

INTRODUCTION TO THE PROGRAMME & DETAILS

Name of the Programme : Associate Degree in Nautical Science(ADNS)

Offered At: Pakistan Marine Academy, Karachi

Programme Nature : Full time (Residential)

Eligibility Criteria for Admission:

- i) Must be unmarried male citizen of Pakistan
- ii) At least 55% marks in HSSC(Pre-Engineering)/equivalent examination with Physics, Mathematics & Chemistry
- iii) Maximum 20 years of age by 31st December of the year when application is submitted. One (01) year relaxation for candidates belonging to FATA, Gilgit /Baltistaan and Azad Kashmir
- iv) Must have qualified the defined pre-admission entry test
- v) Medically fit as per the criteria approved by the Ministry of Ports & Shipping
- vi) Merit will be based on 50% Entry Test + 50% HSSC %age

Intake: Once a year,75 on open merit and 10 on self-finance

Regulations: Academic Regulations for Associate Degree Programme-2017

Commencement: First semester- Spring January

Duration of theProgramme: 2 years/4 semesters

Total No. of Credit Hours: 77

No. ofCourses: 30

**APPROVED SCHEME OF STUDIES
FOR
ASSOCIATE DEGREE IN NAUTICAL SCIENCE**

FIRST YEAR																	
Spring Semester									Fall Semester								
Course Code	Course Title	Credit Hours			Cont Hrs			MKS	Course Code	Course Title	Credit Hours			Cont Hrs			MKS
		Th	Pr	Tot	Th	Pr	Tot				Th	Pr	Tot	Th	Pr	Tot	
ED-101	Pakistan Studies	1	0	1	1	0	1	100	ED-151 / 152	Islamic Studies/ Ethical Behaviour	1	0	1	1	0	1	100
ED-102	Applied Physics	3	1	4	3	2	5	100	ED-153	Applied Chemistry	3	1	4	3	2	5	100
ED-103N	Mathematics-I	3	0	3	3	0	3	100	ED-154	Mathematics-II	3	0	3	3	0	3	100
NS-111	Principles of Navigation-I	3	0	3	3	0	3	100	NS-161	Principles of Navigation-II	3	0	3	3	0	3	100
NS-112	Ocean & Offshore Navigation-I	3	0	3	3	0	3	100	NS-162	Ocean & Offshore Navigation-II	3	0	3	3	0	3	100
NS-113	Seamanship-I	1	1	2	1	2	3	100	NS-163	Seamanship-II	1	1	2	1	2	3	100
NS-114	Marine Communication-	2	1	3	2	2	4	100	NS-164	Marine Meteorology	3	0	3	3	0	3	100
NS-115	General Ship Knowledge-I	3	0	3	3	0	3	100	NS-165	General Ship Knowledge-II	3	0	3	3	0	3	100
Total		19	3	22	19	6	25	800	Total		20	2	22	20	4	24	800
Non Credit Courses																	
GT-121	Officer Like Qualities-I **								GT-171	Officer Like Qualities-II **							
GT-122	Functional English-I *	2	0	2	2	0	2	100	GT-172	Functional English-II *	2	0	2	2	0	2	100
<p>* Academic Course **General Training assed by a Board at the end of each Semester</p>																	

SECOND YEAR																	
Spring Semester									Fall Semester								
Course Code	Course Title	Credit Hours			Cont Hrs			MKS	Course Code	Course Title	Credit Hours			Cont Hrs			MKS
		Th	Pr	Tot	Th	Pr	Tot				Th	Pr	Tot	Th	Pr	Tot	
ED-201	Business Communication-I	3	0	3	3	0	3	100	ED-251	Business Communication-II	3	0	3	3	0	3	100
ED-202	Computer Programming & Applications	1	1	2	1	2	3	100	ED-###	Elective	1	0	1	1	0	1	100
NS-211	Seamanship-III	2	0	2	2	0	2	100	NS-261	Seamanship-IV	2	0	2	2	0	2	100
NS-212	Coastal Navigation-I	0	3	3	0	6	6	100	NS-262	Coastal Navigation-II	0	3	3	0	6	6	100
NS-213	General Ship Knowledge-III	3	0	3	3	0	3	100	NS-263	General Ship Knowledge-IV	3	0	3	3	0	3	100
NS-214	Watchkeeping-I	1	0	1	1	0	1	100	NS-264	Watchkeeping-II	1	0	1	1	0	1	100
NS-215	Radar Navigation	3	0	3	3	0	3	100	NS-265	Electronic Navigation Systems	3	0	3	3	0	3	100
	Total	13	4	17	13	8	21	700		Total	13	3	16	13	6	19	700
Non Credit/Mandatory Courses																	
GT-221	Officer Like Qualities-III**								GT-271	Officer Like Qualities-IV**							
GT-291	Personal Safety & Social Responsibility *								GT-294	Personal Survival Techniques *							
GT-292	Elementary First Aid *								GT-295	Basic Fire Fighting *							
GT-293	Tanker Familiarization *																

Elective Courses

ED-252- International & Legal Maritime Studies(ILMS) ED-253 - Personal & Organizational Management

* Mandatory Short Professional courses (3-5 Days)

**General Training assed by a Board at the end of each Semester

**SUMMARY OF THE ASSOCIATE DEGREE PROGRAMME IN
NAUTICAL SCIENCE**

S.NO	Category	No. of Courses	Credit Hours	% age of total Cr Hrs
1	Academic/Compulsory Courses	4	8	10.3
2	Foundation Courses	13	40	52.0
3	Professional Courses	10	28	36.4
4	Elective Courses	1	1	1.3
	Total	28	77	100%
	Theory		64	83.12
	Practical		13	16.88

- Total number of Credit Hours 77
- Duration of the Associate Degree 2 years
- Semester Duration 20 weeks
- Semesters 4
- Course Load per Semester(except non-credit) 18-20 Cr Hrs

Average number of Courses per Semester 7-8 Courses/Semester

HEC TEMPLATE FOR ASSOCIATE DEGREE (NAUTICAL SCIENCE)

Compulsory Courses		Foundation Courses (Discipline Specific)		Major Courses (including Project/Internship Report)		Elective Courses (supporting the major)	
4 Courses		13 Courses		10 Courses		1 Courses	
8 Credit hours		40 Credit hours		28 Credit hours		1Credit hours	
Subject	Cr Hr	Subject	Cr Hr	Subject	Cr Hr	Subject	Cr Hr
1. Pakistan Studies	1	General Ship Knowledge-I	3	Seamanship-I	2	Elective	1
2. Islamic Studies	1	General Ship Knowledge-II	3	Seamanship-II	2		
3. Business Communications-I	3	General Ship Knowledge-III	3	Seamanship-III	2		
4. Business Communications-II	3	General Ship Knowledge-IV	3	Seamanship-V	2		
5.		Principles of Navigation-I	3	Ocean & Offshore Navigation-I	3		
6.		Principles of Navigation-II	3	Ocean & Offshore Navigation-II	3		
7.		Marine Communication	3	Costal Navigation-I	3		
8.		Marine Meteorology	3	Costal Navigation-II	3		
9.		Applied Chemistry	4	Radar Navigation	3		
10.		Applied Physics	4	Electronic Navigation Systems	3		
11.		Mathematics-I	3	Watch Keeping-I	1		
12.		Mathematics-II	3	Watch Keeping-II	1		
13.		Computer Programming & Applications	2				

Elective Courses(any one)

International & Legal Maritime Studies (ILMS)
Personal & Organizational Management

**PAKISTAN MARINE ACADEMY
ASSOCIATE DEGREE PROGRAMME IN NAUTICAL SCIENCE
COMPARISON OF SCHEME OF STUDIES**

S.NO.	COURSES	CREDIT HOURS/TERM				Tot. Cr Hrs
		I	II	III	IV	
	ACADEMIC					
1	English / Business Communication*	-	-	3	3	6
2	Physics	3+1	-	-	-	3+1
3	Chemistry	-	3+1	-	-	3+1
4	Mathematics	3	3	-	-	6
5	Pakistan Studies	1	-	-	-	1
6	Islamic Studies/Ethics	-	1	-	-	1
7	Personal & Organizational Management	-	-	-	-	
8	International Legal Maritime Studies/Elective	-	-	-	1	1
9	Computer Familiarization/Programming	-	-	1+1	-	1+1
	Total	8	8	5	4	22+3
	PROFESSIONAL					
10	Principles of Navigation	3	3	-	-	6
11	Ocean & Offshore Navigation	3	3	-	-	6
12	Seamanship	1+1	1+1	2	2	6+2
13	Marine Communication	3	-	-	-	3
14	Marine Meteorology	-	3	-	-	3
15	General Ship Knowledge	3	3	3	3	12
16	Coastal Navigation	-	-	3	3	6
17	Watch Keeping	-	-	1	1	2
18	Radar Navigation	-	-	3	-	3
19	Electronic Navigation Systems	-	-	-	3	3
	Total	14	14	12	12	50+2
	General Training					
18	Non Credit Courses	Non Credit				0
	Grand Total(Cr. Hrs)	22	22	17	16	77
	No. of Courses/ Semester	8+2	8+2	7+1	7+1	30+6

* English replaced with Business Communication

**SUMMARY OF THE SCHEME OF STUDIES
FOR ADP IN NAUTICAL SCIENCE**

Description	Approved	Remarks
Total No. of credit hours of the programme	77	As per HEC policy
No. of credit hours/semester	18-20	
No. of courses/semester	7/8	
Total No. of courses	30+6	
Reduction of Courses in program		
Academic		
English	2	
Physics	1	
Chemistry	1	
Mathematics	2	
Pakistan Studies	1	
Islamic Studies	1	
International & Legal Maritime Studies	1 (Elective)	
Personal & Organizational Management	0	Non Credit
Computer Familiarization	1	
Professional		
Principles of Navigation	2	
Ocean & Offshore Navigation	2	
Seamanship(Th + Pr)	4	
Marine Communication	1	
Marine Meteorology	1	
General Ship Knowledge	4	
Coastal Navigation	2	
Watch Keeping	2	
Radar Navigation	1	
Electronic Navigation Systems	1	
General Training/Officer Like Qualities	0	Changed to Non Credit

COURSES FOR ASSOCIATE DEGREE PROGRAMME IN NAUTICAL SCIENCE

				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
ED-101 Pakistan Studies				
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	1	1	100	
Pr.	----	----	----	Remarks
<p>Pakistan Movement – Brief History;</p> <p>Constitution: The Salient Features of the Constitution of 1973; Constitutional amendments; A brief account of the constitutional crisis of 1971</p> <p>Pakistan’s relations: With neighbours; with superpowers; Pakistan and the Muslim world; Pakistan and International Maritime Organization (IMO);</p> <p>Economic Survey of Pakistan with a focus on present situation; The importance of Gwadar Port; Exclusive Economic zone (EEZ) of Pakistan</p> <p>International conventions on environmental pollution related to sea</p> <p>Human Rights: Islamic Perspective (The last sermon of the Holy Prophet P.B.U.H.); Western Perspective (UN Charter); The issue of Piracy.</p> <p>Recommended Books:</p> <ol style="list-style-type: none"> 1. <i>Pakistan in Perspective 1947-1997</i>, Rafi Raza, Oxford University Press, 2003 2. <i>Pakistan’s Foreign Policy: A Reappraisal</i>, Shahid Amin M. Oxford University Press, 2000 3. <i>Constitutional & Political History of Pakistan</i>, Hamid Khan, Oxford University Press, 2005 4. <i>Pakistan: The Formative Phase 1857 – 1948</i>, Khalid bin Sayeed, 2nd Edition, Oxford University Press, 1991 				

				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
ED-102 Applied Physics				
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	3	3	80	
Pr.	1	2	20	Remarks
<p>Vectors: Vector algebra and its applications,</p> <p>Properties of Matter: Elasticity Bulk Modulus, Modulus of Rigidity, Young’s Modulus, Poisson’s ratio, Torsion Pendulum, Bending Beams, Fluids, Liquids and Gases, Hydrostatic Pressure, Manometer, Viscosity, Coefficient of Viscosity, Variation of viscosity with Temperature, Molecular Forces, Surface Tension, and its variation with Temperature.</p> <p>Heat and Thermodynamics: Heat, temperature and temperature scales. Heat transfer: conduction and conduction equation, convection and radiation: thermal expansion; specific heat capacity. 1st, 2nd and 3rd law of thermodynamics, heat Engines, Maxwell’s Thermodynamic relations.</p> <p>Waves and Optics: Wave properties, types and behavior. The wave equation Progressive and standing waves. Variation of</p>				

velocity of sound with temperature, sound intensity, loudness and the decibel. The Doppler Effect, water waves, wave motion in deep and shallow water, tides. Principles of Meteorology, end systems Electromagnetic spectrum:

Electricity: Continuous Charge distribution, Force and Electric Field due to Continuous Charge distribution, Capacitors and dielectrics, Electric potential difference, Electric and magnetic fields associated with electric potentials and currents, Electric Current and its heating effect, Power and its relationship with current and resistance, effects of current, Frequency phase relationship, peak instantaneous and r.m.s. values, reactance, Impedance, Power dissipation, RLC circuits, Simple A.C and D.C circuits, Fuses and circuit breaker device, Principles of electric generations and motors, Outline of shipboard power supplies, Emergency sources, safety precautions for electrical equipment's including spares on board.

Magnetism: Magnetic Field, Magnetic force on a moving charge particle, Hall Effect, the magnetic field caused by current and resulting effects, the effect of a current carrying conductor in a magnetic field, Biotsavart law, Amperes law, Magnetic field of rings and Coil, Magnetic Dipole moment of atom, Laws of Magnetism, Intensity of Magnetization.

Semiconductor Physics and Electronics: Intrinsic and Extrinsic semiconductor, Charge carriers in semiconductor, PN Junction, Half and full wave rectifiers, Filters, Transistors and its characteristics, Transistors as a switch, Transistor as an amplifier, Concept of electromagnetic radiation and the need for a high frequency carrier wave, Propagation. Introduction to Digital Electronics.

Modern Physics: Wave nature of light, wave particle duality, De Broglie hypothesis, Photoelectric effect. Laser and its applications, Atomic spectra, generation and properties of X-ray spectra, Nuclear radiation, Nuclear reactions, Nuclear radiation detectors, Hazard and use of Nuclear Radiation.

Recommended Books:

1. Principles of Physics Extended, 9th Edition International Student Version by David Halliday, Robert Resnick, Jearl Walker, 2011
2. University Physics, 13th Edition International Student Version by Roger A. Freedman, Addison-Wesley, 2011
3. Schaum's Outline of Vector Analysis by Murray R. Spiegel, McGraw-Hill 1968
4. B.Sc. Practical Physics by CL Arora S Chand Limited, 2001

ED-103N Mathematics-I				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Mensuration of Areas & Volumes: Basic formulae for area of regular figures & applied problems, Surface areas & theorem of Pappus; Simpson's and mid ordinate rule, Volume of prism, pyramid and sphere, Simpson's rule applied to volume; center of gravity, Flow of liquid through pipes and valves.</p> <p>Matrix Theory: Basic concepts, definition, notation, Algebra of matrices, Special matrices, Elementary row & column operations; reduced echelon form, Rank of a Matrix, Inverse of a Matrix, Determinate of a square matrix; expansion & general properties of determinants, Cramer's Rule, Determinant & Inverse matrix. Application of matrix theory; Geometrical Transformation, reflection (M), rotation (R), translation (T), enlargement (E), shear (H), stretching (S) and their combinations.</p> <p>Algebraic Equations: Homogeneous & Non-Homogenous system of linear equations, Solution set and admissible operations, Gaussian elimination method, Gauss Jordan Methods, Consistency criterion, Eigen Values & Eigen Vectors.</p> <p>Complex Number: Complex Numbers and its properties, Argand Diagram, De Moivre's Formula & its applications, Root of polynomial equations, Standard functions (exponential, circular and hyperbolic), Inverse trigonometric & hyperbolic functions.</p> <p>Relative Velocity: Composition and resolution of velocities, relative velocity, including solving problems on interception.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Calculus with Analytic Geometry by Howard Anton, (Seventh Edition), Willey, 1980 2. Elementary Linear Algebra by Howard Anton (Tenth Edition), 2010 3. Munro's Mathematics for Deck Officers by Capt. G. E. Earl, 1981 4. Reed's mathematics for Engineers by W. Embleton, 1980 5. Additional Mathematics, J F Talbert & H H Heg, Pearson Education, 2007 				

				<input type="checkbox"/> New Course
NS-111 Principles of Navigation-I				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Description of the Earth: Shape of the Earth, Rotation of Earth's Axis, Gyro and Magnetic Compasses, Departure.</p> <p>Sailing: Parallel, Plane, Mercator, Great Circle and Composite Great Circle Sailings.</p> <p>General Astronomy: Milky-way galaxy and movement of solar system within the milky-way. Solar system, Kepler's Laws of Planetary motion, Earth's Orbit, Cause of Seasons and Length of Days/Nights. Altitudes, Sextant.</p> <p>Time: Local Mean Time (LMT), Equation of time, Solar, Lunar and Sidereal Days, Time Zones.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> Nicholls's Concise Guide, Volumes I & II, Edward J. Coolen, Brown, Son & Ferguson, 1984 Admiralty Manual of Navigation, Volumes I, II & III, H M S O, 1992 Navigation for Watch-keeper, L.W.J. Field 				

				<input type="checkbox"/> New Course
NS-112 Ocean & Off Shore Navigation-I				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Calculating Courses and Distances: Use of Parallel sailing formula, Finding of final position using D.lat, and D.long. Plane Sailing and Practical problems. Day's work. Understanding layout of traverse table. Application of Variation, Deviation Compass Error to True, Magnetic & Compass Courses. Mercator Sailing Formulae, Comparison of mercator sailing and other sailing. Finding of distance and courses by great circle sailing and composite sailing.</p> <p>Nautical Almanac: Understanding the information contained in Nautical Almanac. The Chronometer - Finding Mean Time at Greenwich.</p> <p>Altitude Corrections: Obtaining of true altitude from sextant altitude by applying all necessary corrections. True Zenith distance. Use of Sextant to measure vertical and horizontal angles. Finding of index error of the sextant by Star, Sun etc.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> Nicholls's Concise Guide, Volumes I & II, Edward J. Coolen, Son, & Ferguson, 1984 Admiralty Manual of Navigation, Volumes I, II & III, H M S O, 1992 Navigation for Watch-keeper, L.W.J. Field 				

NS-113 Seamanship – I				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	1	1	80	
Pr.	1	2	20	Remarks
<p>BASIC PERSONAL CONDUCT: Norms of personal conduct ashore and on-board ship. Carrying out orders, personal appearance. Financial affairs including Personal Insurance, Social Security Contributions and Awareness of Ship's Documentation. Health and Personal Hygiene, Prohibition of Drugs, Alcohol be insured. Ships Medicine Chest as per requirement.</p> <p>GENERAL TERMS APPLIED: Terms applied to a ship Structural Parts. Using of Ship Directions and positions related to her Courses. Glossary of Shipping Terms.</p> <p>HELMS MAN SHIP: Interpretation of 0 – 360° notation. The division of Card into 'Points' and 'Half - Points' as well as Relative bearings of objects.</p> <p>WATCH ORGANISATION & MUSTERS: Procedures of Watch Systems at Sea/Ports.</p> <p>ROPES & WIRES: Properties of natural fiber and wire ropes, materials in common use and their properties.</p> <p>LIFTING GEARS: Blocks Types/Parts and Care & Maintenance. Purchase and Tackles. Types of Derricks/Cranes.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> Nicholl's Seamanship & Nautical Knowledge by A.N. Cockerof, 2004 Seamanship Techniques, D. J. House, 2000 The Theory and Practice of Seamanship by Danton, 2002 Mariners Hand Book, H. M. S. O. Survival at Sea by Cdre.N.F. Keens Survival at Sea by C.H. Wright, Son and Feguson (2003) Personal Safety on Ships, D O T. The Collision Regulations explained by C.H. Wright, 1981 Code of Safe Practice. H. M. S. O., 1981 Bridge Procedures Guide(ICS) Efficient Deck Hand by C.H. Wright, Brown, Son & Ferguson, Limited, 2012 A Pocket guide for cold water survival, I. M. O. Ship Fire Fighting Manual, Polytech-International Boat Work by L. G. Taylor Search & Rescue Manual, I. M. O. Manual on Oil Pollution, I. M. O. Marine Pollution 1973, I. M. O. Safety of Life at Sea, I.M.O. 1999 Prevention of Marine Pollution, I. M. O. Tanker Safety & Pollution Prevention, I. M. O. The Inert Gas System, I. M. O. STCW 1995(2010) <p>Seamanship(Practical)-I</p> <p>ROPE WORK: Construction of Natural and Synthetic ropes-lay of rope. Small stuff.Rope work and cordage tools. Fid s-Marline spikes serving board - serving Mallet, Palm and needles. Seizing, worming, Parceling and serving. Whipping.</p> <p>BOAT WORK: Types of Boats. Parts & Equipment of Boats</p> <p>BENDS AND HITCHES: Bends and Hitches in common use on board ships.</p> <p>ROPE WORK: Rope splicing, various types of splices used on board ships:</p> <p>BOAT WORK: Boat pulling terms. Practical Boat pulling-lowering and hoisting boats. Types and parts of Davits.</p>				

NS-114 Marine Communications				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	2	2	100	
Pr.	1	2	----	Remarks
<p>Basic Definitions: The purpose of international code of signal. Addressee, Group, Hoist, Identity signal originator procedure signal, receiving station, Station of origin, tack line, transmitting station, visual signaling.</p> <p>Morse Code, Letter and Figure Spelling: Morse Code from A to Z and 1 to 0 letter and figure spelling from A to Z and 1 to 0.</p> <p>Description of Flags: Recognizing Alphabetical flags, Numeral pendants and substitutes. Sending & receiving MORSE BY HAND FLAGS OR ARMS.</p> <p>Types of Signal Letters: Single letter signals, two letter signal, three letter signals, four letter signals, five letter signals.</p> <p>Methods of Signaling: Flag signaling, flashing light and sound signaling, voice over loud hailer, radio telegraphy and radio telephony.</p> <p>Parts of Signal Made by Flashing, Practical: Reception and transmission of signal by flashing light at the rate of 15 characters per minute.</p> <p>Global Maritime Distress & Safety System (GMDSS): Introduction of GMDSS & familiarization with system and equipment.</p> <p>Coding and De-Coding: Communications with port operation, coast station and vessel traffic services in the form of traffic lists and Trans Receiver in the form of Coded Letter Signals.</p> <p>Flag Signaling: Communications by flags between men-of-war and merchant vessels, Position of hoists on different positions, use of Answering pendent.</p> <p>Practical: Reception and transmission of signal by flashing light at the rate of 15 characters per minute.</p> <p>Signaling: Communication with flag Signals in coded groups to indicate various Navigational terminologies including Affirmative, Negative and Interrogative expressions.</p> <p>Morse Signaling: Procedure signals and signs, form of message. Describing how to signal depths. Practical: Transmission and reception of signal by flashing light.</p> <p>Sound Signaling: Procedure for transmission of sound Signal between ice breaker and assisted vessels. Procedure for sending a message to unknown ship and Letter Codes as per International Code of Signals.</p> <p>Note: Cadets will be examined in transmitting and receiving actual messages where they will be declared pass only if they obtain at least 90% marks.</p> <p>Recommended Books</p> <p>1. International Code of Signals, Published by IMO, 1987</p>				

				<input type="checkbox"/> New Course
NS-115 General Ship Knowledge-I				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>a) Ship Stability Hydrostatic Principles: Definitions of Hydro physical quantities (mass, density, relative density etc). Principles of Floatation and use of dead weight tables/curves. Relationship between pressure and depth of water and relevant Mathematical Calculations Form Co-Efficient: Definition of length, beam, AP, LBP, draught and Freeboard. Block co-efficient of fineness, calculations finding Cb from displacement and dimensions and vice versa. Finding of Cw from W.P.A. and dimensions.</p> <p>b) Ship Construction General Description of Ships: General Description of a dry cargo ship: Arrangements of holds, ballast spaces, machinery spaces, accommodation etc. (Crude Carrier). General description of a tanker: (tanks, pump-rooms and cofferdams etc). Types of Ships: (Passenger; Bulk; Container, Combination Carrier, RORO. Measurement terminology - Definition of Net & Gross Tonnage. Light and loaded displacements, Deadweight, LOA. Length at Waterline. LBP, Lloyd's, moulded beam, depth and draft. Structural Terminology: Definition of camber, rise of floor, flare, sheer, rake, etc. Knowledge of Structural Parts of a Ship: Names and explanation of various constructional elements, parts, compartments and tanks. Identification of above on a ship's plans and their use. General idea on welding, riveting, burning and the Operational precautions.</p> <p>c) Cargo Handling & Stowage (Cargo Operations) Basic Definitions: Understanding hold, hatch covers, Dunnage, Spar Ceiling, Bilge Wells, Deep Tanks, Broken Stowage, Stowage Factor, Freight, Bale and grain capacity, measurement of Cargo/Spaces. Preparation of Holds: Cleaning hold, Dunn aging, Preparations for loading cargo, Separation, Marking of cargoes. Securing, Lashing. General Inspection, infestation, Hygienic standards of bilges. Deep tanks, Preparations for loading/discharging of liquid cargoes. Cargo Handling Equipment: Deck Machinery, Winches, Capstans. Various types of Hatch Covers and their Opening and Closing procedures, Heavy lifting cargo gears, Types of Derricks and Stress Calculations.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Ship Stability by D.R. Derrett, Butterworth-Heinemann, 2011 2. Merchant Ship Construction by H.J. Puresy, Brown, Son & Ferguson, 2002 3. Cargo Work, D. J. House, 1998 4. Merchant Ship Stability by J. Pursey, Butterworth-Heinemann, 1983 5. Ship Construction Sketches and Notes by J.F. Kemp, 1976 6. Reed's Ship Construction Vol-5 by F. Stoke, Bloomsbury Academic, 2004 7. Know Your Own Ship by B. Baxter 8. Ship Stability Notes and Examples by J.F. Kemp 9. Ship Construction by D.J. Eyres 10. Thomas Stowage by Capt. O. O. Thomas 11. Cargo Work by Capt. L. D. Conway 12. Cargo Access Equipment for Merchant Ships by 				

I.L.Buxton 13. Tanker Cargo Handling by D. Rutherford 14. Code of safe practices for Solid Build Cargoes, I.M.O. 15. Code of Safe practices for Merchant Seamen H.M.S.O. 16. Code of Safe Practice for ships carrying timber deck cargoes I.M.O. 17. Grain Rules I.M.O. 18. Emergency Procedures for ships carrying dangerous goods. I.M.O. 19. International Maritime Dangerous Goods Code (IMDG Code) I.M.O. 20. International Safety Guide for Oil Tankers and Terminals, Int..Chamber of Shipping 21. Int. Association of Ports and Harbours	
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ED- 151 Islamic Studies				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
Th.	Cr. Hrs.	Contact Hrs.	Exam Marks	
	1	1	100	
Pr.	----	----	----	Remarks
<p>The Holy Quran: Virtues of Quran, Benefaction and Verses of Quran, Surah All – Hujarat – Text and Translation, Surah Al – Furqan – Verses 63 -77 – Text and Translation.</p> <p>Al – Sunnah: The Importance of Sunnah, Hadith from Riaz –un-Salaheen(250, 251, 264, 266, 171, 273, 291, 298, 299, 593, 594, 596, 606, 628, 630, 344, 591)</p> <p>Islam in the Light of Quranic Verses and Ahadith: Toaheed, Risalat and the Day of Judgement, Namaz, Haj, Zakat and Jihad</p> <p>Uswa-e-Hasana: THE Holy Prophet’s Life in Makkah – Birth to hijrah and His way of preaching, The Holy Prophet’s Life in Madinah; Brotherhood(Fraternity), The Madinah Pact, Conquest of Makkah, The Last Sermon at Hajjat –ul- Wida.</p> <p>Normal Values of Islam and the Fundamental Attributes of Islamic Society: Character Building, The meaning of High Morality, Truthfulness, Tawakkul (Trust in Almighty), Taqwa (Abstinence from evil), Respect for Covenant or Treaty, Austerity, Regard for Parent and Elders, Tolerance and Broad Mindedness, Islamic Society, Kasb-I- Halal (Pious Earnings) Human Dignity, Social, Legislative Political and Economic Justice, Shoora.</p> <p>Role of Islam in The Reconstruction of Civilization of Mankind: Islam a Retrospect, Middle Nation and Best Nation Slavery, Role of Islam in the World history; Reason and knowledge as Basis of Faith; Contribution of Islam to Sciences.</p> <p>Our Problems and their Solutions: Some of the problems facing Pakistan today as corruption, Un-employment, man-power and Literacy, immorality and their solutions. Socio- Economic problems and their solutions.</p> <p>Recommended Books:</p> <ol style="list-style-type: none"> 1. Sirat-e- Mustakeem by Abdul Qayyum Natiq, 2013 2. Islamic Ideology Part I & II by Anwar Hashim 3. What Islam is? by Muhammad Asif Kidwai 4. Islamic Education by M.D. Zafar 5. Riaz-us- Saleheen Part- I, by Sharf- Uddin Noori 6. Towards understanding Islam (Diniyat) by Abul Alla Maudoodi 7. The Sealed Nectar by Safi-ur- Rehman Mubarak Puri 				

				<input type="checkbox"/> New Course
ED-152 Ethical Behaviour (Alternate course for Non-Muslim students in place of ED-151)				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	1	1	100	
Pr.	----	----	----	Remarks
<p>Introduction to ethics, definition of ethics, differentiation between normative and positive science. Problem of free will. Method of ethics, uses of ethics. Ethical theories. History of ethics, Greek ethics, medieval, modern ethics. Basic concept of right and wrong; good and evil. Utilitarianism, hedonism, self-realization, egoism, intuitionism, rationalism, Kant's moral philosophy, Ethics & Religion, the relation of ethics to religion. Basic ethical principles of major religions: Hinduism, Judaism, Buddhism, Zoroastrianism, Christianity, Islam. Ethics, Society and moral theory, Ethical foundation of Rights and Duties, Applied ethics, Society as the background of moral life. Universalism and Altruism. Theories of punishment.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. An Introduction to Ethics, Lillie W., 3rd Edition, Reprinted in 1974 2. Philosophy: The Basic, Warburton N., Routledge, London, 4th Edition, 2004 				

				<input type="checkbox"/> New Course
ED-153 Applied Chemistry				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	80	
Pr.	1	2	20	Remarks
<p>Gases: Gas laws, Vanderwaal's equation, gas equation, critical phenomenon, liquefaction of gases, specific heat (molar heat capacity), Liquid and solution; surface tension, viscosity, ph, colloidal chemistry, osmosis, reverse osmosis, spectrophotometer, liquid crystal (smectic, nematic, cholesteric)</p> <p>Thermodynamics: first law, second law, calorimeter, specific heat of solid and liquid, thermo chemistry.</p> <p>Electrochemistry: ohms law, thermocouple, photoelectric effect, work power and energy, electrolysis, electro chemical cell, electrolytic cell, electroplating.</p> <p>Corrosion: theories, inhibition and protection, mechanism of electrochemical corrosion, cathodic and anodic protection, steel manufacturing, classification of steel and stainless steel, type of alloy.</p> <p>Water and sewage: hardness, quality of water, water purification, sources of water, water analysis.</p> <p>Fuels: classification, gross and net calorific value, storage of fuel, flash point, limit of flammability, explosive limit, fuel as a source of energy.</p> <p>Metal and alloy: properties and general composition such as iron, copper, aluminum, chromium, zinc used in engineering field. Inorganic engineering materials(cement and glass) organic engineering materials(polymers, rubber, plastic and paint, semiconductors and dielectric materials).</p> <p>Lubricants: classification, purification and refining of lubricants, mechanism, testing of lubricants, Oil purification: microbial degradation of lubricating oil, gravitation, separation, filtration of fuel and lubricating oil.</p> <p>Pollution: types of sphere, air pollution, water pollution, soil pollution, solid waste management.</p> <p>Recommended Books</p>				

1.	General Chemistry, by Darrell D, Ebbing and Steven D. Gammon: 8 th Edition, Houghton Mifflin Company, New York, 2008	
2.	Principles and Modern Applications, General Chemistry, Petrucci, Harwood, Herring, 9th Edition, 2006	
3.	Essential of Physical Chemistry, B.S.Bhal, G.D. Tulli, Avum Bahl, (Multi Colour Edition)	
4.	Engineering Chemistry, R. Goplan, 3RD Edition, 2009	
5.	Introduction to Chemical Engineering, S.S.Dara, S Chand 2008	
6.	Engineering Chemistry, S: Uppal, M. M. Bhatia, S C., Khanna Publishers, 2005	

				<input type="checkbox"/> New Course
ED-154 Mathematics-II				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Differential Calculus: Functions, Graph of a functions, Limit of function, Continuity of function, Gradient and rate of change, Maximum and minimum points, Points of inflection, L` Hospitals rule, Partial differentiation, Exact differential equations and its application in computing errors, Solution of non-linear equation by using Newton Raphson method, Properties of ellipse and hyperbola of navigational importance.</p> <p>Integral Calculus: Basic techniques of integration, approximate integration, Application of integration.</p> <p>Ordinary Differential Equations Introduction, Formulation of ODE's, General & Particular Solution, Initial Value Problems (IVP) and Boundary Value problems (BVP), First order linear differential equation with applications, Approximate solution of linear differential equations, The Linear Second Order ODE's (Homogeneous and Non-Homogeneous Cases), Cauchy-Euler ODE's and their Solution Procedure.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Advance Engineering Mathematics by Erwin Kreyszig, Seventh Edition, John Wiley & Sons Inc, 1992 2. Calculus & Analytical Geometry by Howard Anton, Fifth Edition, by John Wiley & Sons, 1988 3. Differential Equations by Dannis G. Zill, Sixth Edition, 2004 				

NS-161 Principles of Navigation-II				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Time: Twilight, Civil, Nautical and Astronomical, use of Nautical Almanac to find out twilights, Necessary conditions for twilight and night continuous day light or darkness.</p> <p>Celestial Sphere: Celestial sphere-true and Mean motion of sun, Ecliptic, Celestial Poles, Meridians, Equinoctial. The obliquity of the ecliptic. Equinoctial system of co-ordinates S.H.A. Declination and Polar distance. Nautical Almanac. Hour angle, G.H.A., L.H.A. and Longitude relationship. Vertical circles and Prime Vertical. Elevated and depressed poles. Altitude of elevated pole in observer's latitude, observer's upper and lower meridian. Apparent daily path of all bodies.</p> <p>Relationship between azimuth, quadrantal bearings and 360° notation bearings. Rising and setting points and amplitudes. Circumpolar Bodies. Figure drawing on the plane of rational horizon and observer's celestial meridian using equidistant projection. Effects of latitude on the accuracy of amplitude observation. Theoretical and visible rising and setting of sun.</p> <p>Spherical Trigonometry: Properties of spherical triangles, Solution of right & quadrantal spherical triangles, Solution of oblique spherical triangles. Haversine formulae and Napier's Rules to solve PZX triangle.</p> <p>Position Line (P/L) Theory: Combination of equinoctial and horizon system of co-ordinates. Plotting celestial position lines. Meridian altitudes of celestial bodies and determination of observer's latitude from observation of bodies on the meridian above and below the pole. Pole star observations to find latitude and direction of P/L.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Nicholls's Concise Guide, Volumes I & II, Edward J. Coolen, Brown, Son & Ferguson, 1984 2. Admiralty Manual of Navigation, Volumes I, II & III, H M S O, 1992 3. Navigation for Watch-keeper, L.W.J. Field 				

				<input type="checkbox"/> New Course
NS-162 Ocean & Off Shore Navigation-II				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Compass Errors – Azimuths: Solution of amplitude problems. Use of isogon lines and other information on charts to obtain magnetic variation at various places. Compass errors and deviation for ship's head. Times of Twilight, Rising, Setting and Meridian Passage Times of Heavenly bodies.</p> <p>Astro Position Line: Latitude by meridian altitude in both hemispheres. Relationship between altitude of the elevated pole and the observer's latitude. Circumpolar stars at upper and lower transits, position line and its direction. Use of Polaris to find the observer's latitude. Position line and its direction. Formation and solution of PZX triangle. Derivation of longitude from the LHA and GHA. Intercept terminal point through which to draw P/L (Mareq. St. Hilaire method). Pre-computation of altitude and azimuths of heavenly bodies for position fixing, using star charts. Modern sight reduction tables. Astronomical and terrestrial position lines, visual bearings and radio line of position. Position of the observer from two or more position lines obtained simultaneously.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Nicholls's Concise Guide, Volumes I & II, Edward J. Coolen, Brown, Son, & Ferguson, 1984 2. Admiralty Manual of Navigation, Volumes I, II & III, H M S O, 1992 3. Navigation for Watch-keeper, L.W.J. Field 				

				<input type="checkbox"/> New Course
NS-163 Seamanship – II				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	1	1	80	
Pr.	1	2	20	Remarks
<p>GENERAL SAFETY AND ACCIDENT PREVENTION: Awareness in respect of Safe Usage of Deck Appliances / Machineries, mooring ropes and Wires, Rigging of Gangways and Hatchways. Lighting / Gas Freeing Arrangements in enclosed spaces inclusive of Double Bottom Tanks. Donning of Safety Clothing's as required under various IMO Conventions. Exercising effective drills regularly.</p> <p>ROPES AND WIRES: Types of whipping and their various uses. Types of Seizing and their uses. Stoppers and their uses. Splices and their uses. Methods of taking Soundings. Safety Precautions to be taken when constructing, rigging and using stages and Boson's Chair.</p> <p>ANCHOR, WINDLASSES & STOWAGE OF CABLE: The constructional features of anchors and cables also Knowledge of the Glossary anchoring terms.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Nicholl's Seamanship & Nautical Knowledge by A.N. Cockerof, 2004 2. Seamanship Techniques, D. J. House, 2000 3. The Theory and Practice of Seamanship by Danton, 2002 4. Mariners Hand Book, H. M. S. O. 5. Survival at Sea by Cdre.N.F. Keens 6. Survival at Sea by C.H. Wright, Son and Feguson (2003) 7. Personal Safety on Ships, D O T. 8. The Collision Regulations explained by C.H. Wright, 				

<p>1981</p> <ol style="list-style-type: none"> 9. Code of Safe Practice. H. M. S. O., 1981 10. Bridge Procedures Guide(ICS) 11. Efficient Deck Hand by C.H. Wright, Brown, Son & Ferguson, Limited, 2012 12. A Pocket guide for cold water survival, I. M.O 13. Ship Fire Fighting Manual, Polytech-International 14. Boat Work by L. G. Taylor 15. Search & Rescue Manual, I. M. O. 16. Manual on Oil Pollution, I. M. O. 17. Marine Pollution 1973, I. M. O. 18. Safety of Life at Sea, I. M.O. 1999 19. Prevention of Marine Pollution, I. M. O. 20. Tanker Safety & Pollution Prevention, I. M. O. 21. The Inert Gas System, I. M. O. 22. STCW 1995(2010) <p>Seamanship(Practical)-II</p> <p>ROPE WORK: Steel wire ropes, construction, uses on board.</p> <p>TACKLES AND PURCHASE: Type of blocks - wooden steel, their parts. Reeving various blocks, tackles to advantage, disadvantage. Use of - shackles thimbles hooks, wire rope grips, clips, turn buckles etc.</p> <p>BOAT WORK: Power boat handling lowering hoisting.</p> <p>ROPE WORK: Opening a new coil of fibre - steel wire Rope. Mousing a hook, shackle pin. Passing rope and chain stoppers. Putting and removing mooring ropes on the bits. Rigging and using bosuns chair and stages for working aloft and over sides.</p> <p>BOAT WORK: Sails - Sailing terms, Sail boat handling</p> <p>PILOT LADDER: Detailed construction of pilot ladder.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. The Theory & Practice of Seamanship by DANTON, 2002 2. Nicholas Seamanship & Nautical Knowledge by A.N. Cockerat, 2004 3. Knots splices & fancy work. By C.L. Spencer 	
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				<input type="checkbox"/> New Course
NS-164 Marine Meteorology				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Marine meteorology as a science. Mercurial barometer-theoretical and practical aspects. Aneroid Barometer. Barograph, Different type of thermometers and temperature scales. Hygrometers. Sea-surface temperature as distinct from surface air Temperature. Earth's atmosphere; physical characteristics and division.</p> <p>Heat-exchange between the earth and its atmosphere: the "lapse rate". Water-vapours in atmosphere; humidity and its parameters. Atmospheric pressure & its related aspects. "Condensation" and "precipitation. Formation of fog, and types of cloud. Correlation between "wind" and "pressure" the forces involved. Principal cloud types.</p> <p>Basic concepts relating to "low pressure" and "high pressure" systems. Elementary concepts regarding "air masses" and allied aspects. Elementary concepts about "fronts" and related aspects. Elementary concepts regarding "high latitude frontal depression". "Occlusion" - mechanism, types. Elementary theoretical and practical concepts about Tropical Revolving Storms. Beaufort wind scale. Introduction to met-reporting.</p>				

Principal ocean currents. Floating ice.	
Recommended Books	
<ol style="list-style-type: none"> Notes on Marine Meteorology by Kemp & Young, Stanford Maritime, London, 1999 Marine Meteorology for Mariners, Marine Div. (M.O) Meteorological, H.M.S.O. Office London (U.K) Marine Meteorology at Sea by Ray Sanderson, 1982, Stanford Maritime London. 	

				<input type="checkbox"/> New Course
NS-165 General Ship Knowledge-II				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>a) Ship Stability Tones per cm Immersion (TPC): Definition, derivation and effect of density on TPC. Draft Calculations and amount of cargo load/discharge. Hydrostatic curves for TPC and Displacement. Simpson Rules: Simpson Rule in the computation of areas, volumes Centroids.</p> <p>b) Ship Construction Stresses in Ship's Structures: Stresses on Ship's Structure due to Shearing & Bending forces/moments. Causes of Stresses in a ship's structure. Stresses due to Rough Sea on various parts of Ship. Stresses Created by uneven loading, concentration of mass. Local stresses. Stresses during buildings. Framing Systems: Longitudinal, Transverse, Combined and Reason for using different framing, Arrangement of frames side girders. Transverse members in each system of framing.</p> <p>c) Cargo Handling & Stowage (Cargo Operations) Methods of Slinging: Use, care and maintenance of cargo gear, safety requirements. Introduction to horizontal & vertical systems. Cargo Stowage Organizations: Cargo Plans, Distribution of Cargo to avoid Stresses. Calculations of Cargo Stowage. Loading/discharging heavy lifts. Prevention of over stowage and sequence of discharge. Ventilation and Sweat: Factors to control sweat. Natural and Forced Ventilation systems and their operation. Controlling humidity. Special Cargoes.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> Ship Stability by D.R. Derrett, Butterworth-Heinemann, 2011 Merchant Ship Construction by H.J. Puresy, Brown, Son & Ferguson, 2002 Cargo Work, D. J. House, 1998 Merchant Ship Stability by J. Pursey, Butterworth-Heinemann, 1983 Ship Construction Sketches and Notes by J.F. Kemp, 1976 Reed's Ship Construction Vol-5 by F. Stoke, Bloomsbury Academic, 2004 Know Your Own Ship by B. Baxter Ship Stability Notes and Examples by J.F. Kemp Ship Construction by D.J. Eyres Thomas Stowage by Capt. O. O. Thomas Cargo Work by Capt. L. D. Conway Cargo Access Equipment for Merchant Ships by I.L. Buxton Tanker Cargo Handling by D. Rutherford Code of safe practices for Solid Build Cargoes, I.M.O. 				

15. Code of Safe practices for Merchant Seamen H.M.S.O. 16. Code of Safe Practice for ships carrying timber deck cargoes I.M.O. 17. Grain Rules I.M.O. 18. Emergency Procedures for ships carrying dangerous goods. I.M.O. 19. International Maritime Dangerous Goods Code (IMDG Code) I.M.O. 20. International Safety Guide for Oil Tankers and Terminals, Int..Chamber of Shipping 21. Int. Association of Ports and Harbours	
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				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
ED-201		Business Communication-I		
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Formal Oral Presentations: Development of Persuasive, Informative and explanatory presentations. Selection of topic, collection of information; organizing information: a) Introduction b) Body c) Conclusion, Rehearsal of the Presentation.</p> <p>Designing Effective Electronic Presentations: Using Templates, working colours, building bullet points, Adding Multimedia and other effects.</p> <p>Critical Reading: Critical reading strategies (Previewing, Contextualizing, questioning to understand and remember, reflecting on challenges, Outlining and summarizing, evaluating an argument, Comparing and contrasting related readings etc.), Practice reading passages.</p> <p>Essay Writing: Descriptive, narrative, expository and process Essays (at least four essays of each type); analysis of the essays (according to each type), finding thesis statement, topic sentences and supports etc.; Exercises: Decide a topic, collect information about the topic (brain storming, mind mapping etc.), writing first draft of the essay, feedback on content, organization and language of the essay, Peer feedback (if appropriate for the group)</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. College Writing Skills, Langan, J. 2nd Edition, 1985, McGraw Hill (Re-print in 2005) 2. Study Skills in English, Wallace, J. M. 2nd Edition, Cambridge University Press, 2004 3. Writing Academic English, Oshima Alice, &Houge A. Longman / Pearson, 2006 4. Business Communication Today (6th Edition) by Courtland L. Bovee & John V. Thill. Prentice Hall International Inc. 				

				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
		ED-202 Computer Programming & Applications		
		Cr. Hrs.	Contact Hrs.	Exam Marks
Th.		1	1	80
Pr.		1	2	20
Language: definition, structures, survey of some programming				Remarks

	<p>languages, special and general-purpose languages, data types, comparative study by means of primitive and composite data structures, control structures by means of expression of algorithms. Maritime related application softwares (General tools, Maple, Matlab, CAD etc.)</p> <p>Recommended Books:</p> <ol style="list-style-type: none"> 1. Turbo C, Robert Lafore, Financial Times Prentice Hall, Rev Sub Edition, 1988. 2. Object-Oriented programming in C++ (4th Edition), Sams 2001 3. "Let us C", Yashwant P. Kanetkar, Jones & Bartlett Publishers, 8th Edition, 2008. 	
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				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
NS-211 Seamanship – III				
		Cr. Hrs.	Contact Hrs.	Exam Marks
	Th.	2	2	100
	Pr.	----	----	----
				Remarks
<p>SHIP MANOEUVERING AND HANDLING: Recounting the basic principles involved in executing various manoeuvres in different weather/loading conditions as well as berthing /un-berthing, anchoring, turning short round at High Seas and in Confined Waters. Methods of taking on board survivors from lifeboats and / or life rafts. Executing Maneuvers in different Emergency Situations in Sea Perils.</p> <p>SEARCH AND RESCUE: Categorizing/Combating types of distress incidents and distinguishing the various agencies that will be involved as per International Aeronautical and Maritime Search and Rescue System (IAMSAR).</p> <p>EMERGENCY PROCEDURES: Handling different situations in emergencies such as Steering Failure, Engine/Machinery Failure, Cargo/Lashing Damages at Sea or Passengers Safety requirements. Proper usage of Ship's Life Saving Appliances and Pyrotechnics in Emergencies.The arrangements for towing, and being taken in tow in an emergency.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Nicholl's Seamanship & Nautical Knowledge by A.N. Cockerft, 2004 2. Seamanship Techniques, D. J. House, 2000 3. The Theory and Practice of Seamanship by Danton, 2002 4. Mariners Hand Book, H. M. S. O. 5. Survival at Sea by Cdre.N.F. Keens 6. Survival at Sea by C.H. Wright, Son and Feguson (2003) 7. Personal Safety on Ships, D O T. 8. The Collision Regulations explained by C.H. Wright, 1981 9. Code of Safe Practice. H. M. S. O., 1981 10. Bridge Procedures Guide(ICS) 11. Efficient Deck Hand by C.H. Wright, Brown, Son & Ferguson, Limited, 2012 12. A Pocket guide for cold water survival, I. M.O 13. Ship Fire Fighting Manual, Polytech-International 14. Boat Work by L. G. Taylor 15. Search & Rescue Manual, I. M. O. 16. Manual on Oil Pollution, I. M. O. 17. Marine Pollution 1973, I. M. O. 18. Safety of Life at Sea, I. M.O. 1999 19. Prevention of Marine Pollution, I. M. O. 20. Tanker Safety & Pollution Prevention, I. M. O. 				

	21. The Inert Gas System, I. M. O. 22. STCW 1995(2010)	

NS-212 Coastal Navigation-I				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	----	----	----	
Pr.	3	6	100	Remarks
<p>Charts: Fathom and Metric Charts. How charts are made, Description of Charts. Categories of charts - Ocean charts, Coastal charts, Plans - some special types of charts. Hyperbolic lines- Lattice charts- Routing charts. Salient features of charts - symbols and abbreviations used. Information available from charts.</p> <p>Miscellaneous Admiralty Publication: Notices to Mariners information they contain large and small corrections. Other publications related to charts and navigation information they contain.</p> <p>Finding Position, Course and Distance: Compass rose - use of chart work instruments. Position by bearing and distance. Latitude, longitude.</p> <p>Fixing Ship's Position: Various methods of obtaining positions and position by cross bearings. Ranges/position D.R. position fix estimated position and fix</p> <p>Compass Corrections: True and Magnetic meridians. Variations - Deviation and compass error definitions. Conversion of compass courses and vice versa. Magnetic courses to true courses and vice versa. Compass courses to true courses and vice versa. Gyro errors and corrections.</p> <p>Running Fix: Simple running fix position. Double angle on the bow. Four point bearing selected angles.</p> <p>Horizontal & Vertical Angles: Finding position by horizontal and vertical sextant angles. Bearings by erroneous compass and finding compass error. Dipping and rising bearing of lights. Distance sailed round on arc.</p> <p>Current and Leeway: D.R position estimated position. Set and rate of current effects of currents and Examples and exercises. Application of lee Way. Examples and exercises.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Chart and Abbreviations, H M S O , 2008 2. Nicholls's Concise Guide Vol-I by H.Brown, HHB, 2010 3. Nicholls's Concise Guide Vol-II by H.H.Brown ,HHB, 2010 4. Navigation for Watch-keepers by L.W.J. Field, LWJF 5. Basic Costal Navigation by Convad Dixon, CD, 1985 6. Modern Chart Work by W. H. Squair, WHS, 1992 7. Publications Containing Navigational information, H M S O 				

				<input type="checkbox"/> New Course
NS-213 General Ship Knowledge-III				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>a) Ship Stability</p> <p>Effect of Density on Draught:Draft and density calculations for box shaped vessels. Marine Hydrometer and its use. Fresh Water Allowance. Bilging & Permeability.</p> <p>Loading/Discharging and Shifting Weights:Effects of loading/discharging/shifting of weights on Center of Gravity. Moments about the keel and centre line to obtain metacentric height. Forces through Center of Gravity(G),Center of Buoyancy (B) on listed ships. Effective Center of Gravity(G) due to suspended weights. Increase of draft with list. Use of the Ralston stability indicator.</p> <p>Transverse Stability (Small Angles):Movement of Center of Buoyancy in a vessel heeled.Transverse metacentre, metacentric height (GM) and righting lever (GZ), Righting moments. Stable, Unstable and neutral equilibrium and angle of loll.</p> <p>Transverse Stability (Large Angle): Gross curves of stability and their use to obtain GZ. Use of KN curves. GZ curves. Difference in typical curves for stiff and tender ships at angle of heel and angle of loll. Effect of quartering and beam on Ship's stability.</p>				
<p>b) Ship Construction</p> <p>Double Bottom Tanks: Function and Construction: Transverse half section through DB Tank of transverse framed and longitudinal framed ship, types of floors.Bilge drainage systems. Bilge piping. Ballast system, Sounding & Air pipes. Duct Keel. Pounding and Panting. Transverse section, Alternate panting arrangements, Panting arrangements at after end.</p> <p>Structure at Upper Deck:Types of Sheer strake.Hatch coamings and deep webs. Tank lids and coamings of oil tankers with details. Hatch covers. Details of Structure, Superstructures and Fashion plate. Bulwarks, Guard rails, Freeing arrangements, Scuppers, Freeing ports. Bilge Keels.</p>				
<p>c) Cargo Handling &Stowage (Cargo Operations)</p> <p>Safety at Work: Factors effecting safety. Code of Safe practice for Merchant Seamen. Carriage of Dry Cargoes: Calculations for charging freight. Full and Down.Carriage of Bulk Cargoes: "IMO" Code of safe practice for the carriage of Bulk Cargoes, Main hazards associated.Carriage of Grain Cargoes: IMO Regulations, recommendation, procedures and ventilation.Carriage of Coal Cargoes & Deck Cargo Including Timber, IMO code of safe practice for ships carrying timber deck cargo. Carriage of Dangerous Cargoes: Classification of dangerous cargoes, IMDG Code.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Ship Stability by D.R. Derrett, Butterworth-Heinemann, 2011 2. Merchant Ship Construction by H.J. Puresy, Brown, Son & Ferguson, 2002 3. Cargo Work, D. J. House, 1998 				

<ol style="list-style-type: none"> 4. Merchant Ship Stability by J. Pursey, Butterworth-Heinemann,1983 5. Ship Construction Sketches and Notes by J.F. Kemp, 1976 6. Reed's Ship Construction Vol-5 by F. Stoke, Bloomsbury Academic, 2004 7. Know Your Own Ship by B. Baxter 8. Ship Stability Notes and Examples by J.F. Kemp 9. Ship Construction by D.J. Eyres 10. Thomas Stowage by Capt. O. O. Thomas 11. Cargo Work by Capt. L. D. Conway 12. Cargo Access Equipment for Merchant Ships by I.L.Buxton 13. Tanker Cargo Handling by D. Rutherford 14. Code of safe practices for Solid Build Cargoes, I.M.O. 15. Code of Safe practices for Merchant Seamen H.M.S.O. 16. Code of Safe Practice for ships carrying timber deck cargoes I.M.O. 17. Grain Rules I.M.O. 18. Emergency Procedures for ships carrying dangerous goods. I.M.O. 19. International Maritime Dangerous Goods Code (IMDG Code) I.M.O. 20. International Safety Guide for Oil Tankers and Terminals, Int..Chamber of Shipping 21. Int. Association of Ports and Harbours 	
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				<input type="checkbox"/> New Course
NS-214 Watch-Keeping-I				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	1	1	100	
Pr.	----	----	----	Remarks
<ol style="list-style-type: none"> 1. Principles of Watchkeeping <ol style="list-style-type: none"> i) Watchkeeping in restricted Water and Visibility ii) Radio Watch 2. Watchkeeping Arrangements and Procedures <ol style="list-style-type: none"> i) The content, application and intent of COLREG 72. ii) Keeping a safe navigational watch <p>Recommended Books</p> <ol style="list-style-type: none"> 1. International Light, Shape & Sound Signal by D.A. Moore, B.H. Newness, 1993, 2. The Collision Regulations fully explained by C.H. Wright, 1981 3. Basic Principles to be observed in keeping a Navigational Watch, I. M. O. 				

				<input type="checkbox"/> New Course
NS-215 Radar Navigation				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Radar Basics: Working of Radar, Installation and components with simple block diagram. ECHO Principle and its application. Radar horizon and the factors which affect its distance from the observer. Safety precautions necessary in the vicinity of open equipment and the radiation hazards. Raster Scan, their advantages and limitations.</p> <p>Setting up and Maintaining, Displays: Display of targets. The correct Procedures and Safe guards. Various Radar presentations. Alignment, accuracy of the heading marker by comparison with visual observations. Performance monitoring procedure and its use. Functions of various Radar controls. Blind and shadow sectors. Detection of poor response targets, growlers, man overboard and landfall. Radar's limitations.</p> <p>Unwanted and Spurious Response: Problems associated with unwanted and spurious responses. Action of limiter. Potential to detect a target beyond the rain clutter area, recognition of true echo out of multiple and indirect echoes. Radar to radar interference.</p> <p>Range and Bearing: Navigational information provided by radar, sources of errors in accuracy of ranges and bearing. Target features which contributes to its radar response. Active and passive Radar Responders. Comparison of the chart and PPI for radar conspicuous targets. Racons and Ramarks. Passage plan and parallel indexing techniques. Effects of pulse length, beam width, shadowing and radar horizon on charted topography. Minimum range detection limits imposed by pulse length. Comparison of positions obtained by radar and other position fixing systems. Importance of radar for warning of restricted visibility.</p> <p>Radar Plotting: Collision Avoidance. Basic theory of Radar plots. Accuracy of information obtained from afterglow. Real time echo Tracking. Symbols and Abbreviations of target movements. True and relative plot to determine target vessels movement, CPA, and TCPA, aspect etc. Making a complete report. Effect of change in own ship's course and speed. Plotting errors and their effects. Use of reflection plotter. Efficient radar watch-keeping with dual radar facilities. Suitable Radar range and correct plotting interval.</p> <p>Application of COLREG at Sea: Rules relating to Restricted visibility. Need for early action, appreciation of delay and recognition of change by the target vessel. Dangers of assumption made on scanty information. Hazards of small alterations. Advantages of safe speed. Responsibility of vessel in restricted visibility. Alteration of course to port to be avoided when safe and practical.</p> <p>Automatic Radar Plotting Aid: ARPA and its limitations. Construction and use of PPC & PAD in collision avoidance. Practical & Exercises</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Radar Observer's Hand Book by W. Burger, 9THEdn. Brown, Son & Ferguson, 2010 2. Radar Watch-Keeping by Capt. W.D. Moss, Maritime Press, London, 2ndEdn. 1973 3. Worked Examples in Radar Plotting by I. W. Bagshaw, Brown, Son & Ferguson, 1979 				

	<input type="checkbox"/> New Course
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ED-251 Business Communication-II				<input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	3	3	100	Remarks
Pr.	----	----	----	
<p>Letter Writing, Memos and E-mails: Letter, memo and email formats, appropriate language and style, Developing Word Documents using MS Office, Routine official messages and correspondence Using email for routine official correspondence.</p> <p>Writing Short Reports/ Briefs/ Progress Updates: Formats for short reports (Informative and Analytical), Informative reports (for various situations), Analytical reports(for various situations), Brief progress reports or status updates, developing reports/ updates/ briefs using visuals (tables, lists, diagrams, charts, graphs, pictures etc), Sending digital reports through emails</p> <p>Maritime English: Maritime vocabulary, maritime phrases, maritime correspondence</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Business Communication Today (10th Edition) by Courtland L. Bovee & John V. Thill. Prentice Hall International Inc. 2013 2. Maritime English (IMO Model Course 3.17), IMO London, 2015 				

ED- 252 International and Legal Maritime Studies (ILMS)				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	1	1	100	Remarks
Pr.	----	----	----	
<p>Law: English Law, The Common Law, Rules of Equity, Statute Law, Sources of International Law, International Law, Customary Law, Treaties, Maritime Law, Flag State Jurisdiction, Coastal State Jurisdiction, Port State Jurisdiction.</p> <p>International Organizations: International Maritime Organization (IMO), United Nations Conference on Trade and Development (UNCTAD), International Labour Organization (ILO), World Health Organization (WHO), International Telecommunications Union (ITU, World Meteorological Organization (WMO), Committee Maritime International (CMI), International Chamber Of Shipping (ICS), International Shipping Federation (ISF), International Transport Workers Federation (ITF), International Ship Managers' Association (ISMA), International Association of Dry Cargo Ship, Owners (Intercargo), International Association of Independent, Tanker Owners (Intertanko), Baltic and International Maritime Council (BIMCO).</p> <p>Legal Aspects of Ship Ownership and Operation: Ship Construction, Ship Ownership, Ship Sale and Purchase, Ship Registration, Securities and Liens, Master Crew and Other Maritime Labour, General Maritime Safety</p> <p>Legal Aspects of Navigation and Safety at Sea: Marine</p>				

<p>Collisions, Other Marine Accidents, Marine Pollution, Marine Salvage, General Damage Liability.</p> <p>Carriage of Goods and Passengers at Sea: Carriage of Goods, Charter Parties, Time Charter, Voyage Charter, Demise Charter, Bill of Lading, The Hague Rules, The Hamburg Rules, Multimodal Transport, Carriage of Passengers at Sea.</p> <p>Master and Crew: Master's Authority, Master's Liabilities, Master's Power of Arrest, Presence on Board Ship, Relationship with Deck and Engineer Officers, Responsibility for Cadets, Master's Duties, Succession to Command In Emergency.</p> <p>Manning: Manning and Certification, Power to Exempt from Manning Requirements, Prohibition Of Going To Sea Undermanned, Unqualified Persons Going to Sea as Qualified, British Certificates Issued Abroad, Certificates of Service.</p> <p>United Nations Convention on the Law of the Sea (UNCLOS): General Information and Provision, Limits of The Territorial Sea, Passages and Zones,</p> <p>International Maritime Organization (IMO): Brief History, IMO Conventions, Structure of IMO Bodies.</p> <p>ISM Code: Explains the outline of ISM Code (International Safety Management) including the background and process of establishment Introduction to Maritime Law</p> <p>Basic Working Knowledge of the Relevant IMO Conventions Concerning Safety of Life at Sea and Protection of the Marine Environment:</p> <ol style="list-style-type: none"> a. Law of the Sea, b. Safety: <ol style="list-style-type: none"> (i). International Convention on load Lines,1966 (ii). SOLAS, 1974 as amended (iii). SOLAS - Subdivision and stability (iv). SOLAS - Fire protection, detection and extinction (v). SOLAS - LSA and arrangements (LSA Code) (vi). SOLAS - Carriage of grain (vii). SOLAS - Carriage of dangerous goods (viii). The International Ship and Port Facility (ix). Security Code (ISPS Code) (x). Code of Safe Working Practices for Merchant Seamen (xi). Maritime Labour Convention (MLC) 2006 <p>Recommended Books:</p> <ol style="list-style-type: none"> 1. Notes on International & Legal Maritime Studies by Capt. Nasim Ahmad Tariq, 2015 	
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				<input type="checkbox"/> New Course
ED-253 Personal & Organizational Management				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	1	1	100	

Pr.	----	----	----	Remarks
<p>Managing Self</p> <ol style="list-style-type: none"> 1. Self-awareness & Self Esteem[strengths, weaknesses, talents, values, preferences, setting goals] 2. Motivation 3. Prioritization 4. Time Management 5. Stress Management 6. Professional Attitude & Ethics 7. Personality & Nonverbal communication [first impressions, personal appearance, body language, postures, gestures. Manners/etiquettes] <p>Managing Team and collaboration</p> <ol style="list-style-type: none"> 8. Interpersonal Communication [Ethics, principles and problems] 9. Intercultural communication/Multicultural communication [basic norms/principles] 10. Avoiding and managing conflict <p>Managing Organization</p> <ol style="list-style-type: none"> 11. Management Function: Planning, organizing and controlling 12. Resource Management 13. Leadership and decision making <p>Recommended Books:</p> <ol style="list-style-type: none"> 1. Business Studies by Michael Barratt, A Mottershead, 2000 2. Managing Organizational Change, A Multiple Perspective Approach by Ian Palmer 				

Approved				<input type="checkbox"/> New Course
NS-261 Seamanship – IV				
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	2	2	100	Remarks
Pr.	----	----	----	
<p>OFFICER-ON- WATCH DUTIES AT SEA & HARBOUR: Basic principles to be observed in keeping a Navigational Watch, look out and Additional duties required under different Circumstances such as Heavy Weather, Restricted Visibility, Ice Conditions and Navigating in Coastal and Pilotage Waters. Periodic checks of Navigational Equipment.</p> <p>PREVENTION OF POLLUTION OF THE MARINE ENVIRONMENT: All objectives refer to the Marine Pollution Protocol (MARPOL) 1973/78.</p> <p>GENERAL POLLUTION: The regulations for the prevention of pollution by oil and Classifying Different Substances as per MARPOL Annexes. Familiarity with the use of the oil record book (both Tanker and Non-Tanker). The regulations concerning the issue of the International Oil Pollution Prevention Certificate (1973). The regulations concerning the control of discharge of oil, and the requirements of special areas with regards to reception facilities.</p> <p>INTERNATIONAL MARITIME ORGANIZATION: What is I.M.O., its functions and working? Members & Associate member Countries. I.M.O. Conventions, Protocols, Agreements such as STCW, MARPOL, SOLAS. Implementations required under United Nations Conventions of Law of Sea (UNCLOS).</p> <p>THE AUTOMATIC PILOT: Principles of an auto Pilot System. Manual settings and their functions.</p> <p>KEEPING A LOG: Rules and Regulations and common practices regarding Keeping Different Logs on board ships.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Nicholl's Seamanship & Nautical Knowledge by A.N. Cockerof, 2004 2. Seamanship Techniques, D. J. House, 2000 3. The Theory and Practice of Seamanship by Danton, 2002 4. Mariners Hand Book, H. M. S. O. 5. Survival at Sea by Cdre.N.F. Keens 6. Survival at Sea by C.H. Wright, Son and Ferguson (2003) 7. Personal Safety on Ships, D O T. 8. The Collision Regulations explained by C.H. Wright, 1981 9. Code of Safe Practice. H. M. S. O., 1981 10. Bridge Procedures Guide(ICS) 11. Efficient Deck Hand by C.H. Wright, Brown, Son & Ferguson, Limited, 2012 12. A Pocket guide for cold water survival, I. M.O 13. Ship Fire Fighting Manual, Polytech-International 14. Boat Work by L. G. Taylor 15. Search & Rescue Manual, I. M. O. 16. Manual on Oil Pollution, I. M. O. 17. Marine Pollution 1973, I. M. O. 18. Safety of Life at Sea, I. M.O. 1999 19. Prevention of Marine Pollution, I. M. O. 20. Tanker Safety & Pollution Prevention, I. M. O. 21. The Inert Gas System, I. M. O. 22. STCW 1995(2010) 				

NS-262 Coastal Navigation-II				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	----	----	----	
Pr.	3	6	100	Remarks
<p>Position Line by Astronomical Observations: Position lines, Longitude by chronometer method. Position line, Marcq St. Helaire Method. The use of a single position line to approach a position making are of current and leeway efforts. Fixing position by astronomical position lines withdrawn between. Exercises.</p> <p>Passage Planning: Principles of passage planning and execution. Landfalls in thick and clean weather situation of a suitable anchorages and entering measured waters.</p> <p>Tides: Finding times of High and Low water at standard and secondary ports from the tide tables. Use of tables and tide courses to find time at which tide reaches a specific height and corrections applicable to charted heights/depths etc. Exercises.</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Chart and Abbreviations, H M S O , 2008 2. Nicholls's Concise Guide Vol-I by H.Brown, HHB, 2010 3. Nicholls's Concise Guide Vol-II by H.H.Brown ,HHB, 2010 4. Navigation for Watch-keepers by L.W.J. Field, LWJF 5. Basic Costal Navigation by Convad Dixon, CD, 1985 6. Modern Chart Work by W. H. Squair, WHS, 1992 7. Publications Containing Navigational information, HMSO 				

Approved				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
NS-263 General Ship Knowledge-IV				
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	3	3	100	Remarks
Pr.	----	----	----	
<p>a) Ship Stability</p> <p>Inclining Experiment: Purpose of experiment and necessary conditions.</p> <p>Free Surface Effect (FSE): Slack tanks. Virtual loss of metacentric height. Precautions to avoid FSE during voyage. Method of correcting an angle of loll. Effect of longitudinal sub-division of tanks.</p> <p>Longitudinal Stability: Definitions of trim, LCF, GML, trimming moment and MCTC. Change of Trim with Density.</p> <p>b) Ship Construction</p> <p>Stern Structure: Stern Frames. Transom stern. Oil/Water Lubricated stern tubes. Rudders & Propellers.</p> <p>Bulk Heads: Bulkheads, Sub-division, various types of bulkheads. Oil tight bulkheads. Corrugated and stiffened bulkhead. Half cross sectional of cargo compartment of dry/bulk cargo and tankers. Cross section of cellular container ship. Deck fittings, lashings. Half cross section of passenger ship, Combination Carrier, RO/RO.</p> <p>Moorings & Fittings: Fairleads - Mooring bits - Winches - Anchors arrangement for mooring & anchoring forward. Description of Construction: Derricks, Deck Cram Masts, Sampson Posts - support at base.</p> <p>Corrosion: Care and precaution against corrosion in a ships</p>				

structure.

c) Cargo Handling & Stowage (Cargo Operations)

Carriage of Special Cargoes: Tallying, Check lists. Precautions, Pilferage. Unitized Cargoes. Palletized cargo. Container and handling equipment. Lashing of containers.

Carriage of Refrigerated Cargoes: Preparations prior loading. Frozen and Chilled cargoes. Points to inspect in a Cargo: a) Prior loading (b) During loading. c) During Carriage.

Oil Cargoes Safety: Precautions, Checklist, Explosimeter - Chemical absorption gas detectors. Toxic effects of Petroleum gases and skin ailments. Health hazards. Marine Pollution Convention (MARPOL 73/78) Coverage: Annex 1. Precaution to be taken to prevent Accidental Pollution by oil.

Recommended Books

1. Ship Stability by D.R. Derrett, Butterworth-Heinemann, 2011
2. Merchant Ship Construction by H.J. Puresy, Brown, Son & Ferguson, 2002
3. Cargo Work, D. J. House, 1998
4. Merchant Ship Stability by J. Pursey, Butterworth-Heinemann, 1983
5. Ship Construction Sketches and Notes by J.F. Kemp, 1976
6. Reed's Ship Construction Vol-5 by F. Stoke, Bloomsbury Academic, 2004
7. Know Your Own Ship by B. Baxter
8. Ship Stability Notes and Examples by J.F. Kemp
9. Ship Construction by D.J. Eyres
10. Thomas Stowage by Capt. O. O. Thomas
11. Cargo Work by Capt. L. D. Conway
12. Cargo Access Equipment for Merchant Ships by I.L. Buxton
13. Tanker Cargo Handling by D. Rutherford
14. Code of safe practices for Solid Bulk Cargoes, I.M.O.
15. Code of Safe practices for Merchant Seamen H.M.S.O.
16. Code of Safe Practice for ships carrying timber deck cargoes I.M.O.
17. Grain Rules I.M.O.
18. Emergency Procedures for ships carrying dangerous goods. I.M.O.
19. International Maritime Dangerous Goods Code (IMDG Code) I.M.O.
20. International Safety Guide for Oil Tankers and Terminals, Int. Chamber of Shipping
21. Int. Association of Ports and Harbours

				<input type="checkbox"/> New Course
NS-264 Watchkeeping-II				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	1	1	100	
Pr.	----	----	----	Remarks
<p>1. Keeping a Watch in Port</p> <p>i) Keeping an effective deck watch in port under normal circumstances.</p> <p>ii) Keeping a safe deck watch in port when carrying hazardous cargo.</p> <p>2. IALA Maritime Buoyage System</p> <p>3. Weather</p> <p>i) Reports of danger navigation</p> <p>ii) Weather forecasts</p> <p>4. Rules concerning lights and signals</p> <p>i) Distress signals</p> <p>ii) Pilot signals</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. International Light, Shape & Sound Signal by D.A. Moore, B.H. Newness, 1993, 2. The Collision Regulations fully explained by C.H. Wright, 1981 3. Basic Principles to be observed in keeping a Navigational Watch, I. M. O. 				

				<input type="checkbox"/> New Course
NS-265 Electronic Navigation Systems				<input type="checkbox"/> Revised Course
	Cr. Hrs.	Contact Hrs.	Exam Marks	<input type="checkbox"/> Applicable to all Batches
Th.	3	3	100	
Pr.	----	----	----	Remarks
<p>Electromagnetic Waves: Nature and Propagation of Electromagnetic Waves.</p> <p>Gyro Compass: Free gyro scope and its gimble mountings. Gyroscopic inertia and precession. Courses of precession. Tilt Drift effects of earth's rotation. Making a free gyroscope north seeking by use of gravity control and the resulting oscillation of the axis. Use of damping in azimuth and damping in tilt to cause settling of the axis. Achievement of control and damping by replacing ballistic elements with electrical signals. Starting of the gyro compass minimizing settling time by slowing and leveling to the correct heading. Settings to be made or adjusted while the compass is in use. Gyro inputs to Radar, ARPA, ECDIS etc. Alarms fitted to a gyro compass.</p> <p>The Magnetic Compass: Construction of a liquid card magnetic compass, sketching a section through the compass to show the float chamber, the pivot support and arrangement of magnets. Keeping the card practically horizontal in all latitudes. Composition and allowance for change in volume of the liquid. Removing of air bubbles from the bowl. Support of bowl in the Binnacle-Marking of lubber line. Binnacle and arrangements of correcting devices.</p> <p>Echo Sounders and Speed Measurement: Principles of marine echo sounding equipment. Physical factors affecting the velocity of sound waves in sea water. Main components on a block</p>				

diagram. Transducers. Recorders. Echo sounder controls. Cross noise - mechanical and electrical noise. Aeration or Reverberation. Pythagoras error. False echoes or 2nd trace echoes. Maintenance of Echo Sounder.

Automatic pilots. The off course alarms.

Various logs: Dynamic pressure or Pitot log, The impeller log, The Electromagnetic log, and The Doppler log.

Berthing Monitor: Doppler Effect. Doppler Radar. Doppler Sonar.

Basic Principles of Hyperbolic Navigation: The nature of hyperbola - Hyperbolic Pattern with two foci. Principles of hyperbolae being position lines. The causes of ambiguity and reduced accuracy in the base line extension area. Confirmation of two hyperbolic patterns.

Global Positioning System (GPS): Working. Accuracy. GPS Satellite System. Signal. Sources of GPS signal errors. Finding Location with GPS. GPS signal characteristics. GPS system segments. GPS system time. Other satellite positioning systems.

Loran-C System: Basic Loran-C System - Principle of Operation. Transmission pulses. Cycle matching. Measurement of the time Difference. Reception of sky wave signals. Chain identification. Loran-C Charts, Tables and corrections. Coverage and accuracy of Loran-C. Future of Loran.

Electronic Chart Display & Information System (ECDIS): Nautical Chart. Raster Navigational Charts (RNC). Electronic Navigation Charts (ENC). Geodetic Datum. Working of system.

Introduction of Automatic Identification System (AIS): Introduction. System concepts. Integration with ARPA.

Voyage Data Recorder (VDR): VDR, it's working. Requirements for carrying VDR.

Recommended Books

1. Electronic Aids to Navigation by Appleyard, Published by Routledge and Kegan Paul PLC, 1988
2. Radio & Radar Aids to Navigation by Sonnenberg, Butterworths, 1988
3. Admiralty Manual of Navigation Vol-I, Admiralty UK, 6th Edition, 2008

GT-121 Officer Like Qualities-I GT-171 Officer Like Qualities-II GT-221 Officer Like Qualities-III GT-271 Officer Like Qualities-IV				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	NC	NC	----	
Pr.	----	----	----	Remarks
1. Integrity and Truthfulness 2. Self and General Discipline 3. Participation in Sports 4. General Appearance and Bearing 5. Punctuality 6. Participation in Extracurricular Activities 7. Power of Expression (oral & written) 8. Manners and Social Conduct 9. Cooperation				

GT-122 Functional English-I				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
	Cr. Hrs.	Contact Hrs.	Exam Marks	
Th.	2	2	100	
Pr.	----	----	----	Remarks
<p>Oral communication: Participation in small and large group or class discussion: strategies for turn taking, polite expressions for agreeing/disagreeing/presenting one's ideas or view point; giving examples, taking simple notes for connecting further points with prior discussion</p> <p>Study Skills: Dictionary Skills: Reading pronunciation symbols (IPA international phonetic alphabets) for correct pronunciation and syllable stress</p> <p>Note taking: using annotation symbols while reading, methods for summarizing class lectures and readings such as Cornell method</p> <p>Grammar</p> <p>Morphology: Derivation (root, suffixes, prefixes for word classes i.e. noun/verb/adverb/adjective)</p> <p>Tenses (All types): exercise from oxford practice grammar</p> <p>Preposition, Articles: exercises from oxford practice grammar</p> <p>Advanced Reading Comprehension</p> <ul style="list-style-type: none"> • Skimming & Scanning • Speed Reading • Practice of PQ3R / SQ3R • Contextual clues: looking for synonyms, repeated or extended ideas, key terms used etc • Vocabulary enhancement: passage based reading of target words and usage through practice worksheets <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Eastwood J., 1997, Oxford Practice Grammar, Oxford University Press (Re-print in 2006) 2. Langan, J., 1985, College Writing Skills, 2nd Edition, McGraw Hill (Re-print in 2005) 3. Wallace, J. M., 2004, Study Skills in English, 2nd Edition, Cambridge University Press 				

GT-172Functional English-II				<input type="checkbox"/> New Course <input type="checkbox"/> Revised Course <input type="checkbox"/> Applicable to all Batches
Th.	Cr. Hrs.	Contact Hrs.	Exam Marks	
	2	2	100	
Pr.	----	----	----	Remarks
<p>Oral communication</p> <p>Interpersonal communication:Talk for socialization and talk for information exchange, admission interviews or employment interview</p> <p>Listening: Listening to real life communication: authentic listening text and exercises</p> <p>And/OR</p> <p>IELTS:General listening exercises recommendedGrammar</p> <p>Passive voice: units from oxford practice grammar (to write sentences with an understanding when action is more important than 'agent', when 'agent' can be absent in a sentence)</p> <p>Direct & indirect speech: units from oxford practice grammar, paraphrasing</p> <p>Reading</p> <p>Vocabulary enhancement: extended passages based reading of target words and usage through practice worksheets</p> <p>Composition</p> <p>Pre-writing: exploring internet and other sources, free writing, mind mapping, outlining</p> <p>Paragraph writing: writing topic sentence, support with details, using sentence connectors, articles etc. for coherence</p> <p>Punctuation: capitalization, apostrophe, colon, comma, exclamation mark, full stop, hyphen, question mark</p> <p>Recommended Books</p> <ol style="list-style-type: none"> 1. Eastwood J., 1997, Oxford Practice Grammar, Oxford University Press (Re-print in 2006) 2. Langan, J., 1985, College Writing Skills, 2nd Edition, McGraw Hill (Re-print in 2005) 3. Wallace, J. M., 2004, Study Skills in English, 2nd Edition, Cambridge University Press 4. Oshima Alice, &Houge A., 2006, Writing Academic English, Longman / Pearson 				