

GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL (STRUCTURAL ENGINEERING) (20)

DESIGN OF TALL STRUCTURES

SUBJECT CODE: 2732005

M.E. SEM-III

Type of course: Elective

Prerequisite: Design of Concrete Structure, Design of Steel Structure

Rationale: With the rapid development of infrastructure facilities, large number of tall structures like tall buildings, chimneys, cooling tower, transmission line towers, microwave towers etc. are being designed and constructed across the globe. The course on *Design of Tall Structures* acquaints the structural engineering students to analyze and design such structures as per Indian Standard code of practice.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	ESE (V)		PA (I)			
					ESE	OEP	PA	RP		
3	2#	2	5	70	30	20	10	10	10	150

Course Content:

Sr. No.	Course Content	Total Hrs	% Weightage
1	Tall Building: Structural systems for (a) floor systems (b) vertical load resisting systems (c) lateral load resisting systems, and (4) connections, Interaction of frames and shear wall, Twist of frames, Effects of opening, Analysis of coupled shear walls; Various methods of analysis like static linear/nonlinear, dynamic, buckling analysis, construction stage analysis etc. ; Structural control and energy dissipation devices for tall building.	15	35
2	Chimney: Design Factors, Stresses due to temperature, components, Platform and Safety ladders, Steel stacks, Refractory linings, Caps and foundation	08	20
3	Cooling towers: types, components, design forces, analysis and design	08	20
4	Transmission Line and Microwave towers: types of loads, Tower Configuration, Analysis and Design of towers	11	25

Reference Books:

1. Tall buildings - B. S. Taranath:
2. Handbook of Concrete Structures - Mark Fintel
3. Tall buildings - Coull and Smith
4. Design of Multi-storeyed structures - U. H. Variani
5. Tall Chimneys: Design & Construction - S. N. Manohar
6. Transmission Line Structures - Santhakumar & Murthy
7. IS:6533 (Part 2) –Code of Practice for Design and Construction of Steel Chimney
8. IS:4998 (Part 1)- Criteria for Design of Reinforced Concrete Chimneys

9. IS: 4091 Code of Practice for Design and Construction of Foundations for Transmission Line Towers and Poles

Course Outcome:

After learning the course the students should be able to design:

- (1) Tall buildings,
- (2) Chimney,
- (3) Design Cooling Tower,
- (4) Transmission Line towers and,
- (5) Microwave towers.

List of Experiments:

1. Case study on tall buildings of the world, India and Gujarat.
2. Design of tall structure based on the syllabus. The design report shall consist of full analytical treatment, design procedure, references and all necessary drawings in the form of neat dimensioned sketches.

Design based Problems (DP)/Open Ended Problem:

Major Equipments: --

List of Open Source Software/learning website: <http://nptel.ac.in/>

<http://skyscrapercenter.com/>, <http://www.emporis.com/>, <http://www.ctbuh.org/>

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.