Course File

Subject Title/Subject Code: WIND AND SEISMIC ANALYSIS
6CE3-01

Semester: VI Year: III

Name of the Faculty: Mrs. Prachi Singhal
E-mail id: prachi.singhal@technonjr.org

Class Schedule

Total Number of Lectures: 28

i) Course Objective

The course aims to provide students with a comprehensive understanding of the design and analysis of structural systems under wind and seismic loads, covering the relevant codes, load calculations, and construction practices to ensure safety and stability in buildings.

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VISSION & MISSION OF INSTITUTE

Vision

Empowering student with recent and emerging technologies to create innovative technical leaders capable of contributing to industrial and societal needs for betterment of mankind across the globe.

Mission

M1: To provide a dynamic learning environment to students by providing constant exposure to latest technologies by linking closely with the industries.

M2: To establish an effective interface with industry to obtain live problems to enhance critical thinking and problem solving skills among students and consultancy projects for faculty.

M3: To provide avenues and opportunities to faculty for domain specific trainings and qualification upgradation.

M4: To develop ethical leaders with strong communication skills.

VISION & MISSION OF DEPARTMENT

Department Vision

To increase students' learning of fundamentals for designing and planning of buildings and latest technologies through industry-aligned project-based learning which will help in transforming students to be good civil engineering professionals leading to innovation and incubation of new ideas.

Department Mission

M1: To create experiential learning through solving problems of Government, Society, Smart Cities, Industry and other entities.

M2: To teach the latest technologies to the students beyond the syllabus activity so that they are updated and industry ready.

M3: To enable engineering students to understand industry-aligned technologies and learn to find solutions from their early engineering days, this is the only way to produce globally relevant engineers solving real-life problems applying current technologies.

M4: To enable students to generate projects through problems faced by and requirement of Smart cities, industry, Government and other entities whereby those outlined problem statements are to be studied deeply by a group of faculty members to convert them into real-time project format.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs 1: To provide an in-depth understanding of the fundamentals of Civil Engineering and create a foundation for lifelong learning to facilitate a progressive career in the construction Industry, as an entrepreneur and in pursuit of higher studies.

PEOs 2: To equip the students with technical and analytical skills to develop innovative solutions to complex real-life problems using existing and novel technologies. To equip the students with good communication and interpersonal skills, inter-disciplinary teamwork and leadership skills to enable them to fulfill professional responsibilities.

PEOs 3: To expose them to various contemporary issues which will enable them to become ethical and responsible towards themselves, co-workers, Society and the Nation.

PEOs 4: To make the student’s industry ready by imparting education related to the latest technologies so that they can grab future industry jobs.

PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO1: To be aware of and initiate some-work on future technologies and new developments which may impact the future Industry 4.0.

PSO2: Hands on training on upcoming technologies and project-based learning.

PSO3: Get exposure to BIM (Building Information Modeling).

PROGRAMME OUTCOMES (POs)

A student will develop:

PO01. ENGINEERING KNOWLEDGE: An ability to apply knowledge of Mathematics, Science and Engineering Fundamentals in Electronics and Communication Engineering.

PO02. PROBLEM ANALYSIS: Ability to analyze and interpret data by designing and conducting experiments. Develop the knowledge of developing algorithms, designing, implementation and testing applications in electronics and communication related areas.

PO03. DESIGN/ DEVELOPMENT OF SOLUTION: An ability to Design a system Component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

PO04. CONDUCTION OF INVESTIGATION OF COMPLEX PROBLEMS: Ability to Identify, formulate and solve engineering problems.

PO05. MODERN TOOL USAGE: An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

PO06. THE ENGINEERING AND SOCIETY: Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.

PO07. ENVIRONMENT & SUSTAINABILITY: Understand the impact of professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of, and need of sustainable development.

PO08. ETHICS: An ability to understand the professional, social and ethical responsibility.

PO09. INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. COMMUNICATION: An ability to Communicate effectively in order to succeed in their profession such as, being able to write effective reports and design documentation, make effective presentations.

PO11. PROJECT MANAGEMENT & FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in team, to manage projects and in multidisciplinary environment.

PO12. LIFE-LONG LEARNING: Recognize the need and an ability to engage in life-long learning.

COURSE OUTCOMES (COs) OF THE SUBJECT

CO No.	Mapping	Statement
CO35301.1	**Understanding**	Students will be able to understand the types of structures, symmetry and asymmetry in Building forms, shear walls and multi-storey configurations.
CO35301.2	**Analyzing**	Students will be able to analyze design loads for different types of buildings.
CO35301.3	**Evaluating**	Students will be able to calculate wind load on flat roof, pitched roof and single sloped Roof buildings.
CO35301.4	**Evaluating**	Students will be able to calculate earthquake loads on framed structures and design of Earthquake Resistant Construction.
CO35301.5	**Applying**	Students will apply wind & seismic load for analyzing the structure to evaluate the response of lateral load

COS MAPPING WITH POs AND PSOs

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	0	0	1	1	0	1	0	0	2	2	2
CO2	1	2	1	1	0	0	1	1	0	1	0	0	1	2	1
CO3	2	2	2	2	0	0	1	1	0	1	0	0	2	2	2
CO4	3	2	2	2	0	0	1	1	0	1	0	0	3	2	2
CO5	2	3	3	2	0	0	1	1	0	1	0	0	2	3	3

UNIVERSITY ACADEMIC CALENDAR

Academic Calendar for even Semester for Session

Course: Bachelor of Technology (B.TECH.)				
Course: Bachelor of Technology (B.TECH.)				
Semester	II	IV	VI	VIII
Commencement of Classes	26.02.2024	15.02.2024	15.02.2024	02.01.2024
First Mid Term	02.04.2024	20.03.2024	20.03.2024	15.02.2024
Second Mid Term	03.06.2024	06.05.2024	06.05.2024	21.03.2024
Last Working Day	10.06.2024	31.05.2024	31.05.2024	20.04.2024
Commencement of Practical Exams	01.07.2024	03.06.2024	03.06.2024	22.04.2024
Commencement of Theory Exams	19.06.2024	14.06.2024	15.06.2024	02.05.2024
Project (VIII)	06.05.2024 to 15.05.2024			
Practical Training (After II Sem.)	15.07.2024 To 31.07.2024			
Practical Training (After IV Sem.)	01.07.2024 To 17.08.2024			
Practical Training (After VI Sem.)	01.07.2024 To 17.08.2024			
Commencement of Classes for next Odd Semesters (2023-24)	I	III	V	VII
	01.08.2024	01.08.2024	20.08.2024	20.08.2024

ACADEMIC CALENDAR OF INSTITUTE

Academic Calendar for even Semester for Session 2023-24 (Even Semester)

Course: Bachelor of Technology (B.TECH.)				
Semester	**II**	**IV**	**VI**	**VIII**
Commencement of Classes	26-02-2024	15-02-2024	15-02-2024	2-01-2024
Commencement of First Mid Term	20-04-2024	25-03-2024	25-03-2024	15-02-2024
Commencement of Second Mid Term	05-06-2024	24-05-2024	24-05-2024	21-03-2024
Last Working Day	15-06-2024	31-5-2024	31-5-2024	20-04-2024
Commencement of Practical Exams	01-07-2024	04-6-2024	03-6-2024	22-04-2024
Commencement of Theory Exams	19-6-2024	15-6-2024	14-6-2024	02-05-2024
Project (VIII)	06.05.2024 to 15.05.2024			
Practical Training (After II Sem.)	15.07.2024 To 31.07.2024			
Practical Training (After IV Sem.)	01.07.2024 To 17.08.2024			
Practical Training (After VI Sem.)	01.07.2024 To 17.08.2024			

Evaluation Scheme

FACULTY DETAILS:

Name of the Faculty : Prachi Singhal
Designation : Assistant Professor

Department : Civil Engineering

1. TARGET

a) Percentage Pass: 100%
b) Percentage I class: 60 %

2. METHOD OF EVALUATION

- ☐ Continuous Assessment Examinations (Mid-Term 1, Mid-Term 2)
- ☐ Assignments / Seminars
- ☐ Mini Projects
- ☐ Quiz
- ☐ Semester Examination

Others_____

3. List out any new topic(s) or any innovation you would like to introduce in teaching the subject in this Semester.
4. Take the help of creative tools to stimulate creativity. Include slide presentations, demonstration or forms of visual exercises that will excite the young minds and capture their interest.

Signature of Faculty: **Signature of HOD**

UNIVERSITY SYLLABUS

6CE3-01: WIND AND SEISMIC ANALYSIS

Credit: 2 **Max. Marks: 100(IA:20, ETE:80)**
2L+0T+0P **End Term Exam: 2 Hours**

SN	CONTENTS	Hours
1	**Introduction:** Objective, scope and outcome of the course.	1
2	**Structural Systems:** Types of structures and Structure's forms, Symmetry and Asymmetry in building forms, Vertical and lateral loadresting elements, shear walls, framed tubes and various multi-storey configurations.	4
3	**Design Loads:** various types of loads and relevant codes. Design loads for different types of buildings. (IS-875 part 1 & 2) & Load Flow Concept	3
4	**Wind Loads Analysis:** Wind loads & calculation of wind load on flat roof, pitched roof and single sloped roof buildings (IS: 875-Part 3).	8
5	**Earthquake Load Analysis:** Earthquake loads & calculations of earthquake loads on framed structures. (IS: 1893 – Part 1).	6
6	**Earthquake Resistant Construction:** Typical seismic failure of masonry and RCC structures.Earthquake resistant construction of buildings, and various provisions as per IS codes; IS-4326,IS-13827, IS-13828, IS-13920, IS-13935.	6
	TOTAL	28

PRESCRIBED BOOKS

1. Earthquake Resistant Building Construction by Neelam Sharma, S.K. Kataria & Sons.
2. Seismic Analysis of Structures by T.K.Datta, John Wiley & Sons (Asia) Pte Ltd.
3. Earthquake Resistant Design of Structures by Pankaj Agarwal Manish Shrikhande, Prentice-Hall of India (PHI).
4. I.S. 1893 - 2002, Criteria for Earthquake Resistance design of Structures

WEEKLY TIME TABLE OF THE TEACHER

First Time Table: with effect from (Date): 22-02-2024

Day	1	2	3	4	5	6	7
Monday			**WSA**				
Tuesday						**WSA**	
Wednesday			**WSA**				
Thursday							
Friday						**WSA**	**WSA**
Saturday							

COURSE-PLAN

UNIT	Lect. No.	TOPICS	Teaching Methods/ Teaching Aids
1	1	INTRODUCTION: Objective, scope and outcome of the course.	White Board
2	2	Types of structures and Structure's forms	White Board
2	3	Symmetry and Asymmetry in building forms	White Board
2	4	Vertical and lateral load resting elements	White Board
2	5	Framed tubes and various multi storey configurations	White Board
3	6	Various types of loads	White Board
3	7	Design loads for different types of buildings	White Board
3	8	(IS-875 part 1 & 2) & Load Flow Concept	White Board
4	9	Introduction to Wind Loads Analysis	White Board
4	10	Wind loads & calculation of wind load on flat roof	White Board
4	11	Wind loads & calculation of wind load on flat roof	White Board
4	12	Wind loads & calculation of wind load on pitched roof	White Board
4	13	Wind loads & calculation of wind load on pitched roof	White Board
4	14	Wind loads & calculation of wind load on pitched roof	White Board
4	15	Wind loads & calculation of wind load on single sloped roof	White Board
4	16	Wind loads & calculation of wind load on single sloped roof	White Board
5	17	Introduction to Earthquake Load Analysis	White Board
5	18	Earthquake loads & calculations of earthquake loads on framed structures	White Board
5	19	Earthquake loads & calculations of earthquake loads on framed structures	White Board
5	20	Practice questions of earthquake loads	White Board
5	21	Practice questions of earthquake loads	White Board
5	22	Practice questions of earthquake loads	White Board

6	23	Introduction to Earthquake Resistant Construction	White Board
6	24	Typical seismic failure of masonry and RCC structures	White Board
6	25	.Earthquake resistant construction of buildings	White Board
6	26	.Earthquake resistant construction of buildings	White Board
6	27	Discussion on provisions as per IS codes; IS 4326,IS-13827, IS-13828, IS-13920, IS-13935	White Board
6	28	Discussion on provisions as per IS codes; IS 4326,IS-13827, IS-13828, IS-13920, IS-13935	White Board

Signature of Faculty: **Signature of HOD**

Assignment – 1

1. Discuss the different types of structural systems used in multi-storey buildings. Highlight the role of symmetry and asymmetry in determining the performance of these structures under lateral loads.
2. Describe the concept of load flow in a structural system. How do different types of loads, such as dead loads and live loads, influence the design and analysis of buildings?
3. Discuss the design loads for different types of buildings as specified in IS-875 Parts 1 and 2. How do these loads vary for residential, commercial, and industrial buildings?
4. Explain the process of calculating wind loads on a building with a flat roof according to IS 875 – Part 3. Include the necessary formulas and discuss the factors that influence wind load calculations.
5. Explain the concept of vertical and lateral load-resisting elements in buildings. How do these elements contribute to the overall stability and safety of a structure during wind and seismic events?

Assignment – 2

1. Analyze the typical seismic failures observed in masonry and reinforced concrete structures. What are the key provisions in IS codes such as IS-4326 and IS-13920 that aim to mitigate these failures?
2. Compare and contrast the design considerations for earthquake-resistant construction of buildings in low-seismic versus high-seismic zones.
3. Discuss the relevance of IS 1893 – Part 1 in guiding these design choices. Elaborate on the methods used for earthquake load analysis on framed structures as per IS 1893 – Part 1. How does the distribution of mass and stiffness in a building affect its seismic response?
4. Critically evaluate the provisions of IS-13827 and IS-13828 concerning earthquake-resistant construction in rural and low-strength masonry buildings. How do these codes address the unique challenges of construction in such areas?
5. Describe the steps involved in the design and construction of earthquake-resistant shear walls. Include a discussion on the key parameters and considerations as per relevant IS codes.

SAMPLE QUIZ QUESTIONS

1. What is the primary objective of the course on Wind and Seismic Analysis?

A) To study advanced fluid mechanics

B) To understand load calculations on buildings

C) To analyze the behavior of materials under stress

D) To design and analyze structures for wind and seismic loads

2. Which of the following is NOT a type of structural system?

A) Shear walls

B) Framed tubes

C) Vertical and lateral load-resisting elements

D) Fluidized bed

3. Symmetry in building forms is essential for:

A) Aesthetics only

B) Uniform distribution of loads

C) Increasing building height

D) Reducing material costs

4. Which IS code provides guidelines for calculating live loads on buildings?

A) IS-875 Part 1

B) IS-875 Part 2

C) IS-875 Part 3

D) IS-1893 Part 1

5. Load flow concept is important because:

A) It determines the water flow in pipes

B) It ensures proper distribution of loads in a structure

C) It calculates electrical load distribution

D) It measures wind speed

6. Which of the following roofs requires wind load calculation as per IS: 875-Part 3?

A) Flat roof

B) Pitched roof

C) Single sloped roof

D) All of the above

7. The purpose of wind load analysis is to:

A) Determine the aesthetic appeal of the building

B) Calculate the amount of rainfall a building can withstand

C) Ensure the structure can resist wind forces

D) Design the electrical systems of a building

8. Earthquake loads on framed structures are calculated using which IS code?

A) IS-4326

B) IS-1893 Part 1

C) IS-13827

D) IS-13920

9. The key consideration in earthquake load analysis is:

A) The building's thermal efficiency

B) The structural integrity during seismic events

C) The building's energy consumption

D) The color and design of the structure

Mid Term Paper-I

TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR

B. TECH 3rd – YEAR (VI SEM.) – MT-I

WIND SEISMIC ANALYSIS (**6CE3-01**)

Time: 3 Hr **Max. Marks:** 70

Note:

1) The paper is divided into 2 parts: Part-A and, Part-B.
2) Part-A contains 10 questions and carries 2 mark each.
3) Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

Part- A (20 Marks)

A.	What is a tube system?	CO1
B.	What do you mean by symmetry?	CO1
C.	Define shear wall.	CO1
D.	What is aspect ratio?	CO1
E.	What are the types of design load on a building?	CO2
F.	Explain load path in a building.	CO2
G.	Write load transfer on one way and two way slab with diagram	CO2
H.	What are the load combinations on the structure?	CO2
I.	Write down the wind load calculation formula.	CO3
J.	Define 'Gust'.	CO3

Part- B (50 Marks)

1. What are the types of structural system based on load vertical load transfer? Explain	CO1
OR	
1. Briefly explain the types of Tube systems with diagram.	CO1

2. What is the building configuration and what are the factors on which it depends?	CO1
OR	
2. Define stiffness of a building and how will it affect design.	CO1

3. Differentiate between vertical and lateral load resisting members with examples.	CO2
OR	
3. What is overturning resistance? Explain with help of diagram	CO2

4. Differentiate between external and internal pressure coefficients with diagrams.	CO2
OR	
4. What is the formula of design wind speed? Explain each factors of the formula in detail.	CO2

5. Calculate wind load on a rectangular clad building with monoslope roof with overhangs. Consider height h=5.0 m, width w=10 m, length l=20 m, roof angle = $20^0$and overhang=0.5 m, ground is flat, building life is 25 years, terrain category is 2 and building is constructed in Surat. Permeability is less than 5%.	CO3

	OR	
5.	Calculate wind load on walls and roof of a rectangular building having pitched roof and height of building is 4 m, width is 12 m, and length is 20 m. Roof angle is 10^0, openings is 10%, overhangs is 0.5 m both sides. Building is situated in Hyderabad.	CO3

Marks and Gap Analysis of Mid-Term I

S.No.	University Roll No.	Name of Student	Mid-Term 1 MM-70	Remark (Remedial Class need or not – Y/N)
1.	21ETCCE001	Dev Vaishnav	45	N
2.	21ETCCE002	Hitesh Sutradhar	43	N
3.	21ETCCE004	Naved Khan	50	N
4.	21ETCCE006	Pushpendra Gehlot	56	N
5.	21ETCCE007	Shalin Dak	41	N
6.	21ETCCE009	Tamanna Kumawat	58	N
7.	21ETCCE300	Muniraj Sharma	61	N
8.	22ETCCE200	Moiz Udaipurwala	52	N
9.	22ETCCE201	Vikas Suthar	52	N

*(Y, if obtained marks are <50%)

Signature of Faculty: **Signature of HOD**

Remedial Action Taken to Remove the Gaps (After Mid- Term 1)

S.no.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Outcome Achieved
1.	NIL				
2.					

Signature of Faculty: **Signature of HOD**

Mid Term Paper-II

TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY, UDAIPUR

B. TECH 3rd – YEAR (VI SEM.) – MT-II

WIND SEISMIC ANALYSIS (**6CE3-01**)

Time: 3 Hr **Max. Marks:**70

Note:

4) The paper is divided into 2 parts: Part-A and, Part-B.
5) Part-A contains 10 questions and carries 2 mark each.
6) Part-B contains 5 questions. Each question is having two options and carries 10 marks each.

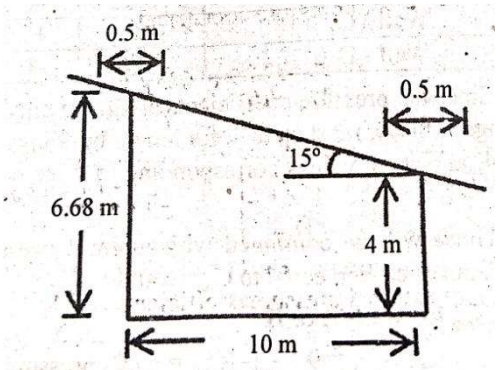
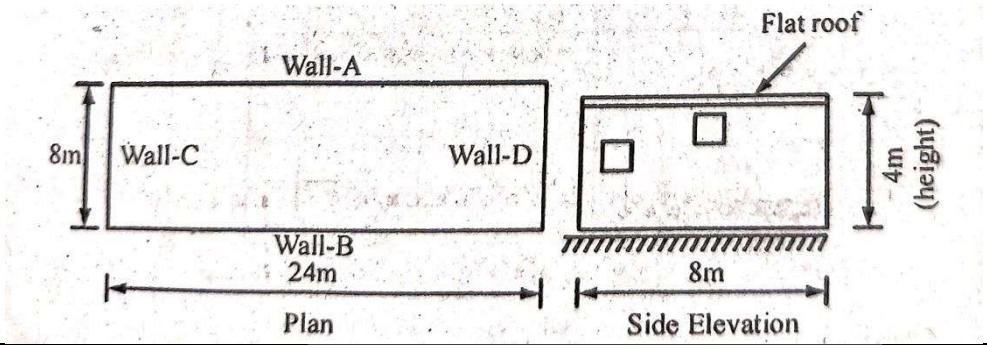
Part- A (20 Marks)

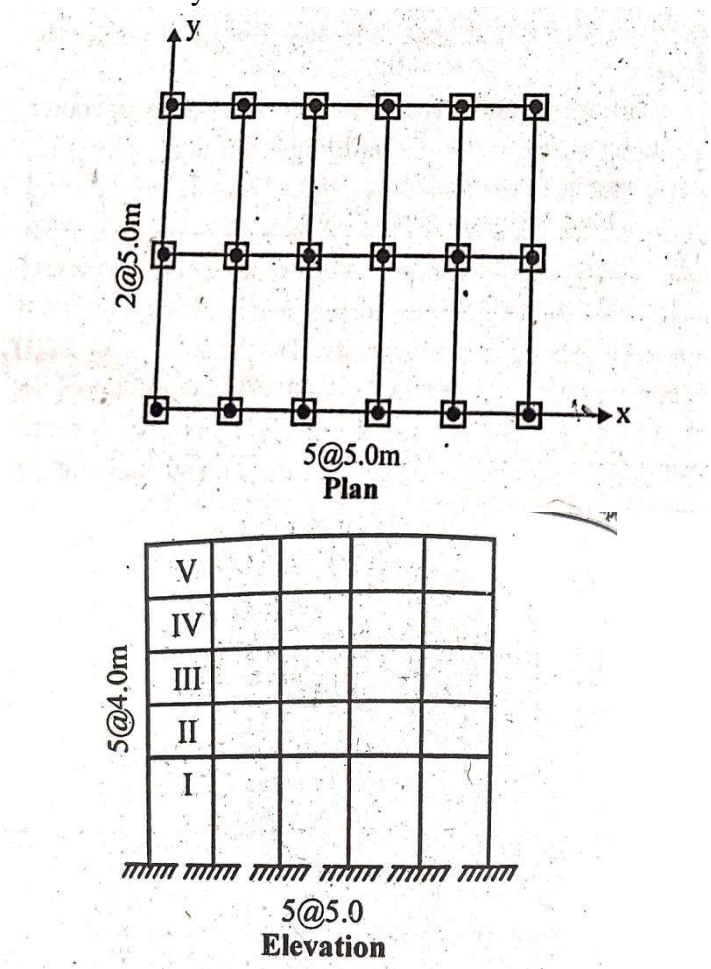
K.	Define stiffness of a building.	CO1
L.	What do you mean by overturning resistance of a building?	CO1
M.	List the factors affecting building configuration.	CO2
N.	Explain wind load on roof with the help of diagram.	CO2
O.	Write about torsion in a building	CO3
P.	What are the factors affecting earthquake design of a building?	CO3
Q.	As per IS 1893 write about DBE and MCE.	CO4
R.	What do you mean by ductility of a building? What is the ductility factor?	CO4
S.	What do you understand by effective length?	CO5
T.	What is squint junction?	CO5

Part- B (50 Marks)

2. Differentiate between the rigid frame and braced frame structure.	CO1
OR	
3. What are the various strengthening techniques adopted in buildings?	CO1

4. Describe the various types of dead loads and imposed loads to be considered for a residential building.	CO2
OR	
3. With the help of suitable examples differentiate between vertical and lateral load resisting members of a building.	CO2

5. Calculate the design wind pressure on walls and at corners of walls of a rectangular clad building with mono slope roof as shown in figure I. Plan size = 10m x 16m II. Openings in walls = 12% of wall area III. Terrain category = 2 IV. Class of structure = farm building V. Topography = fairly smooth VI. Wind zone = III  *Fig.*	CO3
OR	
5. Determine average wind pressure on walls of a general building with flat roof without overhangs. The building is situated in Surat. The topography of the area is fairly leveled and terrain is open with scattered obstructions of less than 10m height. The walls of the building have 10 openings of 1.10m x 1.00m size each.  	CO3

6. Calculate force in given frame building with following data- I. Column size = 375 x 375 mm II. Beam size = 300 x 375 mm III. Brick wall thickness = 150 mm IV. Floor thickness= 120 mm V. Live load on the floor = 4.0 kN/m^2 VI. Storey height = 4 m each VII. No. of storey's =5  	CO4
OR	
6. Calculate earthquake load on a four storey R.C.C. special moment resisting frame building having 3 bays in X-direction and 4-Bays in Y-direction. Storey height of building may be assumed s 4 m, beams sizes 300x450 mm, columns 500x500mm, floor thickness 100mm, walls 300mm and live load on floor may be taken as 3.0 kN/m^2. Building is located in Delhi for telephone exchange,	CO4

6. Write short notes on soft and weak storey.	CO5
OR	
6. Describe the importance and constructional details of plinth band and lintel band.	CO5

Marks and Gap Analysis of Mid-Term II

Sr. No.	University Roll No.	Name of Student	Mid-Term 2 MM-70	Remark (Remedial Class need or not – Y/N)
1.	21ETCCE001	Dev Vaishnav	44	N
2.	21ETCCE002	Hitesh Sutradhar	42	N
3.	21ETCCE004	Naved Khan	49	N
4.	21ETCCE006	Pushpendra Gehlot	55	N
5.	21ETCCE007	Shalin Dak	40	N
6.	21ETCCE009	Tamanna Kumawat	57	N
7.	21ETCCE300	Muniraj Sharma	60	N
8.	22ETCCE200	Moiz Udaipurwala	51	N
9.	22ETCCE201	Vikas Suthar	51	N

*(Y, if obtained marks are <50%)

Signature of Faculty: **Signature of HOD**

Remedial Action Taken to Remove the Gaps (After Mid- Term 1I)

S.no.	University Roll no.	Name of Student	Topics to be discussed in Remedial Class	Schedule Date of Remedial Class	Outcome Achieved
1.	NIL				
2.					

Signature of Faculty: **Signature of HOD**

Model Question Paper

6E1541

Roll No. _____ [Total No. of Pages : 2

6E1541

B.Tech. VI Sem. (Main/Back) Examination, June - 2022
Civil Engg.
6CE3-01 Wind And Seismic Analysis

Time : 2 Hours **Maximum Marks : 80**
Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all five** questions from **Part A**, **four** questions out of **six** questions from **Part B** and **two** questions out of **three** from **Part C**.*
Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.
Use of following supporting material is permitted during examination (As mentioned in form No. 205)

PART - A

All questions are **compulsory.** (5×2=10)

1. What are the various types of structures used in structural systems. (2)
2. Explain load flow concept in detail. (2)
3. What do you understand by the term wind load. (2)
4. Write a short note on earthquake loads in detail. (2)
5. Describe in brief seismic analysis. (2)

PART - B

Attempt any **four** questions (4×10=40)

1. Explain objective, scope and outcome of wind and seismic analysis. (10)
2. Differentiate between symmetry and Asymmetry in building forms. Also explain framed tubes and various multistorey configurations. (10)
3. What are the various types of loads used for different types of buildings. (10)
4. Describe the calculation procedure of wind load on flat roof. (10)

5. Write a short note on seismic failure of masonary and RCC structures. **(10)**

6. Differentiate between pitched roof and single roof buildings in detail? **(10)**

Part - C

Attempt any **two** questions. **(2×15=30)**

1. What is shear wall. Explain its concept of design. Also describe vertical and lateral load resting elements. **(15)**

2. Describe the calculation procedure of an earthquake loads on framed structures. **(15)**

3. Explain earthquake resistant construction of buildings in detail. Also write down the various provision as per IS codes. **(15)**

STUDENT PERFORMANCE REPORT

Roll No.	Name of Student	I Mid-Term	II Mid-Term	Average
21ETCCE001	Dev Vaishnav	45	44	44.5
21ETCCE002	Hitesh Sutradhar	43	42	42.5
21ETCCE004	Naved Khan	50	49	49.5
21ETCCE006	Pushpendra Gehlot	56	55	55.5
21ETCCE007	Shalin Dak	41	40	40.5
21ETCCE009	Tamanna Kumawat	58	57	57.5
21ETCCE300	Muniraj Sharma	61	60	60.5
22ETCCE200	Moiz Udaipurwala	52	51	51.5
22ETCCE201	Vikas Suthar	52	51	51.5

Signature of Faculty: **Signature of HOD**

RESULT ANALYSIS

S.NO.	RTU ROLL NUMBER	NAME OF STUDENT	END TERM MARKS	SESSIONAL MARKS	TOTAL
		MAX MARKS	**70**	**30**	**100**
1.	21ETCCE001	Dev Vaishnav	Result pending	20	
2.	21ETCCE002	Hitesh Sutradhar	Result pending	19	
3.	21ETCCE004	Naved Khan	Result pending	22	
4.	21ETCCE006	Pushpendra Gehlot	Result pending	25	
5.	21ETCCE007	Shalin Dak	Result pending	18	
6.	21ETCCE009	Tamanna Kumawat	Result pending	26	
7.	21ETCCE300	Muniraj Sharma	Result pending	27	
8.	22ETCCE200	Moiz Udaipurwala	Result pending	23	
9.	22ETCCE201	Vikas Suthar	Result pending	23	

TOTAL	PASS	FAIL	ABSENT	PASS %
9				

Indirect Assessment:

Overall Teacher Self-Assessment (at the completion of course) in terms of course objective and outcomes

Course Objectives:

It aims to deepen students' understanding of advanced structural analysis techniques essential for civil engineering. It covers the unit load method for deflection analysis, energy methods for evaluating strain energy under various loading conditions, and the application of Castigliano's theorems to both determinate and indeterminate structures. Students will learn to construct and interpret influence line diagrams, analyze the effects of rolling loads, and study the behavior of arches under different support conditions. Additionally, the course introduces unsymmetrical bending, focusing on the computation of stresses and the location of the shear center. Approximate methods for analyzing multistory frames subjected to lateral loads, as well as the tension coefficient method for space trusses, are also explored. Through this course, students will develop the analytical skills necessary to solve complex structural problems, preparing them for professional practice in civil engineering.

Course Outcomes:

At the end of this course students will be able to:

CO1: Students will be able to understand the types of structures, symmetry and asymmetry in Building forms, shear walls and multi-storey configurations.

CO2: Students will be able to analyze design loads for different types of buildings.

CO3: Students will be able to calculate wind load on flat roof, pitched roof and single sloped Roof buildings.

CO4: Students will be able to calculate earthquake loads on framed structures and design of Earthquake Resistant Construction.

CO5: Students will apply wind & seismic load for analyzing the structure to evaluate the response of lateral load

Methodology to identify bright student

It is done by considering a range of criteria, including academic performance, creativity, critical thinking, problem-solving skills, and enthusiasm for learning. Bright students often excel in multiple areas. Observed how students perform in the classroom. In terms of active participation, engagement in discussions, leadership, and the ability to grasp complex concepts.

Efforts to keep students engaged

1. Active Learning:

- Incorporate active learning strategies, such as group discussions, problem-solving activities, and hands-on projects. Active participation keeps students engaged and encourages critical thinking.

2. Varied Teaching Methods:

- Use a variety of teaching methods, including lectures, group work, multimedia presentations, and interactive activities to cater to different learning preferences.

3. Technology Integration:

- Leverage technology, such as online platforms, educational apps, and interactive software, to make lessons more engaging and interactive.

Methodology to identify weak student

It is done by considering a range of criteria, including classroom observation, formative assessment, summative assessment, assignment review etc. Weak students are struggling students with sensitivity and a desire to support their learning. Some measures, such as additional tutoring, personalized assignments, or alternative assessment methods, to help students succeed.

Targeted inventions for weak student

1. Additional Resources
Offer supplementary learning materials, such as textbooks, online resources, or multimedia content, to provide alternative explanations and reinforce key concepts.

2. Remedial classes
Establish a tutoring program where students can receive extra help from teachers.

3. Flipped classroom
Students are assigned pre-class learning materials, often in the form of videos, readings, or online modules, to cover the foundational concepts before coming to class.