

Seakeeping & Manoeuvring - Video course

COURSE OUTLINE

Seakeeping : Regular water waves – definition of ship motions – single degree of freedom motions in regular waves – uncoupled heave, pitch and roll motions – coupled heave and pitch motions – irregular waves - description of long crested waves by 2D spectrum – ship motions in 2D irregular waves – description of short-crested sea – ship motions in 3D irregular waves – dynamic effects – deck-wetness, slamming, relative motions, sea-sickness etc. – added resistance in waves – roll stabilization

Manoeuvring : Types of directional stability - linear equations of motions in horizontal plane – hydrodynamic derivatives – stability index – standard manoeuvres – turning circle, zigzag, pullout and spiral manoeuvres – roll during turn – experimental determination of hydrodynamic derivatives – straight-line, rotating arm and PMM experiments – description of control surface (rudder) – control derivatives

COURSE DETAIL

Sl No.	Topics	Hours
1	Regular water waves	2
2	Definition of ship motions	1
3	Single degree of freedom motions in regular waves	1
4	Uncoupled heave, pitch and roll motions	3
5	Coupled heave and pitch motions	1
6	Irregular waves	2
7	Description of long crested waves by 2D spectrum	2
8	Ship motions in 2D irregular waves	3
9	Description of short-crested sea	1
10	Ship motions in 3D irregular waves	2
11	Dynamic effects - deck-wetness, slamming, etc.	2



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Ocean Engineering

Pre-requisites:

1. Marine/Ship Hydrodynamics
2. Hydrostatics and Stability
3. Resistance and Propulsion

Coordinators:

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12	Added resistance in waves	1
13	Roll stabilization	1
14	Types of directional stability	1
15	linear equations of motions in horizontal plane	4
16	hydrodynamic derivatives	2
17	stability index	1
18	standard manoeuvres <ul style="list-style-type: none"> • zigzag, pullout and spiral manoeuvres • turning circle • roll during turn 	1 1 1
19	concept of nonlinear derivatives	1
20	experimental determination of hydrodynamic derivatives <ul style="list-style-type: none"> • straight-line tests • rotating arm tests • PMM experiments 	1 1 2
21	description of control surfaces (rudder)	1
22	control derivatives	1
	Total	40

References:

- Principles of Naval Architecture, Vol III, edited by Edward V Lewis
- Introduction in Ship Hydrodynamics, by J M J Journée & Jacob Pinkster, Delft University of Technology
- Seakeeping : Ship Behaviour in Rough Weather , by A R J M Lloyd