GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING SYLLABUS

Minor/Honours Degree : Computer Aided Civil Engineering Processes

Subject Code : N117AV01

Subject Name : Basics of Structural Design (STEEL) - Software Applications

WEF Academic Year:	2026-27
Semester:	7
Category of the Course:	Compulsory

Prerequisite: Concepts of IS Codal provisions for steel structure design, Theoretical design of steel members.

Rationale: The subject help students to learn analysis of steel structural members with consideration of static and dynamic input in software.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
1	0	4	3	70	00	30	00	100

Content:

No.	Course Content	No. of Hours
1	**Introduction** Steel structures concepts as per IS 800, Types of connections, Design of connection, Location of connections, Analysis of Tension members, Compression member, Analysis of truss.	06
2	**Analysis of steel structures in STAAD-pro.** Analysis of tension member and compression member in STAAD-pro. Analysis of truss in Staad-Pro.	06
3	**Industrial Building** Analysis of Industrial building by applying Static and dynamic loads. Providing bracings, and different types of connection in industrial buildings.	08
4	**Pre-Engineered Buildings (PEB Structures)** Concepts of PEB Structures, Comparison between Traditional approach of industrial buildings and PEB Structures. Analysis and design of PEB Structures	08
5	**Special Structures** Analysis and design of special structures in STAAD-pro like, Retaining wall, UG Sump, Water Tank, ESR Water tank, RCC & Steel chimney, Flat slab etc.	08
	Total Hrs.	**36**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10%	**15%**	**25%**	**20%**	**10%**	**20%**

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

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. Design of Steel Structures by S Duggal, Published by McGrow Hill Publications.
2. Design of Steel Structure by N. Subramanian published by Oxford University Press.
3. Design of R.C.C Buildings using Staad Pro V8i with Indian Examples English by T.S.Sharma.
4. MASTERING STAAD PRO: A Comprehensive Guide to Structural Analysis and Design by Syed Mohd Abid.

Course Outcomes:

No	Course Outcomes	Marks % weightage
CO1	Students will be able to learn design of bolted and welded connection	15%
CO2	Students will be able to learn analysis of various types of trusses.	25%
CO3	Students will be able to analyze Steel industrial shed.	25%
CO4	Students will be able to analyze Pre-Engineered building.	25%
CO5	Students will be able to design special structures	10%

List of Experiments:

1. Analyze tension and compression members manually and in STAAD-pro.
2. Design of industrial shed by traditional approach (minimum 1)
3. Design of PEB Structures (Minimum 1)
4. Design of cantilever and counterfort retaining wall (minimum 2)
5. Design of UG Sump & Water Tank (Minimum 2)
6. Design of ESR Water tank (minimum 1)
7. Design of RCC & Steel chimney (Minimum 1)

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