DYNAMICS OF MARITIME STRUCTURES

Fundamentals of Structural Dynamics- Introduction to Maritime structures and environmental loads, Structural action of Maritime systems, Single Degree-of-Freedom (SDOF) models: equations of motion, free and forced vibration, Damped and undamped responses; response build-up.

Multi-Degree-of-Freedom Systems- Numerical examples in SDOF and MDOF, Eigenvalue problems; orthogonality of modes, Influence coefficient method, Stodla method, Rayleigh method, Modal response analysis for MDOF systems

Damping and Numerical Methods- Rayleigh and Caughey damping models, Damping by superposition; Duhamel integral, Modal superposition and truncation; missing mass correction, Numerical integration techniques for dynamic response.

Fluid–Structure Interaction and Compliant Systems- Fluid–structure interaction fundamentals and applications in ocean structures, Retrofitting and rehabilitation of offshore structures, Earthquake forces and dynamic response, Articulated towers, MLAT response control, MLAT with passive dampers, Tension leg platforms, springing and ringing phenomena, Dynamic analysis of offshore triceratops

Stochastic Dynamics and Fatigue- Introduction to stochastic processes in ocean engineering, Response spectrum methods; return period analysis, Fatigue damage and life prediction in offshore structures, Probabilistic design approaches for structural safety