COASTAL ENGINEERING

Introduction to Coastal Engineering: Coastal zones: geomorphology and classifications, Wave theory, Wave transformation: shoaling, refraction, diffraction, reflection, Sediment characteristics: size, density, threshold of motion, Longshore and cross-shore sediment transport, Empirical formulas: CERC, Kamphuis; Coastal Structures: Functional and structural classification of coastal structures, Seawalls, revetments, breakwaters (rubble mound, vertical wall), Design of Groins, jetties, submerged reefs, sills, wave run-up, overtopping, stability, Scour, and foundation protection; Coastal Modelling: Physical modeling: Froude similarity, model scaling, Numerical models: MIKE21, DELFT3D, SWAN, TELEMAC, Shoreline evolution prediction tools. Onshore and offshore sediment transport; stability and dynamics of tidal inlets; coastal and beach geomorphic features; beach cycles and profiles; beach stability analysis; and mechanisms and assessment of coastal erosion; Coastal management: Design and implementation strategies for coastal protection and harbors, Insights from case studies on shoreline erosion and mitigation, Mechanisms of tsunami formation, movement, and impact, Tsunami and storm surge simulation, Environmental Impact Assessment (EIA), Coastal Regulation Zone (CRZ) norms, Integrated Coastal Zone Management (ICZM) principles.