INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

DESIGN OF HIGH-RISE STRUCTURES								
II Semester: ST								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
BSTE16	Elective	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	0	0	3	40	60	100
Contact Classes: 45	**Total Tutorials: Nil**	**Total Practical Classes: Nil**				**Total Classes: 45**		
Prerequisite: Reinforced Concrete Structures Design and Drawing, Steel Structures Design and Drawing								

I. COURSE OVERVIEW:

The high-rise building is generally defined as one that is taller than the maximum height. The foundations of high-rise buildings must sometimes support very heavy gravity loads, and they usually consist of concrete piers, piles, or caissons that are sunk into the ground. Skyscrapers are created using a steel skeleton structure. Giant girder grids are formed by riveting metal beams end to end to form vertical columns. At each floor, the vertical columns are connected to horizontal girder beams to help strengthen and reinforce the structure.

II. COURSE OBJECTIVES:

The student will try to learn:

I. The Analysis, design and detailing of Transmission/ TV tower, Mast and Trestles with different loading conditions.
II. The design principles and techniques such as P-Delta effect, soil structure interaction for efficient design of high rise structures.
III. The behavior of various structural systems under extreme loading conditions.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1 Explain the configuration, bracing systems, and behavior of transmission/TV towers, and analyze their response to vertical, transverse, and longitudinal loads.
CO 2 Analyze and design reinforced concrete and steel chimneys, including suitable foundation systems for different soil conditions.
CO 3 Evaluate structural concepts, configurations, and systems for tall buildings considering architectural and functional requirements.
CO 4 Apply principles of gravity loads, wind loads, seismic effects, and load combinations (including live load reduction and impact loads) in the design of tall structures.
CO 5 Interpret IS code provisions and design considerations for firefighting and fire safety in tall buildings.
CO 6 Utilize structural analysis and design software tools for the modeling, analysis, and design of tall structures.

IV. COURSE CONTENT:

MODULE-I: DESIGN OF TRANSMISSION/ TV TOWER (9)

Mast and trestles: Configuration, bracing system, analysis and design for vertical transverse and longitudinal loads.

MODULE-II: ANALYSIS AND DESIGN OF RC AND STEEL CHIMNEY (9)

Types of chimneys – Loads and stresses – IS code provisions – Analysis and design of RC and steel chimneys – Design of base plate, anchor bolts, and liners – Foundation design for different soil strata..

MODULE-III: TALL BUILDINGS (09)

Structural Concept, Configurations, various systems, factors affecting growth, height and structural form.

Gravity load, dead load, live load, live load reduction technique, impact load, Wind and Seismic loads, combination of load.

MODULE-IV: FIREFIGHTING PROVISION OF TALL BUILDINGS (08)

Dynamic approach, structural design considerations and IS code provisions. Firefighting design provisions.

MODULE-V: APPLICATION (9)

Analysis and design of tall buildings under combined loading conditions with emphasis on structural behavior, stability, and performance evaluation through case studies.

V. TEXT BOOKS:

1. Varyani U. H, "*Structural Design of Multi-storeyed Buildings*", South Asian Publishers, New Delhi, 2nd Edition, 2002.
2. Taranath B. S, "*Structural Analysis and Design of Tall Building*", McGraw Hill, 1988.
3. Shah V. L. & Karve S. R., "*Illustrated Design of Reinforced Concrete Buildings (GF+3 storeyed)",* Structures Publications, Pune, 2013.

VI. REFERENCE BOOKS:

1. Smith Byran S. and CoullAlex, "*Tall Building Structures*", Wiley India. 1991.
2. Wolfgang Schueller, "*High Rise Building Structures*", Wiley., 1971

VII. ELECTRONICS RESOURCES:

1. http://nptel.ac.in/courses/105106113/13
2. http://www.byggmek.lth.se/fileadmin/byggnadsmekanik/publications/tvsm5000/web5213.pdf

VIII. MATERIALS ONLINE:

1. Course Outline Description
2. Tutorial Question Bank
3. Assignments
4. Model Question Paper – I
5. Model Question Paper - II
6. Lecture Notes
7. Early Lecture Readiness Videos
8. Power point presentation