Lesson Plan for Theory of Structures (TH-2), Winter-2025-26		
Discipline	**Semester**	**Name of the teaching faculty**
Civil Engineering	**4TH**	**Manoj Ku Beherdalai, Lect., S-II(Civil))**
Subject: THEORY OF STRUCTURES (TH-2)		**No. of days per Week classes are alloted: 03**
No. of weeks-15 weeks		**Semester Duration: 22.12.2025 to 18.04.2026**
Weeks	**Class days**	**Theory**
1ST	1ST	**Direct & Bending Stresses - Basics** **Introduction to stresses** Axial stress: σ = P/A, uniform distribution Eccentric loading: σ = P/A ± (Pey/I) Stress distribution diagram (trapezoidal)
	2ND	**Solved examples** 3 numericals: axial, uniaxial eccentricity, biaxial eccentricity Max/min stress calculation practice
	3RD	5 problems on combined stresses Short quiz (5 marks)
2ND	1ST	**Core of Section & No-Tension** **No-tension condition** Zero stress at extreme fiber: P/A = Mey/I Limit of eccentricity derivation
	2ND	**Core of sections** Rectangular: middle third rule Circular: D/8 radius core 3 solved examples
	3RD	**Practice problems** Core boundary problems Assignment submission
3RD	1ST	**Chimneys & Dams** **Chimney analysis** Wind pressure → moment at base Stress calculation + distribution diagram
	2ND	**Dam analysis** Water pressure calculation Stability checks (no tension, middle third)
	3RD	**Unit I Test** Chimney + dam numericals
4TH	1ST	**Slope & Deflection Basics** **Concepts** Slope θ = dy/dx, deflection y EI d^2y/dx^2 = M(x) relation
	2ND	**Double integration - Cantilever** Point load at free end UDL over full span
	3RD	**Practice**

		4 cantilever problems
5TH	1ST	**Simply Supported Beams** **SS beams - Point load** Central point load derivation Standard deflection formulae
	2ND	**SS beams - UDL** UDL full span Multiple load cases
	3RD	**Practice sheet** 6 SS beam problems
6TH	1ST	**Macaulay's Method** **Macaulay brackets** ⟨x-a⟩n notation Single span multiple loads
	2ND	**Applications** Cantilever + SS beam examples Step-by-step solving
	3RD	**Unit II Test**
7TH	1ST	**Fixed Beams** **Fixed vs SS beams** Degree of indeterminacy Fixity advantages/disadvantages
	2ND	**FEM derivation** Point load at mid span UDL full span
	3RD	**Standard FEM table** Reactions, SFD, BMD drawing
8TH	1ST	**Fixed Beam Applications** **Multiple load cases** Point load anywhere Partial UDL
	2ND	**Superposition principle** Combined loading examples
	3RD	**Practice problems**
9TH	1ST	**Three Moment Theorem** **Clapeyron's theorem** Three moments equation 2-span application
	2ND	**3-span beams** Point loads + UDL SFD/BMD diagrams
	3RD	**Internal Assessment**
10TH	1ST	**Continuous Beams + ILD** **Complex continuous beams** Different span lengths Support settlement effects
	2ND	**ILD concept**

		Reaction ILD SF/Moment ILD
	3RD	**ILD applications**
11TH	1ST	**Moment Distribution Method** **MDM basics** Stiffness K=3EI/L or 4EI/L Distribution factor, carry-over 0.5
	2ND	**2-span beams** Point load + UDL examples
	3RD	**3-span beams**
12TH	1ST	**Advanced MDM** **Different I values** Side sway considerations
	2ND	**Portal frames intro** Single bay symmetrical Unsymmetrical frames
	3RD	**Previous year question discussion**
13TH	1ST	**Trusses - Types & Reactions** **Truss types** Pratt, Howe, Fink, King/Queen post Nomenclature
	2ND	**Support reactions** ΣV=0, ΣH=0, ΣM=0
	3RD	Practice reactions
14TH	1ST	**Method of Joints** Joint method basics 2 unknowns maximum per joint Tension/compression signs
	2ND	Simple trusses 5-panel Pratt truss example
	3RD	Complex joint analysis
15TH	1ST	**Method of Sections + Revision** Section method Max 3 unknowns per cut Moment equilibrium
	2ND	Complete truss analysis Verify joint vs section methods
	3RD	Revision