AMSB20 SHIP MOTIONS IN SEAWAY

UNIT-1 OCEAN WAVES

1.1 Wind generated waves, regular wave theory, waves of Finite Height, Trochoidal Waves,
1.2 Group Waves, Irregular Seaway, Point and Directional spectras,
1.3 Wave Slope Spectra, Encounter Frequency Spectra, Idealised Spectral Families.

UNIT-2 SHIP IN REGULAR WAVES

2.1 Co-ordinate Systems, Equations of Motion (uncoupled Heave, Pitch and Roll; Coupled Heave and Pitch)
2.2 Hydrodynamic Forces, Radiation Forces, Strip Theory.

UNIT-3 SHIP IN SEAWAY AND DYNAMIC EFFECTS

3.1 Linear Superposition, Response Amplitudes Operator, Pitch and Roll in Irregular Waves,
3.2 Local and Relative Motions, shipping of green Water, Slamming,
3.3 Yawing and Broading, Added Resistance, Powering in waves, Wave Loads.

UNIT-4 SHIP MOTION CONTROL

4.1 Control of Roll – Passive Stabilisers (Bilge Keel, Sails, Free Surface Tanks, U-tanks, Moving weight) Controlled
4.2 Passive Stabilisers, Active Stabilizers (fin, gyro, active-tank) Rudder Stabilisation, Control of Pitch.

UNIT-5 SEA-KEEPING PERFORMANCE AND DESIGN ASPECTS

5.1 Sea-keeping performance criteria and ship seaways responses, factors affecting pitching, heaving and rolling, guidelines for design,
5.2 Sea-keeping features of high-performance ships (catamarans, SWATH, Planning Craft, Hydrofoil Craft, Air Cushion Vehicles and Surface and Surface Effect Ships, Submarines).

Practicals:- Estimation of Hydrodynamic coefficients, Heave, roll and pitch test in waves

Reference Books:

1. Lewis, E.U; 'Principles of Naval Architecture' (2 nd Rev.) Vol. III, 2010, SNAME New York
2. Bhattacharyya..R; 'Dynamics of Marine vehicles', 1978, Wiley Inter Science, New York.
3. Lamb.H; 'Hydrodynamics', 1945, Cambridge University Press, UK
4. Newman J.N; 'Marine Hydrodynamics', 1977, MIT Press, USA