

Course Code	Course Title	L	T	P	C
17CE018	DESIGN OF TALL STRUCTURES	3	0	0	3

Course Objectives:

1. To study the behaviour of tall structures.
2. To learn analysis and design of buildings for wind loads
3. To study design criteria for tall structures.
4. To familiarize the students about stability analysis of tall structures.
5. To study behaviour of various structural systems under wind loads.

Course Outcomes:

At the end of the course student will be able

1. To apply all types loads on tall buildings according IS code
2. To analyze and Design tall buildings.
3. To understand behaviour of various structural systems under different loading conditions.
4. To design towers, chimneys and shear walls.
5. To check stability of tall structures against buckling, Torsion.

Activities:

1. Design any Tall building using IS code method and compare it using any design software.
2. Design a shear wall using IS code method and compares it using any design software.
3. Design a RCC Chimney using IS code method and compare it using any design software.
4. Design steel Chimney using IS code method and compares it using any design software.
5. Design a Tower Structure using IS code method and compare it using any design software.

Skills:

1. Able to design tall building as per IS code.
2. Able to design shear wall using IS code manually and using software.
3. Able to design tower structures and chimney using IS code.

UNIT-I: Introduction:

Basic Introduction and Importance of Tall Structures, Dead load, Live load, Impact load, Construction load, Sequential loading. Wind Loading – Static and Dynamic Approach, Analytical method, Wind Tunnel Experimental methods. Earthquake Loading – Equivalent lateral Load analysis, Response Spectrum Method, Combination of Loads.

UNIT –II: Analysis and Design of Tall Buildings:

Modelling for approximate analysis, Accurate analysis and reduction techniques, Analysis of structures as an integral unit, Analysis for member forces. Analysis of tall building for lateral loads, cantilever method, Portal method, Factor method; Design of structures for wind drift and Twist, Computer application in analysis & design

UNIT-III: Behaviour of Structural Systems:

Factors affecting the growth, height and structural form, Behaviour of Braced frames, Rigid Frames, In-filled frames, Shear walls, Coupled Shear walls, Wall-Frames, Tubular, Outrigger braced, Hybrid systems under wind loads.

UNIT-IV: Design of Various Tall Structures:

Introduction, Loads on towers, Analysis of towers, Masts, Trestles, Stresses in trestles due to vertical loads and horizontal loads, Design of members in towers. Design of Chimneys (RCC and Steel) and Design of shear wall according to IS code for wind loads.

UNIT-V: Stability Analysis:

Overall buckling analysis of frames, wall-frames, Approximate methods, Second order effect of gravity loading, P-Delta Effects, Simultaneous first order and P-Delta analysis, Translational instability, Torsional Instability, Out of plumb effects, Effect of stiffness of members and foundation rotation in stability of structures.

TEXT BOOKS:

1. Bryan Stafford Smith and Alex Coull, "Tall Building Structures - Analysis and Design", John Wiley and Sons, Inc., 1991.
2. S.N. Manohar, "Tall Chimneys: Design and Construction", McGraw-Hill, 1988.

REFERENCES:

3. Taranath B.S, "Structural Analysis and Design of Tall Buildings", McGraw-Hill, 1988
4. Design of Reinforced Concrete Structures by Pillai and Devdas Menon.