

OFFSHORE STRUCTURAL ENGINEERING

Paper Code: ETCE-424

Paper: Offshore Structural Engineering

L	T/P	C
3	1	4

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To obtain expertise and specialize in Offshore Structures and subsea Engineering.

UNIT I

Concrete/composites: Underwater concrete, mix design, quick setting compounds, high strength grout, fiber reinforced plastics, special composite materials for under water repairs.

Structural Steel: Corrosion Mechanism; Types of corrosion; Seawater corrosion; corrosion allowance, cathodic protection design, impressed current method, sacrificial anodes design, protective coatings, splash zone protection, cathodic protection monitoring system.

Underwater repair: Underwater welding, repair schemes for tubular members, grouted sleeve connections, and stressed – grouted connections for tubular joints.

[T1,T2][No of Hours: 12]

UNIT II

Static Structural Analysis: Estimation of wave and current loading on framed structures; maximum base shear and overturning methods; Cyclic loads for fatigue analysis.

Dynamic Structural analysis: Dynamic analysis of framed structures; Mode shapes and Eigen frequency analysis; Wave response; dynamic wave response; frequency and time domain analysis of risers and pipelines.

[T1,T2][No of Hours: 12]

UNIT III

Loads on offshore structures: Wind Loads; Wave and Current Loads; Calculation based on Maximum base Shear and Overturning Moments; Design Wave heights and Spectral Definition; Hydrodynamic Coefficients and Marine Growth; Fatigue Load Definition and Joint Probability distribution; Seismic Loads.

[T1,T2][No of Hours: 11]

UNIT IV

Foundation for Offshore Structures: Mud-mats: bearing capacity, sliding stability, over-turning stability, short term and long term settlements, factor of safety; Bucket foundation; Suction anchors; Gravity foundation.

[T1,T2][No of Hours: 10]

Text Books:

- [T1] Mohamed Abdallah El-Reedy. Offshore Structures: Design, Construction and Maintenance, Elsevier
[T2] Hydrodynamics of Offshore Structures by S.K. Chakrabarti, Springer-Verlag

References:

- [R1] Handbook of Offshore Engineering by S.K. Chakrabarti, Elseviers, 2005.
[R2] Structural Stability - Theory and Implementation by W.F.Chen and E.M.Lui by Elsevier
[R3] Construction of Marine and Offshore Structures by Ben C. Gerwick, CRC Press, 1999.
[R4] Dynamics of Offshore Structures by James F. Wilson – 2003, John Wiley and Sons
[R5] Construction of Marine and Offshore Structures by Ben C. Gerwick, Jr – 2007, CRC Press.