



# Indian Institute of Technology

## Course Details Report

**Course No: OE6201**

**Course Name: Structural Integrity assessment of offshore structures**

**Course Type:**

Theory

**Description:**

To impart knowledge on assessment of existing offshore structures for life extension

**Course Content:**

Introduction : Data Collection; Platform classification; Risk Levels; Met-ocean criteria; Platform initiators; Assessment criteria; Long and short term sea state; Estimation of Wave height and period for reduced design life; Assessment Procedure : Overview of existing assessment procedures from API RP 2A; Initial screening by design level analyses; load reduction; ultimate strength principles; Reserve Strength ratio; Ultimate Strength Analysis: Basics of ultimate strength analysis; M-P-Delta relationship; Ultimate strength of circular hollow sections; Global plastic collapse analysis; Ultimate strength of Tubular connections; Limit state principles; Ultimate and fatigue limit states; Risk and Reliability: Introduction to probability distribution functions; Application of probability theory to wave hydrodynamics; Weibull and Gumbel distributions; Wave force modelling; Modelling uncertainties; Load and Resistance Factors; Code Calibration; Reliability Index; Probability of failure; Fatigue and Risk Based Inspection: Paris law; Crack propagation; Fatigue Reliability; Inspection procedure and interval; Updated inspection methods; Fatigue crack measurement; Mitigation methods;

**Text Books:**

1. Nonlinear analysis of offshore structures by Bjorn Skallerud and Jorgen Amdahl, Research Studies Press Ltd, 2002.
2. Handbook of Offshore Engineering by Subrata K. Chakrabarti, Elsevier, 2005.
3. Probability Concepts in Engineering Planning and Design, Volume I & II – Decision, Risk and Reliability by A. H. Ang and W. H. Tang, John Wiley & Sons, 2005.
4. Structural Reliability Analysis and Prediction by Robert E. Melcher, John Wiley & Sons, 1999.
5. Structural Reliability, Analysis and Design by R. Ranganathan, Jaico Publication House, 2000.

**Reference Books:**

1. Assessment of structural integrity for existing offshore load bearing structures, NORSOK Standard N-006, 2009.
2. Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms - Working Stress Design, API RP2A-WSD 21st Edition, December 2000. Errata and Supplement 1, December 2002, Errata and Supplement 2, September 2005, Errata and Supplement 3, October 2007
3. Guidelines for offshore structural reliability analysis – Application to jackets, Report No. 95-3203, Rev 01, 5th November 1996, DNV, Norway