INDIAN MARITIME UNIVERSITY

FIRST YEAR

SEMESTER – I

UG/MS/BS/T/1101	BASIC ENGINEERING SCIENCE UG22T2101	72 hrs.

SECTION – A (MECHANICS OF MACHINES) [50 HRS]

Unit 1 : Statics (Revision of previous knowledge)

Polygon of forces , conditions for equilibrium , find resultant of forces, moment of force , Condition of equilibrium of a body Balance of moments; Define a couple and the moment of a couple; Determine the moment produced by a couple; Resolve a single force into components acting in two given directions; Resolve a force into a force and a couple.

Unit 2 : Dynamics (Revision of previous knowledge)

DYNAMICS : Relationship between Speed, Acceleration, Mass, Force and Resistance , Define relative velocity; Define velocity as a graphic representation; Use the parallelogram and the triangle of velocities to obtain resultant velocity, Newton's Laws of Motion , Mass, Weight and Force , Law of conservation of momentum; Relationship between forms of Energy, Work and Power , Define Centroides : Centre of gravity. Centroids of areas, Centroids of lines, Centroids of volume, Centroids of masses , Define the factors which govern the stability and overturning of a box; Describe the conditions of stable, unstable and neutral equilibrium; Solve simple numerical and graphical problems involving forces, moments of forces and equilibrium conditions Define . 'potential energy'; & 'kinetic energy' , conversion of energy,

Motion of rigid bodies : Rotation about fixed axis. Rotation under constant moment. Periodic motion, simple Harmonic motion; Application of S.H.M. to masses and springs Simple Pendulum and Compound Pendulum Work, power and energy.

Unit 3 : Light

Spherical mirrors, real and virtual images ; converging and diverging mirrors; location of principal focus of a spherical ; Draw scale diagrams to find the position and size of the image in a spherical mirror; Define linear magnification.

Laws of refraction; refractive index , total internal reflection, 'critical angle'; Derive the relationship between the critical angle and the refractive index; use of prisms as reflectors; optical fiber.

lenses; Define 'principal axis', 'principal foci' and focal length' of a lens; image formed by a lens; function of magnifying glass; function of binoculars, effect of Dispersion of light , scattering.

Unit 4 : Inertia

Centre of mass , Moment of Inertia , deduction of formula ,Transfer formula. Product of inertia and its transfer formula. Maximum and minimum moment of inertia. Neutral axis , Mass moment of inertia and its transfer formula. Radius of gyration.

Unit 5 : Machines

Ideal machines. Law of machines. Reversibility and irreversibility of lifting machines and its application to different types of lifting machines, Define the velocity ratio ; Define efficiency of a machine; Solve the problems on the following machines : lever ;

moving pulley; block and tackle ; inclined plane ; wheel and axle ; gears ; screw jack.

Unit 6 : Friction

Static and Kinetic Friction. - Laws of Friction; Effort required to pull a body up or down an inclined plane. Friction in Square and V-threaded screws, friction in pivots and collars; Conical bearings and thrust bearings plates. Plate clutch, Cone clutches and Centrifugal clutches. .

Unit 7 : Dynamics of Rotation

Dynamics of rotation of particle and rotating bodies, velocity and acceleration in terms of path variables, Torque equation; Work done by application of torque; Kinetic energy of rotation. Total Kinetic energy of a rolling wheel. Gyroscope and it's characteristics ; Precession of gyroscope , gyroscopic effect of engine flywheel and reaction on bearings . Application to Ship's stabilization & steering

Unit 8 : Belt Drives and Brake

Belt and Rope drives; Open and Cross Belt drive; Belt dimensions; Ratio of belt tension; Modification for V-groove pulleys; Power of Belt drives , and maximum power transmitted. Effect of Centrifugal tension; Different types of band brakes . Dynamometers and their working principles; Absorption Dynamometer Band & Rope Brake Dynamometer, Hydraulic Dynamometer.

SECTION – B (MECHANICS OF SOLIDS) [22 HRS]

Unit 9 : Stress and strain (Revision of previous knowledge)

Concept of Elasticity and Plasticity , Stress and Strain, Hooks law, Young's modulus , Modulus of ridigity , Relationship between E & G, testing of material, limit of proportionality , yield point , breaking stress , UTS, Factor of safety

Unit 10 : Torsion & Composite material.

Torsion , Normal & complementary shear and the corresponding strains. Poisson's Ratio and relationship between three elastic constants. Uni-axial loading and deformations; Thermal Stress; Axial Stresses in composite materials. Strain Energy in Simple Stresses: Concept of Strain Energy; Strain Energy due to normal and Shear Stresses; Strain Energy due to impact loads; Resilience.

Unit 11 : Beams

Types of beams, reactions, Sign Convention, Relation between Intensity of Loading, Shearing Force and Bending Moment. Graphical construction of Bending Moment & Shear Force diagrams. Introduction to Built-in and continuous beams Use of empirical formulae for Deflection of beams .

Unit 12 : Bending Moment & Stress

Pure Bending, 2^{nd} moment of area, Stresses due to bending. Position of Neutral axis, Radius of Curvature, Combined bending and direct stress. Short Column with eccentric loading. RCC beams.

PRACTICAL (UG22P2101)

Code No. : P1101 Practical : 36 hrs.

1. Demonstration of a Weston Differential pulley.
2. Demonstration of Block and tackle arrangements.
3. Demonstration of Wheel and axle arrangements.
4. Demonstration of Gears.
5. Demonstration of Screw jacks.
6. Investigation of Hooke's Law by plotting a graph of its extension against the load on a spring.
7. Determination of the elastic constant in the previous objective.
8. A single cantilever (loaded at one end). Determination of E.
9. Use of CRO to study the characteristics of an audio oscillator (frequency, period, amplitude).
10. Determination of velocity of sound in air (using a CRO).
11. Determination of velocity of sound in sea water.
12. Moment of inertia of a rectangular lamina.
13. Moment of inertia of a circular lamina.
14. Moment of inertia of flywheel and frictional torque.
15. To prove that if a system of uni-planar forces are in equilibrium, the links respectively given in magnitude and direction taken in order, form a closed polygon.
16. To determine the reactions of a Loaded Beam.

NOTE :

1) There will be continuous assessment of skills being acquired through class-work, practicals and periodic assignments / project works / tests / orals etc.
2) At least 14 experiments must be undertaken by every student .
3) Laboratory journal to be submitted at the end of each term for assessment .

RECOMMENDED BOOKS :

1) Applied Physics	: J.H. Clough – Smit	Brown, Son & Ferguson Ltd.)
2) Sound	: Khanna & Bedi	
3) Physics - Classical and Modern	: Gettys, Keller, Skove	McGra – Hill International Edition
4) Advanced Level Practical Physics	: M. Nelkon & J.M. Ogborm	ELBS
6) Principles of Physics	: Fredrick J. Bueche	McGra – Hill International Edition
7) Mechanics of Machines	: Hannah - Stephans	Longman, Harlow
8) Strength of Materials	: G. H. Ryder	Macmillan

INDIAN MARITIME UNIVERSITY

FIRST YEAR

SEMESTER – I

UG/MS/BS/T/1102	HEAT & THERMODYNAMICS UG22T2102	72 hrs.

Theory – 50 marks

Unit 1 : Basic Concepts

Heat, Work, Enthalpy, Entropy, Energy, System, Phase Properties, Phase Diagrams. Point Function, Path Function, Reversible and Irreversible Process; P-V Diagram for Work Transfer in Reversible Processes; Closed System and Open System; Steady Flow Process and Non-flow Process;

Unit 2 : Laws of Thermodynamics

Zeroth Law of Thermodynamics.

First Law of Thermodynamics: First law of thermodynamics applied to open systems, Steady flow systems and their analysis, Steady flow energy equation, Boilers, Condensers, Turbine, Throttling process, Pumps etc. First law analysis for closed system (non flow processes). Limitations of first law of thermodynamics, PMM-I.

The second Law of Thermodynamics: - Kelvin Planck statement of second law of thermodynamics, Clausius statement of second law of thermodynamics, Reversible and irreversible processes.

Unit 3 : Properties of Gases

Characteristic Equation of State for a Perfect Gas; Isothermal, adiabatic and polytropic processes; Relationships between pressure, temperature and volume; work transfer in different processes ; Equation of State for Real Gas; Internal Energy of a Gas and Joule's Law; Two Specific Heats of a Gas and Mayer relation between them. Different Gas Processes and Heat & Work Transfer in various Gas Process; Temperature-Entropy Diagram; Applied Problems.

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Unit 4 : Thermodynamic cycles

Carnot cycle, Carnot Principle, Carnot cycle for a gas, Steam and Gas Processes on T-s and h-s charts, Constant Volume Cycle; Constant Pressure Cycle; Diesel Cycle; Dual Combustion Cycle; Application in 4-Stroke & 2-Stroke IC engines ; Criteria of Performance; Compression Ratio and Thermal Efficiency; Air standard efficiency .

Unit 5 : Properties of steam

Pure substance, Property of steam, Triple point, Critical point, Sub-cooled liquid, Saturation states, Superheated states, Phase transformation process of water, Graphical representation of pressure, volume and temperature, P-T & P-V diagrams, T-S and H-S diagrams, use of property diagram, Steam-Tables.

Equation of Steam; Specific Enthalpy and Entropy, Dry and wet steam; Dryness fraction; throttling , Separating and throttling calorimeters. Applied Problems.

Unit 6 :Vapour cycles

Carnot cycle for steam and Ideal Efficiency. Rankine cycle with dry saturated steam and superheated steam, reheat cycle, regenerative cycle for Steam machinery plants, combined steam & gas plant . Feed Pump work. Rankine Efficiency, cycle Efficiency, Isentropic Efficiency, work

Ratio, Reheating and Regenerative Feed Heating and their effect on Thermal Efficiency. Applied Problems,

Unit 7 : Air compressors

Elementary principles, Use of compressed air in industry. Classification of air compressors, Operation of single stage reciprocating compressors Calculation of work done; volumetric efficiency, ideal compression ratio , effect of clearance on volumetric efficiency , Indicator diagrams. FAD.

Unit 8 : Properties of Mixtures of Gases and Gas & Vapours

Dalton's Law of partial pressure, Amagat's Law of partial volume, volumetric and Gravimetric Analysis of Gas Mixtures, Gibbs -Dalton Law, Mean value of a Gas constant. Equivalent Molecular weight, Density, specific volume, specific Heat and Molar Heat capacity of gas mixture. Problem on Adiabatic Mixing Air and Water vapour mixture, Specific Humidity, Relative Humidity, Dew point, unsaturated and saturated Air. Principle of Cooling Tower and surface condenser . Applied Problem

Unit 9 : Fuels & Combustion

Definition of Fuel, combustion. Combustion Equation, Analysis of the Products of Combustion, stoichiometric combustion, Actual combustion, Excess Air, Mixture strength.

Unit 10 : Steam turbines

Steam Nozzles: Types and utility of nozzles, Flow of stream through nozzle and Diffuser, Area of throat and exit for maximum discharge, Variation of velocity, Area and specific volume, Nozzle efficiency Subsonic, sonic and supersonic flow.

Impulse and Reaction Turbines: Principles of stream turbine, General description, Pressure and velocity compounding, Velocity diagram and work done, Effect of blade friction on velocity diagram, Blade efficiency and its derivation, Forces on blades, Work done by Blades, Axial Thrust, Blade or Diagram Efficiency.

Unit 11 : Refrigeration

Reversed Carnot cycle, Vapour compression cycles, Refrigerating Effect, Co-efficient of performance, cooling capacity, rating of a Refrigerating Plant, Methods of improving COP Use of Vapour Tables, Describe how the vapour-compression cycle can be used as a heat pump, Condenser. Difference between refrigerator and heat pump

Unit 12 : Transfer of heat

Theory of conduction, convection and radiation; Fourier's Law of Heat conduction. Thermal conductivity of Insulating materials. Conduction through flat & cylindrical, spherical surfaces in series. Heat Transfer from fluids to fluids through walls. Natural and Forced Convection .Application of Heat Transfer in Marine Heat Exchangers, like Coolers, Heaters, Condensers. Prediction of convection Heat Transfer rates. Use of Non-Dimensional Groups. Prandtl No. Nusselt No., Reynolds No., Stanton No., Grashof No, Graetz No., etc, Radiation : Basic, Stephen-Boltzman law, Grey / Black bodies etc.

UG22P2012

PRACTICAL

Code No. : P1102 Practical : 36 hrs.

1) Study of Thermistor as a thermometer and Calibration of mercury thermometer .
2) To determine Absolute Viscosity and Kinematic Viscosity of oils by Red Wood Viscometer.
3) Stefan's Law of Radiation using a filament lamp.
4) To determine specific heat capacity of substances.
5) To determine final temperature of mixtures, and verification of the observed value by calculations.
6) To verify the law of conduction and thermal conductance.
7) To demonstrate the "corresponding" relationship that exists between pressure and temperature for a saturated liquid or saturated vapour.
8) To read a wet – and dry – bulb hygrometer and to use tables to determine the relative humidity.
9) To determine the Flash Point of a given sample of oil.
10) To determine the Calorific value of the fuel with the help of a Bomb Calorimeter.
11) To determine thermal efficiency of a boiler and steam turbine plant
12) To determine thermal efficiency of a diesel engine.
13) To study various types of blades for steam turbine.
14) To study COP of a refrigeration plant.
15) To study operation of a compressor and calculate volumetric efficiency of the compressor.
16) To study operation of a refrigeration plant on computer based software.
17) To study performance of a Diesel Engine on Turbo- Diesel software.

NOTE :

1. There will be continuous assessment of skills being acquired through class-work, practical and periodic assignments / project works / tests / orals etc.
2. At least 15 experiments must be undertaken by every student.
3. Laboratory journal to be submitted at the end of each term for assessment.

RECOMMENDED REFERENCE BOOKS :

1) University Physics	: Young Sears & Zemansky	Narosa Publishing
2) Heat & Thermodynamics	: Brijlal & Bedi	Ratan Prakashan Mandir
3) Heat & Thermodynamics	: Zemansky	
5) Basic Engineering Thermodynamics	: Joel, R.	Longman, Harlow
6) Physics - Classical and Modern	: Gettys, Keller, Skove	McGra – Hill International Edition
7) Heat & Thermodynamics	Eastop & McKonky	

INDIAN MARITIME UNIVERSITY

FIRST YEAR

SEMESTER – I

UG/MS/MS/T/1103	**TERRESTRIAL & COASTAL NAVIGATION PAPER - I –UG22T2103**	**72 hrs.**

Theory - 50 Marks

SECTION – A (TERRESTRIAL NAVIGATION) **[30 hrs]**

Unit 1 :

The shape of the earth , Poles, Equator, Great circles, Small circles, Parallels of Latitude , D'Lat , Meridians, Prime Meridian, Longitude, D'Long, Position by latitude & longitude; Departure. Relationship between Departure and D'Long. Parallel sailing. Rhumb Line. Mean Latitude. Plane sailing. Relationship between departure, d'lat, course and distance. Middle Latitude.

Unit 2 :

Measurement of distance : Nautical, Geographical and Statute mile. Knot. Effect of polar compression on nautical mile.

Principle of Mercator projection: Mercators chart, Nautical Scale, Meridional Parts; DMP. Latitude and longitude scales and conversion of one to the other; Mercators Sailing. Relationship between Course, D'long and DMP.

Principle of Gnomonic projection .Gnomonic chart.

Unit 3 :

Compass Points, True and Magnetic north. Magnetic variation and changes in its annual value. isogonals. Deviation of magnetic compass, compass error. Course & Bearing. Conversion of compass course to true course and vice versa.

Dead Reckoning position (DR). Estimated position (EP) & Observed position (Fix).Set and drift of current . Leeway.

Unit 4 :

Spherical Triangle. Great circle sailing : initial course ,final course, distance and vertex.

SECTION – B (COASTAL NAVIGATION) **[42 hrs]**

Unit 5 :

The nautical chart. Nautical scale, types of projections, Title of chart , Number of Chart, Date of publication. The Compass Rose. Correction from notices to mariners .To find the date the Chart was last brought up to date. Small and large Correction. Degree of reliability of information shown on the chart. Types of charts –Ocean charts, Coastal charts, Harbour plans, Routing charts.

Unit 6 :
Deciphering the symbols and abbreviations used on a nautical chart. Units of sounding used. How to read latitude and longitude. The distance scale. Use of dividers to measure distances. Reason for using the nearest latitude scale for measuring distance. Nature of bottom. Depth Contours.

Unit 7 :
The use of the Admiralty Catalogue to identify the charts required for voyage. Meaning of chart Datum. Reference point used for heights. Information regarding lights.

Unit 8 :
The use of parallel rulers to lay down or read courses and bearings. Height, colour and characteristics of lights. Use of leading lights for safe navigation in harbour. Horizontal sectors of lights and their use by navigators in keeping clear of submerged dangers to navigation. Use of sectors in laying courses. Use of clearing marks and horizontal and vertical danger angles. Sailing round an arc.

Unit 9 :
True Magnetic and Compass North. Variation. Annual rate of change of variation. How to obtain variation from date given on the Compass Rose. Deviation of the compass. The deviation card.True Magnetic and Compass course. Conversion of one to another. The compass error for the ship's head. True Magnetic and Compass bearings. conversion of one to another. Gyro Error. High and Low. Conversion of Gyro courses to True course and vice versa. The effect of current on course made good. Set and drift. The effect of wind on course made good. Leeway. The Dead Reckoning Position, Estimated position and Observed position.

PRACTICAL- UG22P2103

Code No. : P1103 Practical : 36 hrs.

TERRESTRIAL NAVIGATION

1. The chronometer. Checking chronometer error by radio signals. Finding U.T. and correct data.
2. The micrometer Sextent . Arc of access . Error of perpendicularity . Side error. Index error on the arc and off the arc. Collimation error. Taking vertical and horizontal angles. Position fixing by bearing and vertical sextent angle of a light- house. Position fixing by horizontal angle between three or more points.
   Recognition of important stars with reference to stellar constellations.
3. The use of Azimuth mirror and Pelorus. Procedure for checking accuracy of Azimuth mirrors.
4. The use and care of magnetic compasses. Precautions to be observed while taking compass bearings. Practical limitations of the magnetic compass.

[At least 3 tasks to be completed]

COASTAL NAVIGATION

1. To find compass error by transit bearings.
2. To find the position of a point on the chart by its latitude and longitude.
3. To find the position of a point on the chart by its bearing and distance from a navigational mark.
4. To plot ship's position given the compass bearings of two or more shore objects. The 'Cocked hat' and the reasons for its formation.
5. To plot ship's position, given the rising or dipping bearing of a light.. Caution during abnormal refraction.
6. To plot ship's position using three shore objects by horizontal sextant angles (given Horizontal sextant angle less than 90, equal to 90, or greater than 90). .
7. To plot ship's position, given vertical sextant angles and bearing of a light house.
8. To plot position lines obtained by Radio Aids to navigation.
9. To plot a Position line obtained by an astronomical observation.
10. To find compass course between two positions on the chart.
11. To find compass course to seer between two positions on the chart so as to counteract the given set and drift of current and given leeway.
12. To find the course and distance made good, given course steered, set and drift of current and leeway.
13. To find the course and speed made good and the set and drift, given the course steered, speed, duration and the initial and final observed positions.
14. To find the course from a given position so as to pass a lighthouse at a given position so as to pass a lighthouse at a given distance when abeam:

[At least 12 tasks to be completed]

BOOKS RECOMMENDED FOR REFERENCE:-

1.Practical Navigation	: Capt.H.Subramanism
2. Principles of Navigation	: Capt. P.M. Sarma.
3. Principles of Navigation	: Capt. T.K.Joseph and Capt.S.S.S.Rewari
4. Admiralty Manual of	: Navigation Vol. I & II. HMSO
5. Navigation	: A. Frost.
6. Nicholl's Concise Guide Volumes I & II..	: Brown Son & Ferguson Ltd.
7. Chartwork for Mariners	: Capt. Puri, S.K.
8. Voyage Planning & Chartwork	: Capt.M.V.Naik & Capt. Warty

INDIAN MARITIME UNIVERSITY

FIRST YEAR

SEMESTER – I

UG/MS/BS/T/1104	COMPUTER SCIENCE & APPLICATIONS UG22T2104	36 hrs.

Theory – 50 marks

Unit 1 : [Basic Fundamentals]

Historical development of computers: an evolution. Classification of computers on different Norms such as generations, technology, etc. Different functional parts of computers & their functions. A brief discussion of the principles of a computer; use of utility programs for formatting and copying discs; keeping back-up copies of files; virus protection. storing, naming, renaming and deleting files; arrangement of the directory.

MS-Office:
MS-Word, MS-Excel, MS- Power point, MS Acess.

Unit 2 : [Computer arithmetic]

Binary, octal, decimal & hexadecimal number Systems & mutual conversion: addition, Subtraction, Multiplication, division, 1's & 2's complement method, ASCII code.

Unit 3 : [Basic Hardware and Operating System Fundamentals]

The hardware configuration including the connection peripherals;
The care and storage of floppy discs, CD-ROMs and tapes; explain types of
Input Devices (Keyboard, Mouse, Pen, and Output Devices Monitor, printer, Speakers, Projectors) and of Storage Devices (Hard Disks, CD ROMS, DVD-ROMS, USB Storage) Demonstrate Keyboard layout and functions of different keys. Demonstrate Proper shut down of PC, and explain precautions to avoid an improper shut down. Explain types of Central Processing Unit Processors, RAM, and ROM).

A brief explanation of the operating system, its purpose and how to use it for loading and running programs; organizing programs and documents, sharing data between applications, customizing the control panel, File system and windows explorer, Networking and use of internet with windows.

Explain Networking Concepts. Explain Networking Infrastructure (LAN, WAN, MAN) and topologies, Demonstrate the procedures for net working ship's computers, Explain Issues related to E-mail, Virus Protection, and Firewall.

Unit 4 : [Programming Language]

C Programming: Introduction to C Programming, Basics and History of C.

Object Oriented Programming (OOP):
OOP concepts and fundamentals, Encapsulation, Definition of an object, Inheritance and multiple inheritance, Attributes and methods, Polymorphism, Interfaces, Class diagrams, Virtual functions

C++ Programming:

Fundamentals:	The character set, Identifiers & Keywords, Data types, Constants, Variables & Arrays, Declarations, Expressions, Statements, Symbolic constants,
Operators & Expressions:	Arithmetic operators, Unary operators, Relational & Logical operators, Assignment operators, the conditional operator.
Control Statements:	The while, do-while, for statements, nested loops, The if-else statement, The switch & break statements, The 'go to' statement.
Functions:	Definition of a function, accessing a function, passing argument to function, Function prototypes, Recursion.
Program Structure:	Storage classes, Automatic variables, External variables, Static variables.
Arrays:	Definition of an array, Processing of an array, Passing arrays to a function, Multidimensional arrays.
Pointers:	Pointer declarations, Passing pointers to a function, Pointers & one-dimensional arrays, Operation on pointers, Arrays of pointers, Passing function to other function.

Unit 5 : Visual Basic (VB)
IDE :- Integrated Development Environment in VB
Forms :- Form properties, Form methods and Form events
Controls :- VB controls

PRACTICAL UG22P2104

Code No. : P1104 Practical : 54 hrs.

The following programs are to be written & compiled during practical class , Practical and theory will be undertaken simultaneously as per time distribution shown against each unit :

(1) To understand various types of control statements (if, if-else, nested if-else, for, do-while with sample example for each type)
(2) Lowercase to uppercase text conversion (using while, do-while, for statements)
(3) Averaging a set of numbers.
(4) Calculating averages for different sets of numbers using nested loops.
(5) Programs illustrating switch & break statements
(6) To understand string functions, by developing algorithm, flowchart & writing program for string comparison, copying and concatenation.
(7) To understand pointers in 'C', by developing flowchart & writing program to print values of variables and their addresses and call by reference.
(8) Programs of lowercase to uppercase character conversion using function.
(9) Largest & Smallest of a set of numbers using function.
(10) Calculating factorial of a number using function.
(11) Generating fibonacci numbers using static variables.
(12) Programs illustrating relationship between array elements & their addresses.
(13) Adding two tables of numbers.
(14) Arranging an array of numbers in an order using different sorting algorithms.
(15) To create a simple applet having a level and a command button on a form.
(16) To create a simple multiple document interface (MDI) with working menus.
(17) To add controls to the Tool Box.
(18) To design a simple class object.
(19) To create a dialogue box.
(20) Development of algorithm and flowchart for various programs.

NOTE :

1) There will be continuous assessment of skills being acquired through class-work, class-work, practicals and periodic assignments / project works / tests / orals etc.
2) At least 20 experiments must be conducted by each student
3) Laboratory journal to be submitted at the end of each term for assessment.

INDIAN MARITIME UNIVERSITY

FIRST YEAR

SEMESTER – I

UG/MS/BS/T/110	COMMUNICATION SKILL & ENGLISH UG22T2105	36 hrs.

Unit 1 : Theory of Communication

Communication and its importance. Means & barriers of communication . Verbal & non verbal communication , Interpersonal communication . Communication gap and ways to reduce the communication gap . Means of communication on board ship , Means of communication between shore staff, office and ship staff . Need for good communication with friends & family . Leadership and communication .

Unit 2 : English & Remedial Grammar

Parts of speech
Article : Definite / indefinite articles
Verbs : Transitive/intransitive ; adverbs
Nouns : Common nouns , proper nouns ,Collective nouns and abstract nouns .
Pronouns : Personal pronouns, interrogatives pronouns, distributive pronouns, emphasizing pronouns .
Adjectives : Demonstrative, interrogative, Distributive, Quality & Quantity .
Difficulties in the positive, comparative & superlative ,
Active and Positive Voice.
Appropriate Prepositions,
The use of correlatives , use of who and whom, much and many still & yet, so that, so as, may be and do.

Unit 3 : Written Communication

(a) Formal and ordinary letters, formal invitations, letters to friends and relative
(b) Official and semi-official letters. Application for application for appointment. Commercial letters. Letter to influence public opinion.
(c) Notices, agenda & minutes writing.
(d) Essay writing.
(e) Writing factual reports, accidents and maintaining a diary and a log book.
(f) Summarizing / abstracting the main ideas of an unseen passage, given a working outline.
(g) Stress marking and use of idioms and phrases.

PRACTICAL

Code No. : P1105 Practical : 18 hrs.

Oral communication : Use of English in different situation with elementary phonetic drill. Familiarisation and use of marine vocabulary.

Development of Skills of oral communication

(a) Speech training : Elocution, debating and extempore speech.
(b) Group discussions and interviews.

(c) Delivery of welcome address.
(d) Sea speak.

Selected tests to be conducted to test skill in comprehension and speech.

REFERENCE BOOKS :

Communication skills (Book 1)	S. R. Inthira & V. Saraswati.
Spoken English for India	R. K. Bansal & B. Harrison.
Written communication	Freeman and Sarah.
Note Marking and composition Exercises 1979	ELT Cell, Bombay University
Business correspondence and report writing	R. C. Sharma and Krishnamohan.
Sea Speak manual	International Maritime Organization.

INDIAN MARITIME UNIVERSITY

FIRST YEAR

SEMESTER – I

UG/MS/BS/T/1106	MATHEMATICS - I UG22T2106	54 hrs.

Unit 1 : SPHERICAL TRIGONOMETRY

Properties of a spherical triangle ; Length of no side of spherical triangle – exceeds 180°; Sum of the angles of a spherical triangle – exceeds 180° but is less than 540°; Polar triangles and applications of their properties; Solution of spherical triangles by haversine formula and sine formula; Given two parts of a right-angled spherical triangle, use Napier's rules to solve for any other part ; Solve problems on spherical triangles by dropping a perpendicular and solving the resulting right-angled triangles; What is meant by a quadrantal triangle ; Given two parts of a quadrantal triangle, use Napier's rules to solve for any other part; Solve problems involving oblique spherical triangles by use of the cosine and sine formulas.

Unit 2 : CALCULUS

Differentiation : The formulae for the derivations of algebraic, trigonometric, inverse, exponential and logarithmic functions (to be assumed) and their applications in examples ; Product & quotient functions of a function and simple implicit functions ; Differentiation of second order; Examples of maxima and minima; Simple cases of points of inflexion; Successive differentiation; Standard form to find the nth derivative; Leibnitz's theorem, Rolle's theorem (with proof), Lagrange's and Cauchy's mean value theorem (with proof), Taylor's theorem, Taylor's and Maclaurin's (without proof); Indeterminate forms; L' Hospital's rule; Expansion of function in power series (all types); Partial derivatives of first and higher orders; Examples of motion of a body; Simple harmonic motion ; Deflection of beams; Total differential, Concept of commutativity of partial derivatives (without proof); Euler's theorem on homogeneous functions, Deduction from Euler theorems; Errors & Approximations; Maxima & Minima of the functions of two variables.

Integration : Integration as a reverse process of differentiation ; Integration of standard forms; Integration by substitution ; Integration by parts; Integration using partial fractions; The definite integral as the limit of a sum ; Mean values, Root mean square values of sin nx and cos nx ; Rectification of plane curves; Double & Triple integrals, their geometrical interpretation and evaluation; Evaluation of double integrals by change to polar form; Application of double & triple integrals to areas under curve, the position of the centroid of an area, volume of revolution, work done by variable forces.

Beta & Gama functions : Beta & Gama funcctions and their properties, relation between Beta & Gama functions; Error functions; Differentiation under integral sign.

Unit 3 : Probability & Statistics

Probability and Statistics; Concept of Probability; Random Experiments, Sample Space, Events; Axioms of Probability; Some important Theorems on Probability; Mutually exclusive events; Conditional Probability; Independent Events; Babeys' Theorem; Problems and application on Combinational Analysis

RECOMMENDED BOOKS :

1) Elements of applied mathematics – Vol 1 : Wartikar, P.N. & Wartikar, J.N.
2) Text book of applied mathematics – Vol 2 : Wartikar, P.N. & Wartikar, J.N.
3) Vector algebra : Shanti Narayan
4) Differential calculus : Shanti Narayan
5) Engineering Mathematics : Bali, Saxena, Iyengar
6) Plain trigonometry Part -II : Loney, S.L.
7) Spherical Trigonometry : Capt. H. Subramaniam
8) An introduction to spherical trigonometry : Clough & Smith

INDIAN MARITIME UNIVERSITY

FIRST YEAR

SEMESTER – I

UG/MS/MS/T/1107	ENGINEERING DRAWING UG22T2107	72 hrs.

Final exam – 75 marks

1. Introduction to Technical Drawing : - Introduction to the subject, Drawing instruments and its uses. Lines and letterings. Geometrical construction including tangent curves, exercises on topic covered.

2. Engineering Curves :- Conic section construction of eclipse, parabola, hyperbola by various methods. Drawing of cycloids, epicycloids, hypocycloids, involutes, Spirals, helixes. Detailed drawing of helical springs of round and rectangular sections. Square thread formation single start, double start helical threads, exercises on topic covered..

3. Projection of solids :- (Prisms, Cylinders, Pyramids, cone) Axis inclined to one plane and parallel to others, exercises on topic covered..

4. Developments of Lateral Surfaces of solids :- Prisms, Pyramids, Cylinder and Cone, exercises on topic covered..

5. Intersections of surfaces of solids :- Cylinder – Cylinder, Cylinder – Cone, Prism – Cylinder and Vise versa, exercises on topic covered..

6. Orthographic Projections :- Orthographic Projections 1^{st} and 3^{rd} angle method of projections of simple machine components from given pictorial views. Missing view or reading of orthographic projections. (Drawing of third view from given two views) Sectional Views :- Full sections, Half section, Partial sections, Offset sections views, exercises on topic covered..

7. Pictorial Projections :- Isometric Projections and Isometric Views - (Use of Isometric Scale) Isometric drawing of simple solids like, prisms, cylinders, cones and simple Block objects and cylindrical objects, sectional views of simple machine components in Isometric, exercises on topic covered..

8. Projection of Ports :- Projection of Ports and opening in hollow cylinders, Parallel cut radial cut, inclined ports in cylinders. Example of diesel cylinder liners, Blow down cock, exercises on topic covered..

9. Thread Formation :- V thread, Square threads, BSP, IS conversion of representing external threads, internal threads, blind holes, special boles, special bolts & screws, Heads and ends of screws, Locking arrangements of nuts, exercises on topic covered..

10. Principles of Assembly and details :- Simple assemblies – Flanged couplings, Knuckle joint, Cotter joint, Piston and Connecting rod assembly, Non return valve, Steam stop valve, exercises on topic covered..

RECOMMENDED BOOKS :

1.	Engineering Drawing	:	Bhatt
2.	Engineering Drawing for Marine Engineers	:	Reeds
3.	Pictorial Drawing book for Marine Engineers	:	McGibbon
4.	Geometrical and Engineering Drawing	:	Jackson
5.	Text book of Engineering Drawing	:	R. B. Gupta
6.	Elementary Engineering Drawing (Plane & Solid Geometry)	:	N.D. Bhatt
7.	Engineering Drawing	:	B. C. Rana .