations

COMPETENCES:

- Use English in written and oral form to support safe and efficient ship operations.

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: : MARITIME ENGLISH AND COMMUNICATION II	**Course Code: NSC 219**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: II Semester: I	**Pre-requisite: -**	**Practical: 0**
COURSE SPECIFICATION: Theoretical		
GOAL: This course is to equip students with competence in Maritime English to enhance communication clearly, accurately, and confidently in routine shipboard, port, and safety-related operations, using Standard Maritime Communication Phrases (SMCPs) to support safe and efficient ship operations.		
General Objective 1.0: Understand Standard Maritime Communication Phrases.		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain how to ccommunicate fluently and accurately in complex operational and emergency situations, ensuring clarity under time pressure and stress. 1.2 Explain the Standard Maritime Communication Phrases (SMCP) precisely and consistently in internal and external communications,	• Facilitate scenario-based simulations (bridge operations, emergencies, port communication) that require students to use advanced maritime language and SMCP accurately. • Model corrects professional maritime communication, including commands, reports,	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc			

	including ship-to-ship and ship-to-shore exchanges. 1.3 Explain the participation in briefings, meetings, and drills using clear, structured, and professional maritime language. 1.4 Explain the clear commands and instructions and confirm understanding when managing bridge, engine room, or deck operations. 1.5 Communicate effectively with multicultural crews and external authorities by adapting language, tone, and clarity to different communication contexts. 1.6 Demonstrate advanced listening and interpretation skills to accurately understand fast, accented, or non-standard maritime English in real	and briefings, for students to observe and practice. • Guide role-plays and structured discussions involving ship-to-ship, ship-to-shore, and onboard management communication. • Conduct listening exercises using authentic maritime audio (VHF conversations, safety announcements, incident reports) to develop advanced comprehension skills. • Supervise student-led briefings, drills, and presentations, providing corrective feedback on clarity, accuracy, and use of terminology. • Assign and review written maritime communication				

	operational environments.	tasks such as incident reports, log entries, and safety notices. • Assess student performance through practical evaluations, including simulations and oral examinations, and give targeted feedback for improvement.				
General Objective 2.0: Understand the International Code of Signals, and effective bridge, ship-to-ship, and ship-to-shore communication.						
4-7	2.1 Identify the International Code of Signals (ICS), flags, lights, and sound signals for routine and emergency situations 2.2 Discuss the use of ICS messages for conveying navigational intentions, safety information, and operational commands	• Introduce the International Code of Signals, including flags, lights, sound signals, and their meanings using visual aids and charts. • Demonstrate correct use of ICS in routine and emergency scenarios through live examples or multimedia simulations. • Conduct practical	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc			

	2.3 Explain the application of ICS knowledge in bridge communication to coordinate maneuvers and navigation with the crew 2.4 Discuss how to communicate effectively ship-to-ship using ICS and radio procedures, ensuring clarity and proper acknowledgment. 2.5 Explain how to communicate effectively ship-to-shore using ICS, VHF radio, and standard maritime phrases for reporting, requests, and safety notifications. 2.6 Explain how to respond appropriately to ICS signals during emergency situations, such as	exercises and role-plays for bridge communication, ship-to-ship, and ship-to-shore interactions using ICS and radio protocols. • Guide learners in interpreting ICS signals during simulated navigation, distress, and operational situations. • Supervise communication drills using VHF radios or simulated bridge setups, ensuring proper message formulation, acknowledgment, and confirmation. • Provide feedback on accuracy, clarity, and professionalism in the use of ICS and maritime communication • Assess learners through practical tests, scenario-based exercises, and oral				

	Man Overboard, collision risk, or distress alerts. 2.7 Demonstrate accurate interpretation and confirmation of messages to prevent misunderstanding and enhance operational safety	questioning to evaluate their competence in applying ICS and effective communication.				
General Objective 3.0: Understand safe and effective communication on board ships						
8-11	3.1 Discuss the importance of clear and accurate oral communication with crew members during routine shipboard operations. 3.2 Use appropriate maritime terminology and Standard Marine Communication Phrases (SMCP) in operational and safety-related contexts. 3.3 Explain how to communicate effectively during	• Demonstrate correct use of maritime terminology and SMCP during routine and emergency shipboard scenarios. • Conduct role-plays and simulations of shipboard operations, drills, and emergency situations to practice clear and safe communication. • Guide students in practicing message confirmation, clarification, and acknowledgment to prevent misunderstandings.	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc			

	distress or other emergencies, such as fire, Man Overboard, or abandon ship, following established protocols. 3.4 Discuss how to confirm, clarify, and acknowledge messages to prevent misunderstandings and ensure operational safety. 3.5 Apply communication skills in teamwork and coordination, promoting cooperation among multicultural crews and between shipboard departments.	• Supervise teamwork and coordination exercises among learners to develop effective communication in multicultural shipboard environments. • Provide feedback on oral and written communication, highlighting clarity, accuracy, professionalism, and safety compliance.				
GENERAL OBJECTIVE 4.0: Know communication skills for routine, operational, and emergency situations						
12-15	4.1 Explain effective oral communication during routine shipboard operations,	• Demonstrate correct use of SMCP and maritime terminology in routine operations, watchkeeping, and emergency scenarios.	Laptop Computers, Smart Board, Projector, Writing			

	including instructions, watchkeeping, and coordination with crew members. 4.2 Discuss application of Standard Maritime Communication Phrases (SMCPs) and maritime terminologies accurately in operational contexts. 4.3 Discuss how to communicate clearly and promptly in distress or other emergency situations, such as fire, man Overboard, or collision, following safety protocols. 4.4 Interpret correctly incoming messages from shipboard personnel, other ships, or shore	• Conduct role-plays and simulations of routine, operational, and emergency situations to practice clear and effective communication. • Supervise practical exercises and drills, providing guidance on how to convey instructions and respond appropriately under pressure. • Provide feedback on learners' communication performance, emphasizing clarity, accuracy, and adherence to safety protocols. • Facilitate message confirmation, clarification, and acknowledgment exercises to ensure learners understand the importance of preventing misunderstandings.	Materials, White Board, Markers, Multi-Media Resources etc			

	authorities.					

Course Assessment:
Course work: 20%
Test/Assignments: 20%
Examination: 60%
Total: 100%

YEAR II SEMESTER II

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: CELESTIAL NAVIGATION II	**COURSE CODE: NSC 221**	**Contact Hours: 4 Hours/Week**
Year: II Semester: II	**Credit Units: 4**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 2 Hours/Week**

GOALS: This course is to equip students with operational competence in celestial navigation, including taking and reducing celestial sights, determining latitude and longitude, calculating Azimuth, compass errors, and integrating celestial navigation into passage planning and watchkeeping, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

On completion of this course the student should be able:
1.0 Understand celestial sight taking in observation techniques;
2.0 Know the application of sight reduction and position fixing;
3.0 Determine compass error by celestial methods;
4.0 Understand the Integration of celestial navigation into passage planning.

COMPETENCES:

- Determine position of the ship

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: CELESTIAL NAVIGATION II	**Course Code: NSC 221**	**Contact Hours: 4 Hours/Week**
	Credit Unit: 4	**Theoretical: 2 Hours/Week**
Year: II Semester: II	**Pre-requisite:**	**Practical: 2 Hours/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOALS: This course is to equip students with operational competence in celestial navigation, including taking and reducing celestial sights, determining latitude and longitude, calculating Azimuth, compass errors, and integrating celestial navigation into passage planning and watchkeeping, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
General Objective 1.0: Understand celestial sight taking and observation techniques.		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain procedures for taking accurate celestial sights. 1.2 Discuss common errors in celestial observation. 1.3 Explain the application of corrections to sextant observations. 1.4 Explain recording of celestial observation data correctly. 1.5 Explain operational constraints during observations.	• Take students through related lectures • Explain procedures for accurate sight taking • Take students through the theory of altitude corrections	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc	• Carryout altitude correction using real data. • Record celestial observation data. • Analyse celestial historical observation data.	• Use an example to demonstrate altitude correction to students	Marine Sextants, Nautical Almanac etc.
General Objective 2.0: Know the application of sight reduction in position fixing						

4-7	2.1 Discuss the essence of sight reduction in position fixing. 2.2 Determine latitude and longitude from celestial observations. 2.3 Explain the plotting of celestial position lines accurately. 2.4 Assess the accuracy of celestial fixes. 2.5 Demonstrate the ability to carry out calculation procedures.	• Perform one or two examples of altitude correction • Give class work to students on altitude correction • Supervise and guide students in class work activity.	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.	• Perform altitude corrections. • Find ship's latitude and longitude.	• Demonstrate altitude correction using worked examples • Worked examples find the latitude and longitude of the ship using various methods of celestial navigation. • Use any acceptable means to check the accuracy of the worked example. • Supervised calculation and plotting exercises	Nautical almanac, Nories' Tables, Polaris Tables etc.
General Objective 3.0: Determine compass error by celestial methods						
9-12	3.1 Define Azimuth, True Azimuth at rising and setting, compass error, Variation and	• Explain Azimuth, true azimuth at rising and	Laptop Computers, Smart Board, Projector,	• Compute Azimuth and true Azimuth of selected celestial bodies.	• Supervise and guide students during the class work.	Fuel system diagrams, Safety manuals,

	Deviation. 3.2 Explain the importance of Azimuth at rising and setting celestial bodies. 3.3 Discuss the uses of Azimuth tables and diagrams correctly. 3.4 Determine compass error using celestial Azimuth and / or true Azimuth at rising and setting. 3.5 Explain the principles of magnetic and gyro-compasses 3.6 Apply Azimuth calculations in determining errors of the magnetic and gyro compass 3.7 State importance of compass accuracy.	setting, compass error, variation and deviation. • Give classwork to students on computation of azimuth and compass errors.	Writing Materials, White Board, Markers, Multi-Media Resources etc.	• Given the variation and deviation of the ship, calculate the compass error from the computed Azimuths.		Azimuth tables, Calculation sheets etc.
GENERAL OBJECTIVE 4.0: Understand the integration of celestial navigation into passage planning						
13-15	4.1 Discuss how to Integrate celestial fixes into operational navigation planning. 4.2 Distinguish between celestial positions with electronic navigation fixes.	• Give classwork to students • Give assignments to students on • Supervise and guide students' activities in the	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-	• Demonstrate how to plot ship's position on graph sheets • Demonstrate how to plot ship's position on charts. • Demonstrate the	• Carry out demonstrations and guide students' activities.	Instructional or navigational Charts, Nautical Almanac, Norie's Tables,

	4.3 Explain the uses of celestial navigation as the main position fixing method. 4.4 Explain the use of electronics navigational aids as a backup to celestial navigation 4.5 Support safe watchkeeping using data derived from celestial navigation.	class.	Media Resources etc.	use of celestial navigation as a main position fixing method.		Graph sheets Protractor, sets square, pencils and eraser etc.

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: MARINE METEOROLOGY II	**COURSE CODE: NSC 222**	**Contact Hours: 3 Hours/Week**
Year: II Semester: II	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite: NSC 126	**Practical: 1 Hour/Week**

GOAL: This course is designed to equip students with knowledge and skills to interpret and apply marine meteorological information, including synoptic charts, weather forecasts, and routing considerations, to support voyage planning, watchkeeping, and safe navigational decision-making, in all weather conditions, in accordance with STCW Code, Section A-II/1,Table A-II/1.

GENERAL OBJECTIVES: At the end of this course, the students should be able to**:**

1.0 Understand the content of Weather charts;
2.0 Know Marine Weather Forecasting and Voyage Planning;
3.0 Understand Heavy Weather Avoidance and Navigational Decision-Making;
4.0 Know Weather Monitoring during Watchkeeping.

COMPETENCES:

- Plan and conduct a passage

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: MARINE METEOROLOGY II	**Course Code: NSC 222**	**Contact Hours: 3 Hours/Week**
	Credit Unit: 3	**Theoretical: 2 Hours/Week**
Year: II Semester: II	**Pre-requisite: NSC 126**	**Practical: 1 Hour/Week**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to equip students with knowledge and skills to interpret and apply marine meteorological information, including synoptic charts, weather forecasts, and routing considerations, to support voyage planning, watchkeeping, and safe navigational decision-making, in all weather conditions, in accordance with STCW Code, Section A-II/1,Table A-II/1.		
General Objective 1.0: Understand the content of Weather charts		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain weather charts. 1.2 Identify types of weather chart. 1.3 Explain the purpose of synoptic charts in marine meteorology. 1.4 Identify symbols and conventions used on synoptic charts. 1.5 Discuss the interpretation of pressure systems and frontal boundaries. 1.6 Relate synoptic patterns to expected marine	• Explain the use of weather symbols, isobars, wind barbs, pressure values, front symbols on weather charts. • Explain High (H) and Low (L) pressure centres and expected marine weather.	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.	• Interpret synoptic charts correctly. • Identify potential weather hazards from charts.	• Supervised chart analysis	Synoptic charts, Meteorological symbols guide etc.

	weather. 1.7 Discuss meteorology chart update and forecast limitations.					
General Objective 2.0: Know Marine Weather Forecasting and Voyage Planning						
4-8	2.1 Explain sources of marine weather forecasts. 2.2 Interpret forecast data for navigational use. 2.3 Assess forecast reliability and uncertainty. 2.4 Explain the application of weather information to voyage planning. 2.5 Explain the procedure to communicate weather information. 2.6 Explain weather-related route adjustments.	• Explain the source of marine weather forecast: Met agencies; Ship and buoys observation (voluntary observing ships; automatic weather buoys; Coastal radios; NAVTEX etc. • Use synoptic code symbols to communicate weather information. • Explain weather routing and weather-related data used in route adjustment.	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.	• Carryout forecasts for voyage safety. • Carryout route adjustments based on weather data.	• Scenario-based planning exercises	Forecast bulletins, Route planning examples, etc.
General Objective 3.0: Understand Heavy Weather Avoidance and Navigational Decision-Making						

9-12	3.1 State characteristics of heavy weather systems. 3.2 Explain principles of heavy weather avoidance. 3.3 Explain the application of meteorological information to reduce weather risks. 3.4 Discuss ship handling decisions in adverse weather. 3.5 Identify weather-related maritime accidents.	• Explain the formation of Tropical Revolving Storm (TRS). • Explain Buy-Ballot law, Semi navigable quadrant; Dangerous quadrant. • State the seasons and areas prone to TRS. • Explain the formation Depressions and state the areas associated with Tropical and Temperate Depressions. • State the procedure to communicate severe weather in line with SOLAS Regulations	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.	• Identify heavy weather threats from forecasts. • Propose safe navigational responses Scenario-based discussions	Scenario-based discussions	Heavy weather case examples, Meteorological dat, Full Mission Bridge Simulator etc.
General Objective 4.0: Know Weather Monitoring During Watchkeeping						
13-15	4.1 Explain weather monitoring conditions during watchkeeping. 4.2 Explain navigation updating decisions based on changing	• Divide the students into groups for weather observations and recording. • Explain the importance of Meteorological	Laptop Computers, Smart Board, Projector, Writing Materials, White Board,	• Interpret real-time weather data. • Support navigational decisions during simulated watches.	• Scenario-based watchkeeping exercises • Use simulation to update	Logbooks, Weather monitoring tools, Bridge resources etc.

	weather. 4.3 Discuss effectively the communication of weather information to the bridge team. 4.4 Discuss the integration of meteorological data with Radar and visual observations.	logbook. • Watchkeeping scenarios. • Demonstrate readiness for ocean navigation and management-level meteorology.	Markers, Multi-Media Resources etc.		navigation decisions based on weather changes. • Integrate radar and visual observations in decision making	

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: SHIP CONSTRUCTION AND STABILITY II	**COURSE CODE: NSC 223**	**Contact Hours: 2 Hours/Week**
Year: II Semester: II	**Credit Units: 3**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 1 Hour/Week**

GOALS: This course is designed to enhance the students' knowledge and understanding of Ship Stability and Structure at the Operational Level. It meets requirements of STCW Code, Section A II/1, Table A-II/1.

GENERAL OBJECTIVES: At the end of this course, the student should be able to:

1.0 Know the principal structural members of a ship and the proper names for the various parts;
2.0 Understand the ship's hull structure;
3.0 Understand hull fittings including bow and stern construction;
4.0 Understand the ship's rudder, propeller and steering gear systems;
5.0 Understand the fundamentals of watertight and weathertight integrity;
6.0 Understand the principles of ship stability;
7.0 Understand stability conditions such as effect of movement of weights; angle of loll; effects of free surface and trim;
8.0 Understand the application of stability, trim and stress tables, diagrams and stress with reference to calculating equipment in ship stability;

COMPETENCES:

- Monitor loading, stowage, securing and unloading cargoes

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE						
Course Title: SHIP CONSTRUCTION AND STABILITY II			**Course Code: NSC 218**		**Contact Hours: 2 Hours/Week**	
			Credit Unit: 2		**Theoretical: 2 Hours/Week**	
Year: II Semester: II			**Pre-requisite: -**		**Practical: 1 Hour/Week**	
COURSE SPECIFICATION: Theoretical and Practical						
GENERALOBJECTIVE 1.0: Know the principal structural members of a ship and the proper names for the various parts.						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-2	1.1 Define the following ship structural members: Keel, Frame, Deck beam, Longitudinal, Bulkhead, Deck plating; Floors; Girders, Stem; Brackets; Hatch coaming; Pillar. 1.2 Explain the following ship dimensions: Aft perpendicular, forward perpendicular, Length between perpendiculars, Length overall, Length on waterline, Moulded breadth, etc. 1.3 Explain the following ship forms: Camber, sheer, tumble home, flare, rise of floor, etc.	• Identify ships dimensions and forms with the use of sketch or diagram.	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Calculator etc.			
General Objective 2.0: Understand the ship's hull structure.						

3-4	2.1 Explain structural components on ship's plans and drawings, e.g. Frames, floors, transverse frames, deck beams, knees, brackets, Shell plating, decks, tank top, stringers, Bulkheads and stiffeners, pillars, Hatch girders and beams, coamings, bulwarks, Bow and stern framing, cant beams, bulbous bow. 2.2 Describe the longitudinal, transverse and combined systems of framing on transverse sections of a ships. 2.3 Illustrate double-bottom structure for longitudinal and transverse framing 2.4 Explain compensation for loss of strength at hatch openings.	• Identify structural components on ship's plans and drawings, e.g. Frames, floors, transverse frames, deck beams, knees, brackets, Shell plating, decks, tank top, stringers. • Bulkheads and stiffeners, pillars, Hatch girders and beams, coamings, bulwarks, Bow and stern framing, cant beams,. • Sketch the arrangement of frames, webs and transverse members for each system	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Calculator etc.	• Compute GM for simple loading conditions. • Interpret stability outcomes correctly.	• Supervised stability exercises	Stability data sheets, Calculation templates, etc.
GENERAL OBJECTIVE 3.0: Understand hull fittings including bow and stern construction						

5-6	3.1 Describe an arrangement of modem weather-deck mechanical steel hatches. 3.2 Describe how watertightness is achieved at the coamings and cross joints. 3.3 Describe the clearing arrangements for the hatch covers. 3.4 Describe roller, multi-angle, pedestal and Panama fairlead. 3.5 Distinguish between the stern tube and stern frame. 3.6 Describe the function of the stern frame. 3.7 Describe the arrangement of fittings, and lashings for the carriage of containers on deck.	• Sketch an arrangement of modem weather-deck mechanical steel hatches for the students to see. • Sketch mooring bitts, showing their attachment to the deck	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Calculator etc.	• Identify stability risks from loading plans. •	Scenario-based exercises	Cargo loading diagrams, Accident case examples etc.
General Objective 4.0: Understand the ship's rudder, propeller and steering gear systems						
7-8	4.1 Describe the action of the rudder in steering a ship 4.2 Explain the purpose of the rudder carrier and pintle 4.3 Explain how the weight of the rudder is supported by the rudder carrier 4.4 Describe the rudder trunk.	• Produce drawings of modem rudders: semi-balanced, balanced and spade • Sketch the arrangement of an oil-lubricated stern tube and tailshaft	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media			

	4.5 Describe a propeller. 4.6 Explains the principle of screw propulsion 4.7 Define parts of a propeller, e.g. Boss i) Rake ii) Skew iii) Face iv) Back v) Tip vi) Radius vii) Pitch 4.8 Compare fixed-pitch with controllable-pitch propellers 4.9 Describe how the propeller is attached to the tailshaft 4.10 Describe the main components of a ship's steering gear system, 4.11 Describe the operating principle of a common steering gear type 4.12 Explain how steering commands are transmitted from the bridge to the rudder 4.13 Describe emergency steering arrangement and their use. 4.14 State basic maintenance and safety requirement		Resources Calculator etc.			

	for the steering gear systems.					
General Objective 5.0: Understand the fundamentals of watertight integrity.						
9	5.1 Define watertight integrity. 5.2 Explain its importance to ship safety. 5.3 Describe the main structural members that ensure watertight integrity. 5.4 Describe the functions and operations of watertight door and hatches. 5.5 Explain how damage and flooding affect a ship's watertight integrity and buoyancy. 5.6 Describe procedures for maintaining and testing watertight integrity. 5.7 State safety regulations and operational practices related to watertight integrity.	• Identify the main structural members that ensure watertight integrity	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Calculator etc.			
General Objective 6.0: Understand the principles of ship stability						

10-11	6.1 Define 'light displacement' and 'load displacement'. 6.2 Define 'deadweight'. 6.3 Use a deadweight scale to find the deadweight and displacement of a ship at various draughts in seawater. 6.4 State that, for a ship to float, it must displace a mass of water equal to its own weight. 6.5 Explain how, when the mass of a ship changes, the mass of water displaced changes by an equal amount. 6.6 Define 'tonnes per centimeter immersion' (TPC); Freshwater Allowance and Dockwater Allowance. 6.7 Explain what is meant by 'buoyancy'. 6.8 State that the force of buoyancy is an upward force on a floating object created by the pressure of liquid on the object. 6.9 State that the buoyancy force is equal to the	• Perform hydrostatic data calculations, including Fresh Water Allowance (FWA), Dock Water Allowance (DWA).	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Calculator etc.			

	displacement of a floating object. 6.10 Describe reserve buoyancy. 6.11 Explain the importance of reserve buoyancy. 6.12 Explain how freeboard is related to reserve buoyancy.					
General Objective 7.0: Understand stability conditions such as effect of movement of weights; angle of loll; effects of free surface, List and Trim						
12-13	7.1 Define centre of gravity. 7.2 Discuss the movement of the ship's centre of gravity when a weight is added, discharged or shifted. 7.3 Explain given minimum GM expected during a voyage calculate the weight of cargo to load in a given space and height above the keel. 7.4 Differentiate between List and Heel. 7.5 State that the listing moment is given by	• Show on a diagram that cause a ship to list when the centre of gravity of the ship as move to one side (Port or Starboard). • Calculate the movement of the ship's centre of grav (GG_1) from: vGG_1 = Mass added or removed x distance of mass from the centre of gravity New displacement of the ship • Calculate the metacentric height (GM) of a ship after loading, discharging or transferring weight onboard.				

	displacement x transverse distance of G from the centerline. 7.6 State that in a listed condition the range of stability is reduced. 7.7 Discuss given the displacement, KM and KG of a ship, calculate the angle of list resulting from loading or discharging a given mass at a stated position, or from moving a mass through a given transverse distance 7.8 Calculates the displacement, GM and the angle of list of a ship, the mass to load or discharge at a given position to bring the ship upright. 7.9 Calculate the displacement, GM and angle of list of a ship, the mass to move through a	• Show on a diagram that the angle of list (θ) is given by $\text{Tan}\theta = \frac{GG_1}{GM}$ where GG_1 is the transverse shift of G from the centerline • Explain by means of diagrams how the centre of gravity of the liquid in a party filled tank moves during rolling the centerline, how the list may be removed. • Shows on a sketch the development of angle of loll • Perform calculations involving the free surface effect of tanks. • Describe hull fittings including bow and stern construction • Perform trim calculations to find weight to load to keep aft draft constant • Perform trim calculations to				

	given transverse distance to bring the ship upright. 7.10 State that if a tank is full of liquid, its effect on the position of the ship's centre of gravity is the same as if the liquid were a solid of the same mass. 7.11 State that when the surface of a liquid is free to move, there is a virtual increase in KG, resulting in a corresponding decrease in GM. 7.12 State that the increase in KG is affected mainly by the breadth of the free surface and is not dependent upon the mass of liquid in the tank. 7.13 Explain the meaning of angle of Loll. 7.14 Describe how to correct an angle of loll. 7.15 Explain fundamental actions to be taken in	achieve a given draft aft				

	the event of partial loss of intact buoyancy. 7.16 Define: i. Trim ii. Longitudinal centre of flotation (LCF) iii. Longitudinal centre of buoyancy (LCB) iv. MCTC 7.17 Explain how the trim of a ship changes by moving masses already on board forward or aft, or by adding or removing masses at a position forward of or abaft the centre of flotation. 7.18 Derive the formula for calculating change of trim (COT). 7.19 Given initial draughts and the position of the centre of flotation, extend the calculation in above objective 7.18 to find the new					

	draughts after loading, shifting or discharging cargo.					
GENERAL OBJECTIVE 8.0: Understand the application of stability, trim and stress tables, diagrams and stress with reference to calculating equipment in ship stability						
14-15	8.1 Explain the principles of ship stability, trim, and stress and their importance for safe navigation and cargo operations. 8.2 Describe the purpose and structure of stability, trim, and stress tables/diagrams used in shipboard calculations. 8.3 Identify the types of stress calculating equipment (loading computers, hull stress monitoring systems, strain gauges) and	• Explain the types of stress calculating equipment (loading computers, hull stress monitoring systems, strain gauges) and their role in modern ship operations. • Use stress tables and diagrams to calculate shear forces and bending moments for given cargo distributions. • Demonstrate how to input cargo, ballast, and fuel data into	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources Calculator etc.			

	their role in modern ship operations. 8.4 Explain the application of stability and trim tables to determine draft, trim, and metacentric height (GM) under different loading conditions. 8.5 Discuss the interpretation of hydrostatic and stress diagrams to assess the ship's condition during loading, discharging, and at sea. 8.6 Analyze the impact of improper cargo distribution on hull stresses and overall stability.	loading computers to obtain real-time stress calculations. • Interpret hydrostatic and stress diagrams to assess the ship's condition during loading, discharging, and at sea. Evaluate scenarios where free surface effect or uneven trim could compromise safety, and propose corrective measures. • Perform calculations using Simpson's Rule and other numerical methods to derive displacement, buoyancy, and stress values. • Conduct basic checks using draft gauges and stress monitoring systems to verify calculated results. • Integrate manual calculations with electronic equipment outputs to ensure				

		accuracy and compliance with class/IMO requirements.				

Course Assessment:

Course work:	10%
Test/Assignments:	10%
Practical:	40%
Examination:	40%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: CARGO OPERATIONS II	**COURSE CODE: NSC 224**	**Contact Hours: 2 Hours/Week**
Year: II Semester: II	**Credit Unit: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**

GOAL: This course is designed to equip students with operational knowledge in cargo operations, including cargo documentation, cargo planning considerations, heavy-lift operations, and basic dangerous goods handling, enabling them to support safe and compliant cargo operations onboard ships, in accordance with STCW Code, Section A-II/1, Table A-II/1 and relevant international cargo regulations.

GENERAL OBJECTIVES: At the end of this course, the student should be able to:

1.0 Understand the concept of Cargo Documentation and Cargo Information Management;

2.0 Understand Cargo Planning and Operational Considerations;

3.0 Understand Heavy Lift Operations;

4.0 Understand the handling of Dangerous Goods and Safe Cargo operations.

COMPETENCES:

- Monitor the loading, stowage, securing and unloading cargoes

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: CARGO OPERATIONS II	**Course Code: NSC 224**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: II Semester: II	**Pre-requisite:**	**Practical: 0**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is designed to equip students with operational knowledge in cargo operations, including cargo documentation, cargo planning considerations, heavy-lift operations, and basic dangerous goods handling, enabling them to support safe and compliant cargo operations onboard ships, in accordance with STCW Code, Section A-II/1, Table A-II/1 and relevant international cargo regulations.		
General Objective 1.0: Understand the concept of Cargo Documentation and Cargo Information Management		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the purpose and importance of cargo documentation. 1.2 State common cargo documents and manifests. 1.3 Explain the relevance of cargo information to ship operations. 1.4 Describe the relationship between cargo documentation and stowage/stability planning. 1.5 Discuss risks arising from incorrect cargo	• Introduce students to the purpose and significance of cargo documentation in ship operations. • Demonstrate how to interpret key cargo information, such as weight, type, and handling requirements. • Refer students to cargo manuals, maritime regulations, and	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	documentation. 1.6 Explain the regulatory requirement relating to carriage of various types of cargoes. Such as: Regulations regarding loss of container, Regulation relating to safe carriage of container, etc.	online resources. • Give class exercises and assignments on interpreting cargo documents and identifying errors. • Ask oral and written questions to assess understanding of cargo documentation and operational relevance.				
General Objective 2.0: Understand Cargo Planning and Operational Considerations						
4-7	2.1 Explain the factors influencing cargo planning. 2.2 Describe the application of cargo planning principles to different ship types. 2.3 Explain risks associated with loading and unloading operations 2.4 Discuss how effective planning supports safe cargo operations. 2.5 Explain operational	• Introduce students to key factors that influence cargo planning, including ship type, cargo characteristics, and voyage requirements. • Explain cargo planning principles and how they vary between vessel types (e.g., bulk	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	constraints affecting cargo operations.	carriers, container ships, tankers). • Demonstrate identification of risks during loading, stowage, and unloading operations. • Refer students to cargo manuals, operational guidelines, and online resources. • Give class exercises and assignments on cargo planning scenarios for different ship types. • Ask oral and written questions to assess understanding of planning principles and risk awareness.				
General Objective 3.0: Understand Heavy Lift Operations						
8-11	3.1 Explain the concept and purpose of heavy-lift cargo operations.	• Introduce students to heavy-lift cargo operations and	Laptop Computers, Smart Board, Projector,			

	3.2 Identify equipment and gear used for heavy-lift handling. 3.3 Describe risks associated with heavy-lift operations. 3.4 Discuss basic safety precautions during heavy-lift activities. 3.5 Explain the implications of heavy-lift cargo on ship stability and safety.	their importance in maritime transport. • Demonstrate basic safety precautions and correct handling procedures through examples or diagrams. • Refer students to operational manuals, safety guidelines, and online tutorials. • Give class exercises and assignments on heavy-lift planning, equipment selection, and risk identification. • Ask oral and written questions to assess understanding of safe heavy-lift practices and stability awareness.	Writing Materials, White Board, Markers, Multi-Media Resources etc.			
GENERAL OBJECTIVE 4.0: Understand the handling Dangerous Goods and Safe Cargo Operation.						

12-15	4.1 Explain the concept and classification of dangerous goods in maritime transport. 4.2 State common markings, labels, and placards used for dangerous goods. 4.3 Describe safe handling, stowage, and segregation principles for hazardous cargo. 4.4 Discuss their effect on safety of life, ship and the environments. 4.5 Discuss the application of safety procedures during cargo operations involving dangerous goods. 4.6 Explain reporting requirements and emergency response procedures related to dangerous goods.	• Introduce students to the concept of dangerous goods and their classification according to IMO/IMDG Code. • Demonstrate procedures to apply safety measures during cargo operations through case examples or diagrams. • Explain emergency response, reporting procedures, and documentation requirements. • Refer students to the IMDG Code, ship manuals, and online safety tutorials. • Give class exercises and assignments on identifying, handling, and stowing dangerous goods. • Ask oral and	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

		written questions to assess understanding of safe practices and emergency preparedness.				

Course Assessment:

Course work:	20%
Test/Assignments:	20%
Examination:	60%
Total:	**100%**

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: MARINE ENVIRONMENTAL PROTECTION AND POLLUTION PREVENTION	**COURSE CODE: NSC 225**	**Contact Hours: 2 Hours/Week**
Year: II Semester: II	**Credit Unit: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**

GOAL: This course is to equip students with knowledge of marine environmental protection and pollution prevention, including sources and effects of marine pollution, international environmental conventions, and shipboard pollution-prevention practices, to ensure compliance with environmental protection requirements onboard ships, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand Marine Environment and Sources of Pollution;

2.0 Understand International Conventions and Environmental Regulations;

3.0 Understand Shipboard Pollution Prevention Practices;

4.0 Understand the importance of reception facilities on shore or offshore.

COMPETENCES:

- Ensure compliance with pollution prevention requirements

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: MARINE ENVIRONMENTAL PROTECTION AND POLLUTION PREVENTION	**Course Code: NSC 225**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: II Semester: II	**Pre-requisite:**	**Practical: 0**
COURSE SPECIFICATION: Theoretical and Practical		
GOAL: This course is to equip students with knowledge of marine environmental protection and pollution prevention, including sources and effects of marine pollution, international environmental conventions, and shipboard pollution-prevention practices, to ensure compliance with environmental protection requirements onboard ships, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
General Objectives 1.0: Understand Marine Environment and Sources of Pollution		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the importance of protecting the marine environment. 1.2 Discuss major sources of marine pollution originating from ships. 1.3 Describe the effects of pollution on marine ecosystems. 1.4 Discuss the relationship between ship operations and potential pollution	• Introduce students to the concept of marine environmental protection and its global significance. • Refer students to relevant regulations, manuals, and environmental case studies. • Give class exercises, scenario analyses, and	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	risks. 1.5 Explain the environmental responsibilities of deck officers.	discussions on pollution				
General Objective 2.0: Understand International Conventions and Environmental Regulations						
4-7	2.1 Explain the purpose of major marine environmental conventions. 2.2 Explain key pollution-prevention requirements applicable to ships. 2.3 Describe shipboard responsibilities under environmental regulations. 2.4 Discuss how compliance requirements relate to daily ship operations. 2.5 Explain penalties and consequences for non-compliance.	• Introduce the students to major marine environmental conventions (e.g, MARPOL 73/78, International Convention for the control and management of ships Ballast water and sediments 2004, London Convention). • Discuss practical examples of how environmental compliance integrates into daily ship operations. • Explain penalties, fines, and legal consequences for non-compliance with environmental laws.	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

		• Refer students to official convention documents, ship manuals, and online learning resources. • Give class exercises, case studies, and scenario-based assignments on environmental compliance. • Ask oral and written questions to assess understanding of regulatory responsibilities and environmental awareness.				
General Objective 3.0: Understand Shipboard Pollution Prevention Practices						
8-11	3.1 Explain pollution-prevention procedures onboard ships. 3.2 Discuss shipboard equipment used for pollution control. 3.3 Describe correct procedures for managing waste and discharges.	• Introduce the students to pollution-prevention procedures and relevant MARPOL regulations. • Demonstrate proper waste management procedures, including handling,	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	3.4 Discuss how to support pollution-prevention measures during cargo and deck operations 3.5 Discuss reporting requirements for pollution incidents.	segregation, and disposal. • Refer students to relevant manuals, MARPOL annexes, and online tutorials. • Give class exercises and assignments on pollution prevention and compliance scenarios. • Ask oral and written questions to assess students' understanding of environmental responsibilities and safe practices.				
GENERAL OBJECTIVE 4.0: Understand the importance of reception facilities on shore or offshore						
12-15	4.1 Explain the purpose and function of reception facilities for oily waste, garbage, sewage, and other ship-generated residues. 4.2 Identify the types of reception	• Case Study Discussion: – Present real or hypothetical scenarios of ships failing to use reception facilities properly. • Ask students to identify environmental, legal,	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	facilities available onshore or offshore and the services they provide to ships. 4.3 Discuss the legal and environmental requirements for using reception facilities, including MARPOL compliance. 4.3 List the use of reception facilities to pollution prevention and safe ship operations. 4.4 Discuss proper procedures for delivery of wastes to reception facilities in accordance with shipboard waste management plans.	and operational consequences and suggest corrective actions. • Facility Mapping Exercise • Provide a port or offshore terminal map. • Guide students to locate reception facilities for oily water, garbage, sewage, and other wastes, and discuss access procedures. • Shipboard Waste Delivery Simulation • Using role-play or simulation software, demonstrate the step-by-step procedure for delivering waste to reception facilities. • Ask students to perform the process, including documentation and compliance checks. • MARPOL Compliance Workshop • Show extracts of				

		MARPOL Annexes relevant to reception facilities. • Instructor-Led Demonstration				
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: INTRODUCTION TO MARITIME LAW AND REGULATORY COMPLIANCE	**COURSE CODE: NSC 226**	**Contact Hours: 2 Hours/Week**
Year: II Semester: II	**Credit Unit: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**

GOAL: This course is to equip students with knowledge of maritime law and regulatory frameworks, including international conventions, flag-state requirements, and shipboard legal responsibilities, enabling them to support compliance with legislative and regulatory requirements during ship operations, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand the concept of Maritime Law and Legal Frameworks;

2.0 Understand International Conventions and Flag-State Requirements;

3.0 Understand Legal Responsibilities of Deck Officers;

4.0 Comprehend Compliance Monitoring and Operational Application.

COMPETENCES:

Monitor compliance with legislative requirements

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: MARITIME LAW AND COMPLIANCE WITH LEGISLATIVE REQUIREMENTS	**Course Code: NSC 225**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: II Semester: II	**Pre-requisite:**	**Practical: 0**
COURSE SPECIFICATION: Theoretical		
GOAL: On completion of this course, students should acquire knowledge of maritime law and regulatory frameworks, including international conventions, flag-state requirements, and shipboard legal responsibilities, enabling them to support compliance with legislative and regulatory requirements during ship operations, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
General Objectives 1.0: Understand the concept of Maritime Law and Legal Frameworks		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-3	1.1 Explain the scope and purpose of maritime law in relation to ship operations. 1.2 State major sources of maritime law affecting ships and seafarers. 1.3 Distinguish between international regulations, national regulations, and company policies governing ships. 1.4 Explain the role of maritime	• Introduce students to the concept and objectives of maritime law. • Discuss the role of key maritime conventions (e.g., SOLAS, MARPOL, STCW) in ship safety and compliance. • Explain legal accountability of shipowners, masters, officers, and crew members. • Relate legal requirements to everyday shipboard	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	conventions in ensuring ship safety and regulatory compliance. 1.5 Explain legal accountability and obligations onboard ships.	operations and decision-making. • Refer students to relevant maritime law texts, convention extracts, and training manuals. • Give class discussions, short assignments, and case studies on maritime legal responsibilities. • Ask oral and written questions to assess students' understanding of maritime law and onboard accountability.				
General Objective 2.0: Understand International Conventions and Environmental Regulations						
4-7	2.1 Describe major international maritime conventions applicable to ships, including SOLAS 74, MARPOL 73, STCW 1978, MLC 2006 . Tonnage 1969, and Loadlines 1966. 2.2 Explain flag-state	• Introduce international maritime conventions using lectures, charts, and official IMO documents. • Explain flag-state responsibilities	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	administration, its responsibilities, and enforcement mechanisms. 2.3 Describe ship certification and documentation requirements in accordance with international maritime regulations. 2.4 Discuss the relationship between flag-state compliance and safe and efficient ship operations. 2.5 Explain the concept of port-state control and its implications for ships and ship operators.	through guided discussions and illustrative examples of flag-state administration. • Describe and demonstrate common ship certificates and documents using samples, images, or case illustrations. • Lead discussions on how flag-state compliance enhances maritime safety and operational efficiency. • Discuss port-state control procedures using real or hypothetical detention and inspection scenarios. • Summarize key				

		points at the end of each lesson and ask review questions to assess understanding.				
General Objective 3.0: Understand Legal Responsibilities of Deck Officers						
8-11	3.1 Explain the legal duties and responsibilities of deck officers under maritime law and regulations. 3.2 Describe areas of legal liability arising during navigation, watchkeeping, and cargo operations. 3.3 Explain the importance of proper record-keeping and statutory documentation onboard ships. 3.4 Discuss how deck officers support legal and regulatory compliance during watchkeeping and ship operations. 3.4 Describe the	• Present relevant maritime laws and regulations governing deck officer duties. • Illustrate situations that may result in legal liability during navigation and cargo operations. • Provide examples of proper record-keeping and shipboard documentation. • Demonstrate how compliance is maintained during watchkeeping and ship operations. • Highlight the consequences of	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	consequences of non-compliance with maritime laws and shipboard procedures.	non-compliance using real or hypothetical scenarios. • Conduct review questions and facilitate student participation to reinforce understanding.				
GENERAL OBJECTIVE 4.0: Comprehend Compliance Monitoring and Operational Application						
12-15	4.1 Explain how to monitor compliance with legislative requirements onboard ships. 4.2 Explain the objectives, scope, and key provisions of SOLAS (Safety of Life at Sea), including life-saving appliances, ship construction, and safety management. 4.3 Describe the requirements of the ISPS Code and IMO conventions relating to ship and port security, including shipboard security	• Present legislative requirements relevant to ship operations and compliance monitoring. • Provide scenarios of non-compliance and guide students to analyze them. • Introduce key IMO conventions (SOLAS, MARPOL, ISPS, ISM, STCW). • Illustrate how corrective actions are implemented	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	measures. 4.4 Discuss situations of non-compliance during ship operations. 4.5 Explain the role of corrective actions in maintaining compliance. 4.6 Explain effective ways of communicating compliance issues to senior officers.	to ensure compliance. • Facilitate exercises on effective communication of compliance issues to senior officers. • Review questions and short exercises to reinforce understanding.				

Course Assessment:
Course work: 20%
Test/Assignments: 20%
Examination: 60%
Total: 100%

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: EMERGENCY RESPONSE, SEARCH AND RESCUE AND DISTRESS PROCEDURE	**COURSE CODE: NSC 227**	**Contact Hours: 2 Hours/Week**
Year: II Semester: II	**Credit Unit: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**

GOAL: This course is designed to equip the students with competence in responding to shipboard emergencies and distress situations, including application of distress communication procedures and awareness of the IAMSAR framework, enabling them to respond effectively to emergencies and distress signals at sea, in accordance with STCW Code, Section A-II/1, Table A-II/1.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand Shipboard Emergencies and Emergency Preparedness;
2.0 Understand Distress signal and Distress communication Procedure;
3.0 Understand Search and Rescue (SAR) and International Aeronautical and Maritime Search and Rescue (IAMSAR) procedures;
4.0 Understand Integrated Emergency Response and Application.

COMPETENCES:

- Respond to emergencies and distress at sea.

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: EMERGENCY RESPONSE, SEARCH AND RESCUE AND DISTRESS PROCEDURE	**Course Code: NSC 227**	**Contact Hours: 2Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: II Semester: II	**Pre-requisite: -**	**Practical:**
COURSE SPECIFICATION: Theoretical		
General Objective 1.0: Understand the basics of Shipboard Emergencies and Emergency Preparedness		

THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-4	1.0 Explain common shipboard emergency scenarios. 1.1 Explain emergency procedures for the protection and safety of passengers in various emergency situations. 1.2 Describe the procedures for initial assessment of damage and damage control following an emergency. 1.3 Explain the actions to be taken following a collision in accordance with international maritime practice.	• Illustrate emergency procedures using diagrams, videos, and real maritime incident case studies. • Demonstrate passenger safety precautions through discussions on mustering, communication, and emergency response coordination. • Guide students through classroom and simulator-based exercises on damage assessment and basic damage control techniques. • Explain step-by-step	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources etc.			

	1.4 Explain the actions to be taken following grounding in accordance with established emergency procedures. 1.5 Describe emergency steering arrangements and procedures. 1.6 Explain arrangements and procedures for towing and being taken in tow. 1.7 Discuss procedures for rescuing persons from the sea and assisting survivors. 1.8 Explain the responsibilities and actions required when assisting a vessel in distress. 1.9 Discuss the application of basic emergency response procedures.	actions required after collision and grounding, supported by charts and procedural checklists. • Demonstrate and discuss emergency steering systems using ship plans, models, or simulator controls. • Explain and illustrate towing arrangements, including towing gear, connection procedures, and safety precautions. • Organize practical or simulated exercises on rescuing persons from the sea and assisting vessels in distress. • Conduct role-play or simulator exercises covering emergency response situations in port environments. • Assess student performance through				

		observation, oral questioning, scenario-based discussions, and practical demonstrations.				
General Objective 2.0: Understand Distress Signal and Distress Communication Procedure.						
5-8	2.1 Identify distress, urgency and safety signals. 2.2 Describe emergency organization and alarm systems onboard ships. 2.3 Explain the duties of crew members during emergencies. 2.4 Explain the application of basic emergency response procedures. 2.5 Explain the implication of false distress alert.	• Conduct a signal recognition exercise using audio and visual aids where students must categorize GMDSS alerts, pyrotechnic displays, and sound/light signals as distress, urgency, or safety, referencing the International Code of Signals and COLREGs • Role-play communication exercises • Lead a systems familiarization walkthrough, having students trace alarm circuits from initiation points to the bridge and public address system, and map the command	Laptop Computers, Smart Board, Projector, Writing Materials, White Board, Markers, Multi-Media Resources, Distress Signal Charts, Communication Scripts etc.			

		structure as outlined in the vessel's emergency plan and muster list. • Run hands-on procedural drills at skill stations				
General Objective 3.0: Understand Search and Rescue (SAR) and IAMSAR Procedures						
9-12	3.1 Explain the purpose of search and rescue (SAR) operations. 3.2 Describe the IAMSAR framework and coordination roles. 3.3 Identify responsibilities of ships involved in SAR. 3.4 Explain the responsibilities of the on-scene Commander during search and rescue operation. 3.5 Discuss the application of basic SAR awareness in navigation scenarios. 3.6 Demonstrate understanding of cooperation with rescue authorities.	• Lectures • SAR scenario discussions • Identify SAR responsibilities in given scenarios. • Support coordination through correct reporting. • Scenario based discussions	IAMSAR Summaries, SAR diagrams etc			
General Objective 4.0: Understand Integrated Emergency Response and Application						
12-15	4.1 Demonstrate the ability to respond	• Introduce to students to Search and Rescue	Emergency response			

	effectively to combined emergency and distress scenarios. 4.2 Explain the application of procedures in SAR-related incidents. 4.3 Demonstrate how to communicate clearly and calmly during emergencies. 4.4 Discuss the support the Officer of the Watch should offer during emergency situations. 4.5 Highlight competence required for shipboard emergency duties.	(SAR) tabletop exercise where students must apply IAMSAR Manual procedures to plot search patterns, calculate datum, and prepare the vessel for survivor recovery per SOLAS regulations. • Video-based critical incident for debrief of an emergency drill. • Evaluate competence for shipboard emergency duties.	checklists Case			
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: LEADERSHIP, TEAMWORK AND BRIDGE RESOURCE MANAGEMENT	**COURSE CODE: NSC 228**	**Contact Hours: 2 Hours/Week**
Year: II Semester: II	**Credit Unit: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**
GOAL: This course introduces students to leadership and teamworking competence, including application of Bridge Resource Management (BRM), with effective communication, decision-making, and human-element principles, enabling them to contribute positively to bridge team performance during routine and emergency operations, in accordance with STCW Code, Section A-II/1, Table A-II/1.		
GENERAL OBJECTIVES: At the end of this course, the student should be able to: 1.0 Understand the basics of Leadership and Human-Element Principles at Sea; 2.0 Know the principles of Teamwork, Communication and BRM ; 3.0 Understand Decision-Making, Situational Awareness and Workload Management; 4.0 Understand leadership responsibilities in any operational environment.		
COMPETENCES: • Apply leadership and teamworking skills		

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
Course Title: LEADERSHIP, TEAMWORK AND BRIDGE RESOURCE MANAGEMENT	**Course Code: NSC 228**	**Contact Hours: 2 Hours/Week**
	Credit Unit: 2	**Theoretical: 2 Hours/Week**
Year: II Semester: II	**Pre-requisite:**	**Practical: 0**
COURSE SPECIFICATION: Theoretical		
General Objective 1.0: Understand the basics of Leadership and Human-Element Principles at Sea		

THEORETICAL CONTENT				**PRACTICAL CONTENT.**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-4	1.1 Explain the concept of leadership in shipboard operations. 1.2 Describe human-element and factors affecting performance at sea. 1.3 Identify behaviours that promote safe and effective teamwork. 1.4 Explain the relationship between leadership and safety culture 1.5 Explain personal social responsibility within a team.	• Give real shipboard scenario to discover how good leaders balance tasks and people. • Introduce Students to create a personal "risk map" to identify factors like fatigue and stress on how to manage them. • Video example and list the dos and don'ts of effective teamwork on board. • Guided discuss on how a leader's	Human-element guides, Case examples etc.			

		actions set the tone for safety and decide what a great leader should do.				
General Objective 2.0: Know the principles of Teamwork, Communication and Bridge Resources Management (BRM)						
5-8	2.1 Explain the principles and objectives of BRM. 2.2 Apply effective communication techniques within the bridge team. 2.3 Demonstrate closed-loop communication principles. 2.4 Identify barriers to effective teamwork. 2.5 Support cooperate decision-making on the bridge.	• Use a major incident case study to have students derive and explain BRM's core principles and objectives. • Conduct a drill to force the practical application of standardized maritime communication phrases. • Run a structured message relay exercise to demonstrate and assess proficiency in closed-loop communication.	BRM manuals, Communication scenarios, Bridge simulator etc.			
General Objective 3.0: Understand Decision-Making, Situational Awareness and Workload Management						

9-12	3.1 Explain decision-making processes at operational level. 3.2. Maintain situational awareness during bridge watchkeeping. 3.3 Identify factors leading to loss of situational awareness. 3.4. Identify workload and task-sharing principles. 3.5 Identify the awareness of stress and fatigue effects	• Use scenario-based drills to make students to explain structured operational decision-making.	Decision-making models, BRM scenarios, Bridge simulator etc.			
GENERAL OBJECTIVE 4.0: Understand leadership responsibilities in any operational environment.						
13-15	4.1 Apply leadership skills during routine bridge operations. 4.2 Demonstrate teamwork during emergency situations. 4.3 Support the officer of the watch through effective cooperation. 4.4 Communicate clearly under pressure. 4.5 Explain allocation, assignment, and prioritization of resources 4.6 Demonstrate competence for operational-level leadership duties onboard.	• Teach skills in anticipatory cooperation and clear information transfer under pressure. • Other scenario-based Lectures • Evaluate competence for operational-level leadership duties onboard. • Perform leadership and teamwork roles in simulations. • Demonstrate calm and effective behaviour during	Bridge scenarios Emergency case studies Bridge simulator			

		emergencies. • Simulator-based team exercises				
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE		
COURSE TITLE: SHIP MANAGEMENT	**COURSE CODE: NSC 229**	**Contact Hours: 2 Hours/Week**
Year: II Semester: II	**Credit Units: 2**	**Theoretical: 2 Hours/Week**
	Pre-requisite:	**Practical: 0**

GOAL: This course aims to equip students with a perspective on modern ship management, enabling them to understand, integrate, and apply key technical, commercial, and logistical functions necessary to plan, execute, and sustain safe, efficient, compliant, and profitable maritime operations within the global shipping industry.

GENERAL OBJECTIVES:

At the end of this course, the student should be able to:

1.0 Understand ship management as an interconnected system for maritime operations;
2.0 Comprehend shipping trade, trends, and systems as a tool for ship management decisions;
3.0 Understand maritime security and safety management principles to ensure effective ship management, safeguarding ships; crew, cargo, and port facilities, in compliance with the ISPS and the ISM Codes;
4.0 Comprehend the concept and importance of ship husbandry and shipping agency;
5.0 Understand stevedoring operations and its critical role in safe, efficient, and compliant cargo handling;
6.0 Know containerization as a modern innovation and seamless intermodal transfers for the development of global liner shipping networks;
7.0 Understand basic knowledge of freight rate calculation and performing structured estimations of trip revenue for cost reduction;

COMPETENCES:

- Plan, execute, and sustain safe, efficient, compliant, and profitable maritime operations

PROGRAMME: NATIONAL DIPLOMA IN NAUTICAL SCIENCE.						
Course Title: SHIP MANAGEMENT		**Course Code: NSC 229**	**Contact Hours: 2 Hours/Week**			
		Credit Unit: 2	**Theoretical: 2 Hours/Week**			
Year: II Semester: II		**Pre-requisite:**	**Practical: 0**			
COURSE SPECIFICATION: Theoretical						
General Objective 1.0: Understand ship management as an interconnected system for maritime operations						
THEORETICAL CONTENT				**PRACTICAL CONTENT**		
Week	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**	**Specific Learning Outcome**	**Teacher's Activities**	**Resources**
1-2	1.1 Define ship management 1.2 Explain the significance of Ship Management to the marine industry. 1.3 Describe types of ship management. 1.4 Identify the integrated functions of ship management and applying the knowledge to make operational decisions. 1.5 Explain a typical structure of a shipping company. 1.6 Explain organogram of a shipping company, labelling	• Introduce to the students the concept of ship management • State various integrated functions of ship management. • Introduce a clear and comprehensive organogram (organizational chart) for a typical shipping company. • Build the Organogram" Collaborative Puzzle • Apply integrated ship management functions for operational decisions.	Laptop Computers, Smart/white board, Projector, Textbook, Lecture note, Calculator, Charts, Handouts with notes on ship management, Diagrams illustrating ship Power point illustration etc.			

	its primary departments					
General Objective 2.0: Comprehend shipping trade, trends, and systems as a tool for ship management decisions.						
3-4	2.1 Define the following: i. Shipping Trade ii. Shipping Trends 2.2 Discuss the overview of the global Shipping trade and trends. 2.3 Define Liner and Tramp Shipping. 2.4 Highlight the key difference between Tramp and Liner Shipping.	• Introduce the concepts of shipping trade *and* shipping trends, explaining their significance to the global maritime industry. • Facilitate group discussions on how shipping trade and trends influence ship management decisions. • Present real-world examples comparing liner and tramp shipping operations, highlighting their advantages and challenges. • Guide students to identify and discuss the key differences between liner and tramp shipping in terms of schedules, cargo types, and management implications.	Laptop Computers, Smart/white board, Projector, Textbook, Lecture note. Diagrams and pictures of different types of ships, Online resources: IMO website, Audio visual Videos etc.			

General Objective 3.0: Understand maritime security and safety management principles to ensure effective ship management, safeguarding ships, crew, cargo, and port facilities, in compliance with ISPS and ISM Codes.						
5-6	3.1 Discuss maritime security. 3.2 Explain the importance of safeguarding ships, crew, cargo, and port facilities. 3.3 Describe the objectives and requirements of the ISPS Code in enhancing ship and port facility security. 3.4 Explain the purpose of the ISM Code and its role in establishing a safety management system onboard ship. 3.5 Describe the roles and responsibilities of key personnel within the SMS.	• Introduce the concepts of maritime safety and security, ISPS Code, and ISM Code, highlighting their importance in ship security and safety management. • Present real-life examples of piracy, port security breaches, or accidents linked to poor safety management, • Engage students in group discussions on the implications of these codes for crew safety, cargo protection, and operational efficiency. • Role-Play: Organize drills where students act as crew members responding to a security threat or safety incident onboard.	Laptop Computers, Smart/white board, Projector, Textbook, Lecture note, Charts, Smart Boards, Handouts with notes on shipping regulations, Online resources: IMO website, shipping industry publications etc.			
GENERAL OBJECTIVE 4.0: Comprehend the concept and importance of ship husbandry and shipping agency.						
7-8	4.1 Define ship husbandry, chandlers,	• Lecture and Explanation: Introduce	Laptop Computers, Smart/white board,			

	ship agents, and agency 4.2 Explain the importance of maintaining vessel efficiency, seaworthiness, and compliance with ship management practices. 4.3 Describe the role of ship chandlers in supplying provisions, spare parts, and essential materials, and how this supports effective ship operations. 4.4 Explain the duties of ship agents in coordinating port services, documentation, and communication between shipowners, crew, and port authorities. 4.5 Identify the concept of shipping agency and its significance in ensuring smooth port operations	the concepts of ship husbandry, chandlers, ship agents, and agency, linking them directly to ship management responsibilities. • Use real-life port operation scenarios to show how chandlers supply ships, and how agents coordinate documentation and services. • Facilitate group discussions on the importance of these services in ensuring smooth ship operations and compliance with regulations. • Present examples of successful or problematic port operations, analyzing the role of agents and chandlers in ship management outcomes.	Projector, Textbook, Lecture note, Charts, Smart Boards, Handouts with notes on shipping regulations, Online resources: IMO website, shipping industry publications etc.			
General Objective 5.0: Understand stevedoring operations and its critical role in safe, efficient, and compliant cargo handling.						
9-10	5.1 Define stevedoring.	• Introduce the concept	Laptop Computers,			

	5.2 Explain the role of cargo handling and port operations. 5.3 Describe the duties of stevedores in loading, unloading, stowing, and securing cargo onboard ships. 5.4 Explain how stevedoring activities are coordinated with ship management to ensure efficiency, safety, and compliance with international regulations. 5.5 Identify the implications of poor stevedoring practices on ship stability, cargo safety, and overall operational performance. 5.6 Evaluate the importance of effective collaboration between ship managers, stevedores, and port authorities in	of stevedoring. • Explain its role in cargo handling and how it connects to ship management. • Use diagrams or videos to show loading, unloading, stowing, and securing cargo operations. • Facilitate group discussions on the importance of proper stevedoring practices for ship safety, stability, and efficiency • Present examples of accidents or delays caused by poor cargo handling and analyze the implications for ship management. • Ask students to prepare short reports or presentations on how stevedoring impacts ship management, focusing on safety and cost-effectiveness.	Smart/white board, Projector, Textbook, Lecture note, Charts, Smart Boards, Handouts with notes on shipping regulations, Online resources: IMO website, shipping industry publications etc.			

	achieving smooth maritime operation					
General Objective 6.0: Know containerization as a modern innovation and seamless intermodal transfers for the development of global liner shipping networks.						
11-12	6.1 Define containerization 6.2 Explain the role of containerization in modern maritime transport. 6.3 Describe the types of containers and their uses in shipping operations. 6.4 Explain how containerization has transformed cargo handling, port operations, and global trade. 6.5 Identify the implications of containerization for ship management, including stowage planning, stability, and safety.	• Introduce the concept of containerization, its history, and its impact on global shipping and ship management. • Illustrative Demonstration: Use diagrams, videos, or models to show different types of containers and how they are stowed onboard ships. • Facilitate group discussions on how containerization improves efficiency, reduces costs, and affects ship stability and safety. • Present examples of successful containerized shipping operations and analyze challenges such as mis-stowage or	Laptop Computers, Smart/white board, Projector, Textbook, Lecture note, Charts, Smart Boards, Handouts with notes on shipping regulations, Online resources: IMO website, shipping industry publications etc.			

		accidents.				
General objective 7.0: Understand basic knowledge of freight rate calculation and performing structured estimations of trip revenue for cost reduction.						
13-15	7.1 Define freight and freight rate and explain its importance in maritime commerce. 7.2 Describe the factors influencing freight rates, including cargo type, distance, market demand, and ship operating costs. 7.3 Explain how freight rates affect ship management decisions and profitability. 7.4 Identify the relationship between freight rate negotiation and commercial management in shipping. 7.5 Discuss the basic knowledge of freight rate calculation to	• Introduce the concept of freight rates, their types (liner, tramp, charter), and importance in ship management. • Use real-world shipping cases to show how freight rates are determined and negotiated. • Facilitate group discussions on how freight rates influence ship managers' decisions regarding routes, cargoes, and costs. • Present examples of freight market fluctuations and analyze their impact on ship operations and profitability. • Role-Play Exercise: Assign students roles as shipowners, charterers, and agents to simulate freight rate	Laptop Computers, Smart/white board, Projector, Textbook, Lecture note, Charts, Smart Boards, Handouts with notes on shipping regulations, Online resources: IMO website, shipping industry publications etc.			

	simple shipping scenarios.	negotiations.				
Course Assessment: Course work: 20% Test/Assignments: 20% Examination: 60% **Total: 100%**						

LIST OF MINIMUM RESOURCES/PHYSICAL FACILITIES

A. SEAMANSHIP WORKSHOP

S/N	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1.	Gravity Davit	1
2.	10 Man Life Raft	1
3.	Ropes:– Fibre Wire	4 rolls 2 rolls
4.	Derrick Model	1
5.	Set of Rules of The Road (Light and Shape)	1
6.	Buoyage Model	1
7.	GMDSS Equipment	1
8.	Vices	10
9.	Safety Helmet	10
10.	Thimbles	5
11.	Marline Spikes	10
12.	Fid – (Wooden Spike)	10
13.	Wooden Stage	2
14.	Bosun Chair	2
15.	Rope Lizards	5
16.	Gantlines	5
17.	Pilot Ladder	1
18.	Jacob's Ladder	1
19.	4 H.P Electric Hoist Unit	1
20.	½ Tonne Electric Winch	1
21.	Crane Model (Crane Simulator)	1
22.	Windlass Model	1
23.	Hatchcover Model	1
24.	½ Tonne Chain Block	1

25.	Set of International Code, Model Flag and Stand	1

B. BOATYARD

S/N	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1	Glass Fiber Boat	1
2	Set of Oars/Crutches	1
3	Training Craft	1
4	Lifeboat Davit	1
5	Survival Crafts	2

C. CHARTROOM AND METEOROLOGICAL LABORATORY

S/N	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1	Parallel Rules	30
2	Chart Dividers	30
3	Transparent Stations Pointers (Star Finder)	2
4	Chart Magnifier	1
5	Sextants	5
6	Wet Compass Card	1
7	Navigational Charts	30
8	Instructional Charts	30
9	Tide Table	30
10	Thermometers	6
11	Sea Temperature Bucket	1
12	Chronometer	1
13	Magnetic Compass and Binnacle with Azimuth Mirror	1
14	Cup Anemometer	1

15	Digital Anemometer	1
16	Laboratory Thermometer	6
17	Min. and Max. Thermometers	2
18	Barometer	1
19	Stevensen Screen	1
20	Facsimile Receiver	1
21	Star Charts and Finders	5

D. RADAR/ARPA SIMULATOR LABORATORY

S/N	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1	Global Positioning System (GPS)	1
2	Automatic Radar Plotting Aids (ARPA) (Simulator)	1
3	Global Maritime Distress and Safety System (GMDSS)	1
4	Electronic Chart Display and Information System (ECDIS)	1
5	Radar	1

E. STABILITY/CARGO ROOM LABORATORY

S/N	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1	Stability Tank	1
2	Stability Model	1
3	Working Model of Traditional Derrick Gear in Various Rigs (Simulator)	1
4	Working Model of Velle Ship Derrick (Simulator)	1
5	Working Model of Thompson Crane (Simulator)	1
6	Working Model of Hellen Derrick (Simulator)	1
7	Working Model of Stulken Derrick (Simulator)	1
8	Schematic Model of Crude Oil Tanker, Cargo, Tank and Pump room (Simulator)	1

9	Schematic Model of Product Tankers, Cargo, Tank and Pump room (Simulator)	1
10	Schematic Model of Cargo Hold and Ship's Engine Room Showing Piping System (Simulator)	1

F. NAVIGATIONAL AIDS LABORATORY

S/N	DESCRIPTION OF ITEMS	QUANTITY REQUIRED
1	Magnetic Compass & Binnacle with Azimuth Mirror	1
2	True Motion Radar Set with Reflection Plotter (40cm Display) Simulator	2
3	Automatic Radar (ARPA) Simulator	1
4	Gyro Compass with Bearing and Azimuth Mirror	1
5	Radio telephone Receiver/Transmitter for Practice in R/T Procedure	1

LIST OF WORKSHOP PARTICIPANTS

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