

OE6005: RELIABILITY OF OFFSHORE STRUCTURES

Course content:

Introduction to uncertainty, probability and random variables. Calculations of failure probability by simple methods (R-S). General formulation for the reliability problem – FORM, SORM methods, Calculations of failure probability using unions and intersections, Uncertainty modeling of loads and resistances, Calculation of failure probability by Monte Carlo Method, Computational aspects. Updating of reliability, Reliability of time dependent loads and resistances. Probability, inspection and planning. Codal regulations. Uncertainties in material characteristics used in offshore structures- Reliability estimates for different types of offshore structures- Case studies. Seismic and fatigue reliability.

Text Books:

1. **HO Madsen, S Krenk and NC Lind.** 2006, Methods of structural safety, Dover.
2. **R. Ranganathan,** 1999 Structural reliability analysis and design, Jaico Publishing House.
3. **A Haldar and S Mahadevan.** 2000. Probability, reliability and statistical methods in engineering design. John Wiley and Sons, NY.
4. **P Throft-Christensen and MJ Baker,** 1982, Structural reliability theory and applications, Springer Verlag, Berlin.
5. **RE Melchers.** 1999, Structural reliability: analysis and prediction, 2nd Edition, John Wiley.
6. **AHS Ang and W H Tang.** 1984, Probability concepts in engineering planning and design, Volume II Decision, Risk & reliability, John Wiley, NY.

Reference Books:

1. **AHS Ang and WH Tang,** 1975, Probability concepts in engineering and design, Volume 1 - Basic concepts, John Wiley, NY
2. **A Papoulis, and SU Pillai** 1991, Probability, random variables and stochastic processes, 3rd Edition, McGraw-Hill, New York.
3. **J R Benjamin and C A Cornell,** 1970, Probability, statistics and decisions for civil engineers, John Wiley, New York.
4. **I Elishakoff.** 1999, Probabilistic theory of structures, Dover.
5. **PH Wirsching, TL Paez and K Ortiz** 2006 Random Vibrations: Theory and Practice, Dover.
6. **N C Nigam and S Narayanan.** 1994 Applications of random vibrations, Springer.
7. **G Augusti, A Baratta and F Casciati,** 1984, Probabilistic methods in structural engineering, Spon Press.

Prerequisite:

Consent of teacher