OE5600: ADVANCED WAVE DYNAMICS

Course Content:

Introduction to wave generation, SMB and CEM approaches of wave estimation. Elements of probability theory and random processes - Sea as a stationary random process – Description of random sea waves – Statistical and Spectral analysis - Short term and Long term wave statistics – Directional Spectra – Design wave spectrum – Extreme value prediction. Non-stationary waves: Wavelet transforms and principal component analysis; Univariate and multivariate spectral analysis of signals; Hilbert transform; Bi-spectral analysis of nonlinear waves. Laboratory wave simulation, measurement & analysis: Wave groups, Breaking waves, Stokes 2nd order & Shallow water waves such as Cnoidal and Solitary waves. Multi-Directional waves – simulation and analysis using Fourier Method, MLM & MEM – single point measurement and array of gauges.

Text Books:

1. **Y.Goda**, Random Seas and Design of Maritime Structures, World Scientific Publishing Company, 2010. ISBN 10: 9814282405.

Reference Books:

1. **Chakrabarti S K**: Offshore Structure & Modeling, World Scientific, 1994.
2. **Ochi M K.:** Ocean Waves - The Stochastic Approach- Cambridge University Press, 1998.

Prerequisite:

Consent of teacher