DESIGN OF TALL BUILDINGS
(Professional Elective-IV)

Course Code: 19CE2260	L	P	C
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Course Outcomes:
At the end of the course the student will be able to
CO1: Describe the development of tall building structure including loading and other serviceability parameters.
CO2: Discuss about various types of loads, combinations and its influence on tall buildings.
CO3: Demonstrate various types of structural forms and its applications.
CO4: Modeling for analysis of Rigid frame building structure.
CO5: Analyse shear wall system, wall frame system of tall buildings.

UNIT- I **(10-Lectures)**

TALL BUILDINGS

Introduction – Factors affecting growth, Height and structural form – Tall building structure – Philosophy – Design criteria– Design process– Design philosophy – Loading – Strength and Stability – Stiffness and Drift limitations – Human comfort criteria – Creep, shrinkage and temperature effects – Fire – Foundation settlement and soil-structure interaction.

LO1: Design and development of tall structures.
LO2: Demonstrate the influence of various design parameters and limitations in design of tall structures.

UNIT- II **(10-Lectures)**

LOADING ON TALL BUILDINGS

Introduction – Gravity loading including live load and its reduction – Impact load due to elevators – Construction loads.

Wind loading – Load Combinations as per BIS-Methods of Design

LO1: Understand various loads acting on Tall Building Structure including its combinations.

LO2: Demonstrate various methods of design of tall buildings.

UNIT- III (10-Lectures)

STRUCTURAL FORM

Introduction – Braced frame structures – Rigid frame structures – In-filled frame Structures – Flat plate and Flat slab structures – Shear wall structures including coupled walls– Dual structures(wall frame structures)– Framed-Tube structures – Outrigger-Braced Structures – Suspended structures – Core structures – Space Structures – Hybrid Structures-Different R.C. floor systems.

LO1: Understand suitable form and configuration of structural systems.

LO2: Evaluate the selected form for analysis of tall buildings.

UNIT- IV (10-Lectures)

MODELING FOR ANALYSIS

Introduction – Approaches to analysis – Assumptions – High-Rise Behavior – Modeling for Approximate analysis – Modeling for Accurate Analysis – P-Delta effects –Wide Column Deep beam analogies etc.

RIGID FRAME STRUCTURES

Introduction – Rigid frame behavior – Approximate Determination of member forces caused by gravity loading - Approximate Analysis of member forces caused by horizontal loading – Approximate analysis for Drift - Computer analysis of Rigid frames(only for practice and not included in the exam).

LO1: Understand modeling of the structure and its behaviour.

LO2: Carryout various approximate analysis and compute the forces for design.

UNIT- V **(10-Lectures)**

SHEAR WALL STRUCTURES

Introduction – Behavior of shear wall structures – Analysis of proportionate wall systems - and Non proportionate structures and its behavior - Effects of Discontinuities at Base – coupled shear wall structure –Behaviour – Methods of Analysis (limited to theory only – Computer analysis). (Only for practice and not included in the exam)

WALL - FRAME (DUAL) STRUCTURES

Introduction – Behavior of symmetric wall frames – Approximate theory for wall frames – Computer Analysis (only for practice and not included in the exam).

LO1: Understand the behavior of shear wall structures and its analysis.

LO2: Carryout the analysis of dual structures and compute the design forces.

Text Books:

1. Bryan Stafford Smith and Alex Coull, Tall Building Structures Analysis and Design, Wiley India Pvt. Ltd., 2011.
2. Bungale S. Taranath, Wind and Earthquake Resistant Buildings, Structural Analysis and Design, Marcel Dekker, 2005.

Reference Books:

1. John D Holmes Wind Loading of Structures, Spon Press, 2003.
2. Pankaj Agarwal &Manish Shrikhande, Earthquake Resistant Design of Structures, 9th edition, PHI Learning Private Limited, New Delhi, 2011.
3. IS 456: 2000 or latest.
4. IS 1893 (Part 1) : 2016 or latest
5. IS 13920: 2016 or latest
6. IS 875 (Part 1 to Part 5) latest.
7. IS 16700: 2017 Criteria for structural safety of Tall Concrete Buildings.