Hydrostatics and Stability - Video course

COURSE OUTLINE

This is the first course for Naval Architecture students in 'Hydrostatics and Stability'. This course covers the basic principles of stability, starting from the Archimedes principle and going deeper into the conditions for stability of a vessel.

Study of metacentric height and radius gives an insight into Naval Architectural stability problem. A thorough study of the various weight shiftings which give rise to various forms of heeling are investigated. Conditions of free-surface effect and inclining experiment are studied.

This is followed by stability of the ship at larger angles of heel under various turning moments. The course then discusses about the various conditions of damaged stability, dry docking and launching calculations. A demonstration of the software 'SPAN' which performs these hydrostatic calculations will be demonstrated.

Contents: Hull form definition of ships and ocean structures; Deadweight, capacity and tonnage measurement; Numerical Integration, Hydrostatic calculations; Hydrostatic curves, Initial stability, free surface effects, stability at large angles; Intact and damaged stability computations; IMO stability criteria; Damaged stability and its calculation by lost buoyancy and added weight methods; Subdivision and floodable length calculations; Launching and dry docking calculations; Stability of fully submerged body; Stability of multibody systems; Pressure integration technique of computing hydrostatic and stability.

COURSE DETAIL

Sl No.	Topic/s	Hours
1	Introduction	1
2	Archimedes principle	2
3	Hydrostatics	3
4	Numerical Integration	2
5	Free surface effect	1
6	Hydrostatic curves	3
7	Stability at large angles of heel	3
8	Dynamic stability	2
9	Weight and trim calculations	2

NP-TEL

NPTEL

http://nptel.iitm.ac.in

Ocean Engineering

Pre-requisites:

Mathematics I

Additional Reading:

- Resistance & propulsion
- Sea keeping and maneuvering

Coordinators:

Dr. Hari V. Warrior
Department of Ocean Engineering & Naval ArchitectureIIT Kharagpur

10	Intact Stability Regulations	3
11	Parametric resonance	2
12	Flooding and damaged stability	4
13	Dry docking	2
14	Longitudinal stability	3
15	Bending moment, shear force	2
16	Response in waves	2
17	Turning stability	1
18	Computer methods	2
	Total	40

References:

Reference Books:

- Brian, A. Ship Hydrostatics and stability, Butterworth Heinemann.
- Lester A R, Merchant ship stability, Butterworths