



**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**Bachelor of Engineering**  
**Subject Code: 3170626**  
**SUBJECT NAME: DESIGN OF INDUSTRIAL STRUCTURES**  
**B.E. SEM-VII**

**Type of course:** Professional Elective Core

**Prerequisite:** Structural Analysis, Design of structure

**Rationale:** The recent worldwide boom and investment in the Industrial construction, there is a high need of building technical competence in the design of Industrial structures. This subject provides knowledge of designing & detailing of few reinforced concrete and steel structures in industrial projects.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

**Note: IS:456(2000), IS:800 (2007), SP 6(1), IS-1893-1(2016), IS-875 (Part 3) & other relevant codes are permitted in the examination.**

**Content:**

Sr. No.	Content	Total Hrs
1	<b>Industrial Building:</b> Structural layout of industrial building, Design of roof: (a) with trusses and (b) with Gable frame. Effect of wind loads on purlin and trusses, bracing systems, columns, Design of Gantry Girder with static and Moving loads.	12
2	<b>Transmission and Communication towers:</b> Types and configuration, Loads & load combinations be considered, Analysis and design of tower & foundations	06
3	<b>Chimneys :</b> Loads and stresses in chimney shaft, Earthquake and wind effect, Stresses due to temperature difference, combined effect of loads and temperature, temperature. Design of RC chimney	10
4	<b>Bunkers &amp; Silos:</b> Introduction, Jassen's theory, Airy's theory, Shallow and deep bins, Design of RC circular/cylindrical bunkers, silos using Jensen's theory as per IS.	11
5	<b>Grid Slabs</b> Introduction, Size of beams & topping, Design of RC Grid slab using Rankine Grashoff Method, Detailing of reinforcement.	06

**Suggested Specification table with Marks (Theory):**

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
05	10	30	30	20	5

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**



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Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

## Reference Books:

1. N. Subramaniam, Design of Steel Structures, Oxford University Press
2. S. K. Duggal, Limit State Design of Steel Structure, Tata Mc-Graw-Hill Publishing House
3. S. S. Bhavikatti, Design of Steel Structures: By Limit State Method as Per IS: 800-2007, I K International Publishing House Pvt. Ltd
4. P. Dayaratnam, "Design of Steel Structures", S. Chand Group
5. Dr. H. J. Shah, Reinforced Concrete, Volume-II, Charotar Publishing House Pvt. Ltd.
6. S. S. Bhavikatti, Advance RCC Design, New Age International Publishers Pvt. Ltd
7. N. Subramaniam, Design Reinforced Concrete Structures, Oxford University Press

## Course Outcome:

Sr. No.	CO statement	Marks % weightage
CO-1	Identify different structural components & Prepare geometric & structural lay-out of different industrial structures.	25
CO-2	Determined different types of loads & load combinations to be considered on the structures.	25
CO-3	Apply the design principles, procedures and current Indian (or any international) codal provisions for design & detailing of structures.	25
CO-4	Carry out design and structural detailing of different structural components of the structures.	25

## Term Work :

Term work shall consist of satisfactory completion and submission of following list of Practicals/Tutorials.

### List of Practicals /Tutorials:

1. Full Design of at least 01 industrial structure from any topic with structural detailing in A2 size drawing sheet covering all required details in structural drawing.
2. Solve at least 05 design examples from the topics covered in the syllabus.
3. Software applications of one/two industrial structures with any professional software.
4. Preparation of EXCLE Worksheets for the design of various structural components of Industrial structures.
5. Prepare at least one drawing in any CAD software (like AutoCAD) for any industrial structures.

Practical examinations shall consist of oral based on the term-work and above course.

## Major Equipment/Software:

1. Any professional software of Structural analysis such as STAAD-pro, SAP, Tekla



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**List of Open Source Software/learning website:**

[www.nptel.iitm.ac.in/courses/](http://www.nptel.iitm.ac.in/courses/)