4331 - BASIC SHIP THEORY - I

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
					Theory		Practical Ex.	Total
Lectures	Practical	Credits						
3	3	6	50	25	3 Hrs	100	-	175

Pre-requisite	Source
Nil	SHB

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	50	–	150

Rationale: The theory course content is framed to impart knowledge to students regarding the general aspect of ship geometry, stability and numerical methods of calculating various ship forms and hydrostatic aspects. The drawing practical content will enable the students to acquire the desired competency to prepare plan and section drawings of a ship from a given table of offsets, acquaint himself with numerical rules used in the shi related calculations and experience the calculation of fundamental hydrostatic particulars.

COURSE CONTENTS	Hrs	Ma
1. INTRODUCTION TO SHIPS Types of Ships-Features and functions of- General cargo ship, tankers, container ships, bulk carriers, Roll on Roll off ships, fishing trawlers, barges, dredgers, tugs, submarines, LPG carriers, hydrofoil, hover craft, catamaran, SWATH, planing craft. Principal dimensions. Form coefficients.	6	1
2. PRINCIPLES OF FLOATATION Laws of floatation, effect of shifting of weights and suspended weights on centre of gravity, motions of a ship.	5	1
3. LINES PLAN Fairing of lines, table of offsets.	2	8
4. INTEGRATION RULES Simpson's rule, Trapezoidal rule, 5, 8,1-rule, Tohebycheff's rule. Application of integration rules in determining areas, volumes, centroids, first moments and moment of inertia of waterplanes of ships.	6	14
5. SMALL ANGLE STABILITY Types of equilibrium. Initial stability: -Heeling and righting moments. Statical stability curve -Range of stability, initial GM, maximum GZ, angle of vanishing stability, point of inflexion. Cross curves of stability. Determination of GZ curve from cross curves. Effect of various factors on stability-Calculations of free surface effect. Longitudinal stability and trim.	14	32
6. BONJEAN AND HYDROSTATIC CURVES Determination of volume of displacement, LCB, VCB from Bonjean curves. VCB, KB, KM, LCF, LCB, C_B, C_P, C_{VP},C_M, C_{WP}, MCT, TPC and displacement curves	15	26
Total	48	100

PRACTICALS

1. Lines plan drawing- Table of offsets, body plan, half breadth plan, profile, diagonal, buttock lines. Fairing of lines.	32	30
2. Bonjean calculation and Bonjean curves: Determination of volume of displacement, longitudinal centre of buoyancy, vertical centre of buoyancy in even keel and trim conditions.	16	20

REFERENCE BOOKS

1. Ship Stability for Masters and Mates by Derett, D.R (Stanford Maritime)
2. Principles of Naval Architecture by John P. Comstock (SNAME)
3. Ships and Naval Architecture by Munro-Smith, R. (Institute of Marine Engineers)