ME 141352

Introduction to Naval Architecture
Introduction

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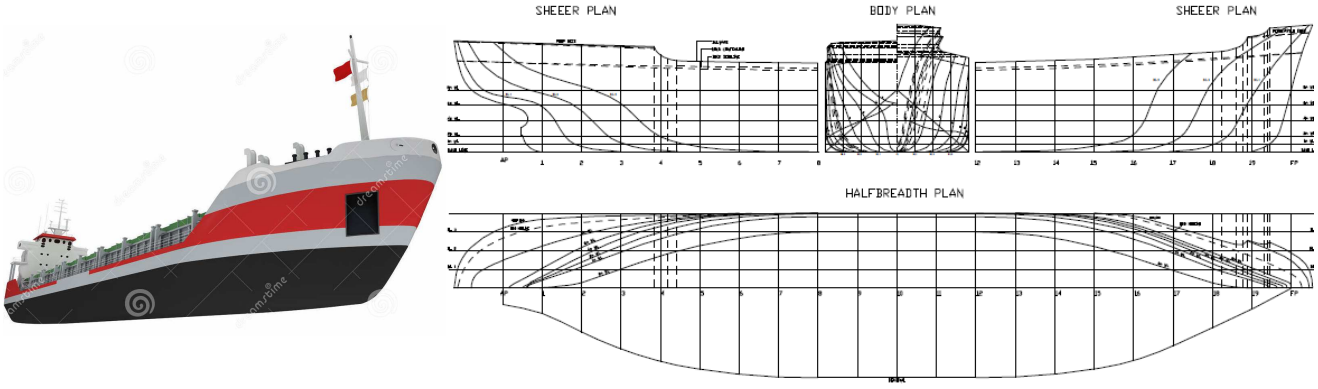
Course Objectives

- Students understand basic principles of naval architecture.
- Students able to draw a lines plan of ship given ship principal dimension and coordinates of body plan.



Course Position

Semester 1

Introduction to Naval Architeture

(3 credits)

Semester 3

Ship Construction and Strength

(3 SKS)

Transmission System

(3 credits)

Semester 4

Resistance and Ship Propulsion – including Propulsion System Design

(4 credits)

Semester 4

General Arrangement

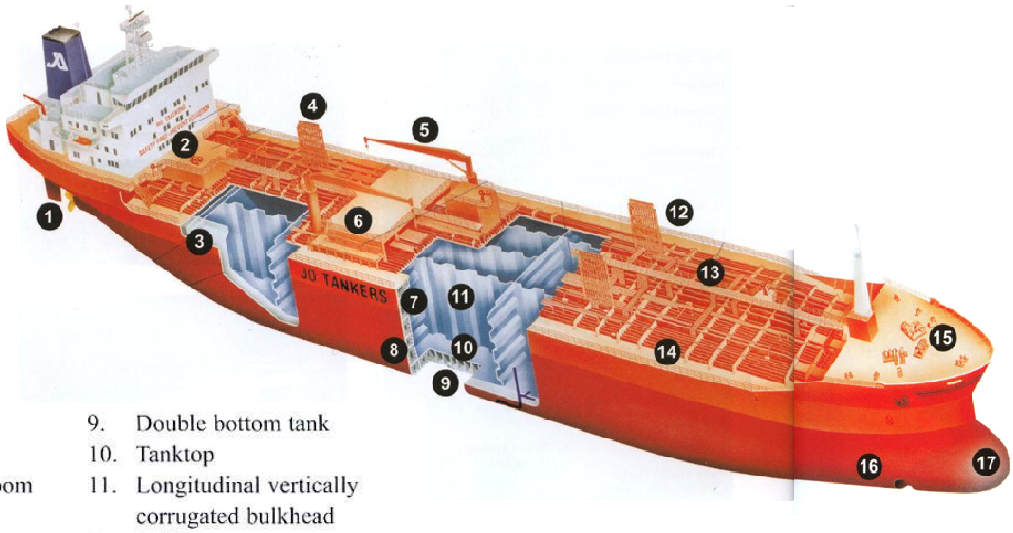
(2 SKS)

Semester 5

Ship Machinery Plan

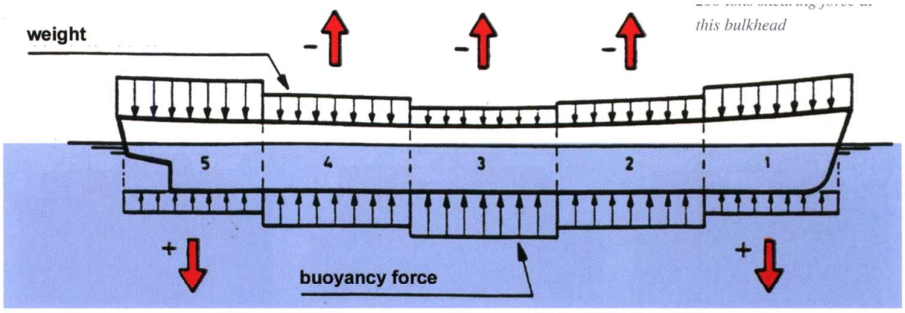
(4 credits)

Ship Parts



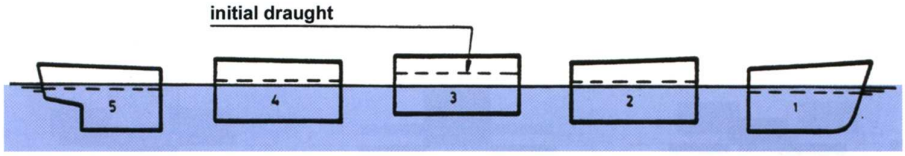
1. Rudder with conventional propeller
2. Tank heating / tankwash room
3. Cofferdam, empty space between two tanks
4. Vent pipes with pressure-vacuum valves
5. Hose crane
6. Manifold
7. Transverse horizontally corrugated bulkhead
8. Wing tank in double hull
9. Double bottom tank
10. Tanktop
11. Longitudinal vertically corrugated bulkhead
12. Railing
13. Catwalk
14. Deck longitudinals
15. Forecastle deck with anchor- and mooring gear
16. Bow thruster
17. Bulbous bow

Static condition

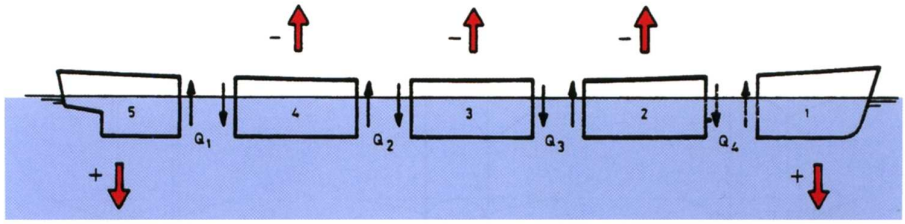


this bulkhead

The black vectors represent the upward pressure and the weight of the ship.
The red vectors give the resultant per section.



This is how the separate compartments would float. The dashed line gives their actual draught.



The black vectors give the resultant shearing forces between the different compartments.
The red vectors give the resultant per section.

Dynamic condition

Container feeder in heavy weather. The ship is partially on a wavetop; hogging

The ship is partially in a trough. In this case the foreship will experience a large sagging moment while the aft ship experiences a large hogging moment

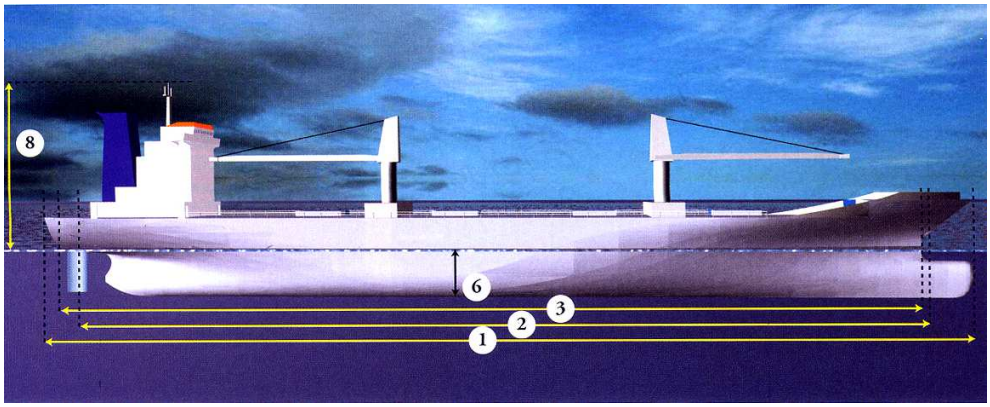
Subjects

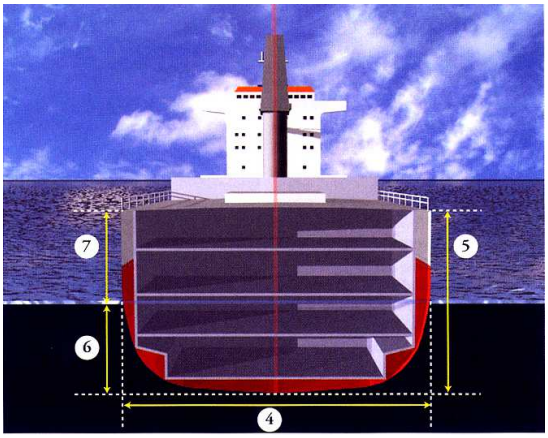
- Ships' Type
- Ship Principal Dimension
- Displacement
- Tonnage
- Capacity
- Form Coefficients
- Lines Plan and Shell Expansion
- Simpson's Rule for Numerical Integration
- Theory of Flotation

Materi

- Freeboard
- Hidrostatic Curves
- Bonjean Curve
- Static Stability
  - Longitudinal stability
  - Transverse stability
  - Stability Curve

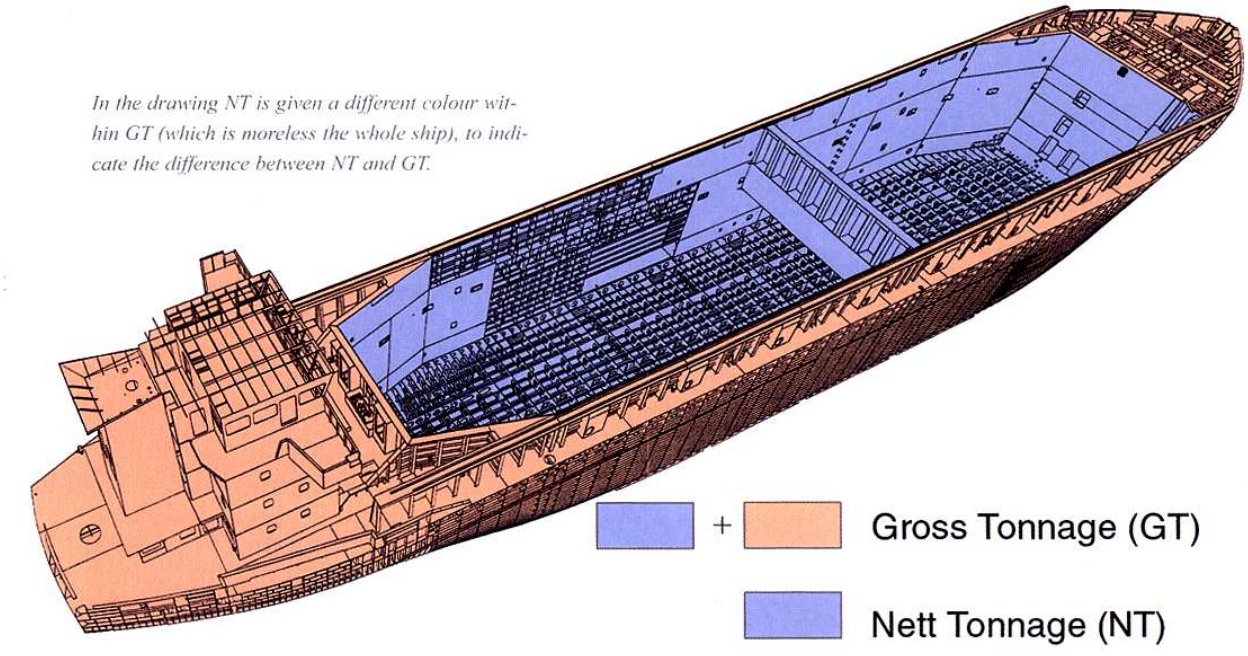
Ship principal dimension



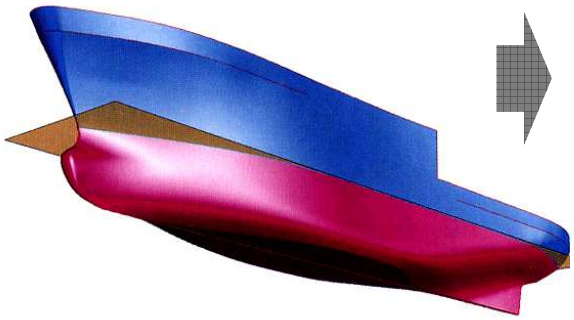


1. Loa (Length overall)
2. Lpp (Length between perpendicullars)
3. Lwl (Length on the waterline)
4. Breadth moulded
5. Depth/Height
6. Draught/Draft

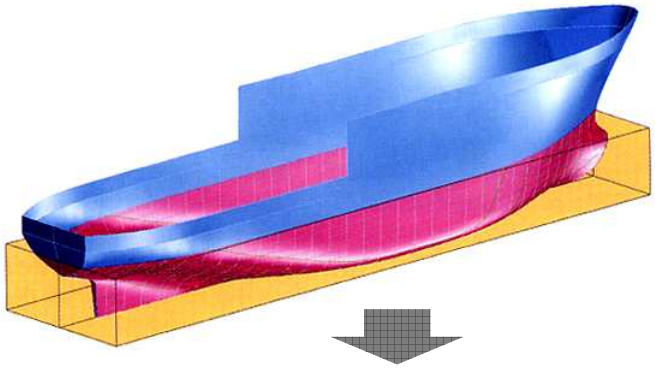
Tonnage



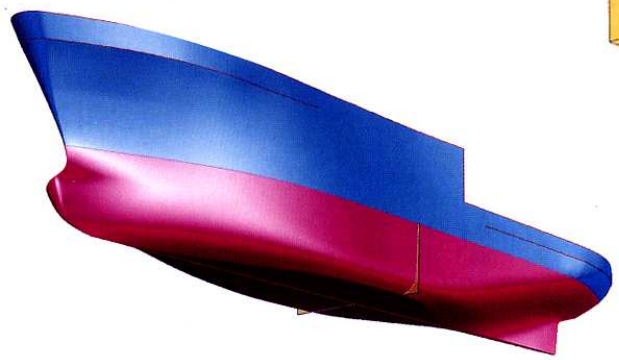
Form coefficients



Water-plane Coefficient

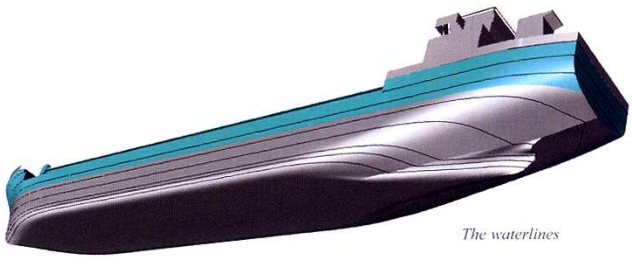


Block Coefficient

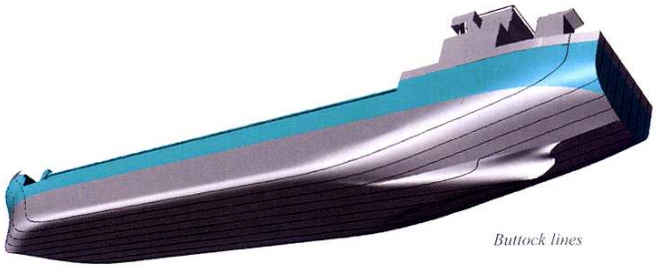


Midship Coefficient

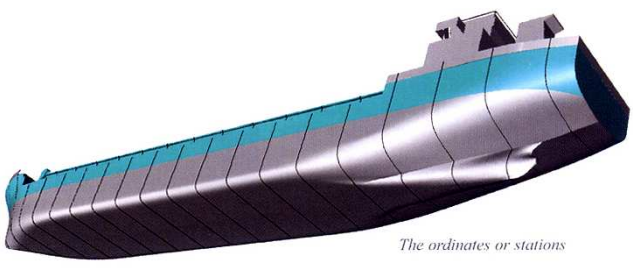
Lines plan



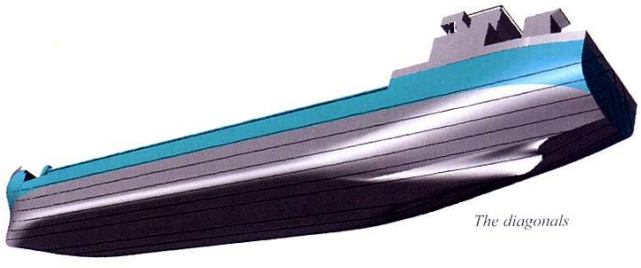
The waterlines



Buttock lines

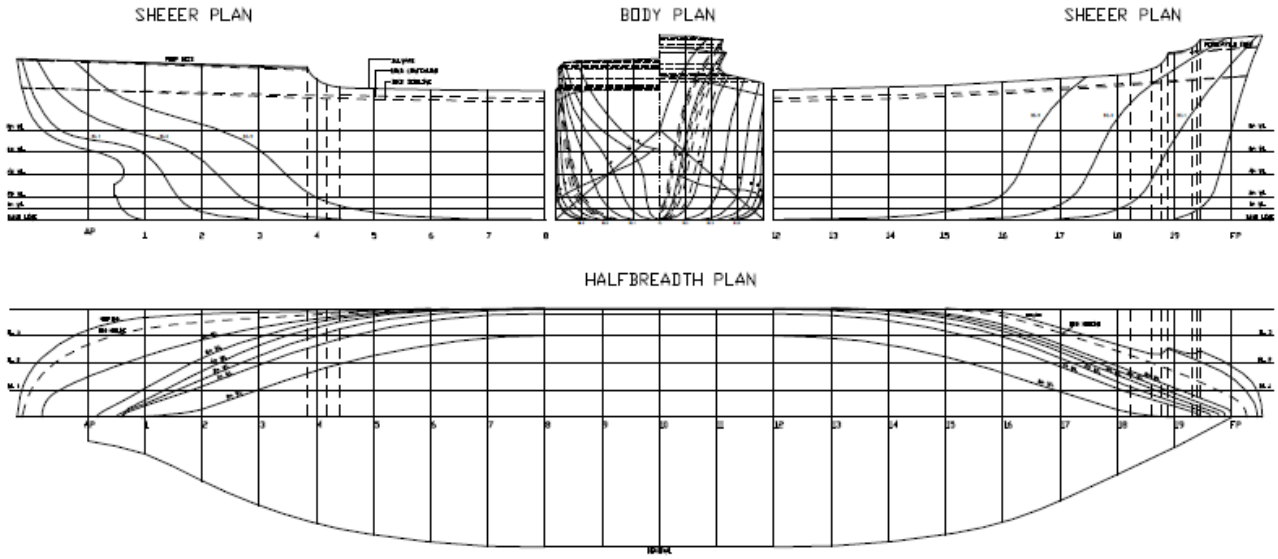


The ordinates or stations

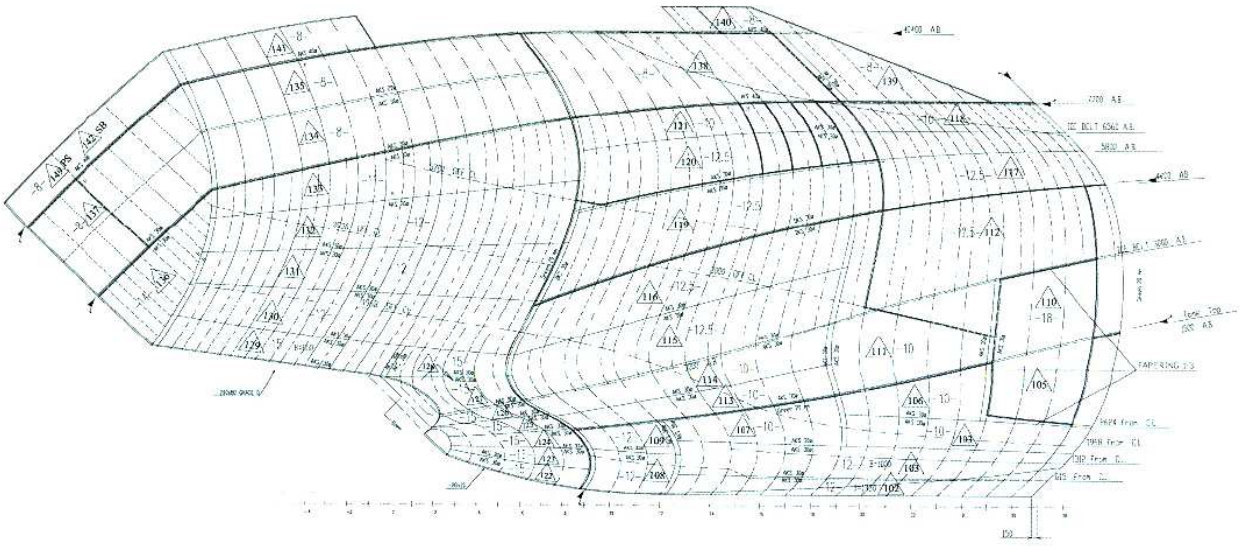


The diagonals

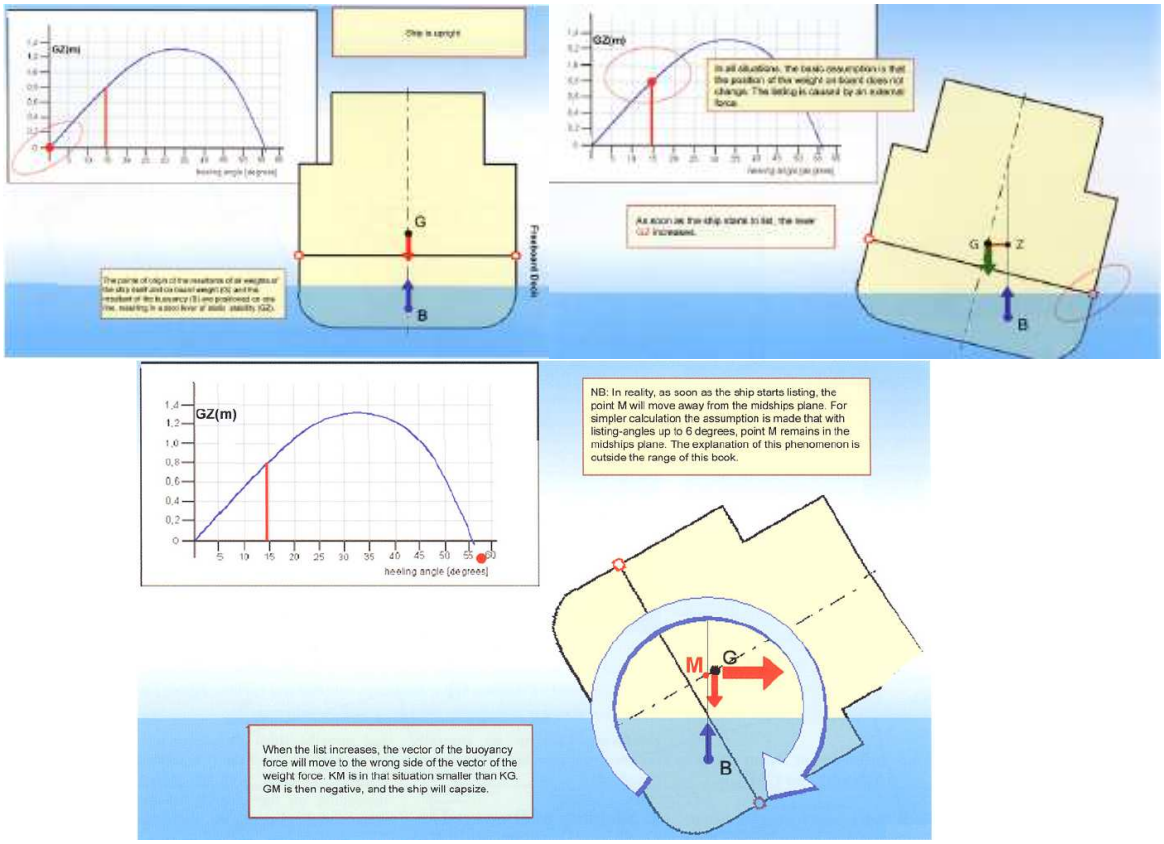
Lines plan



Shell expansion



Ship stability



Grading

- Class attendance : 0 %
- Midterm evaluation : 30 %
- Final evaluation : 30 %
- Quiz & assignment : 40 %

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Room : Laboratorium Keandalan dan Keselamatan
JTSP – ITS

References

- Introduction to Naval Architecture

  Thomas C. Gillmer and Bruce Johnson, Naval Institute Press, 1987
- Basic Ship Theory , 5th Edition ,Volume I: Hydrostatics and Strength

  K.J. Rawson & E.C. Tupper, Butterworth Heinemann, 2001
- The Maritime Engineering Handbook: A Guide to Ship Design, Construction and Operation

  Edited by Anthony F. Molland, Elsevier Science & Technology, 2008
- Any book related to Ship Design and Construction