

**Government Polytechnic Nawada**  
**Department of Civil Engineering**  
Lesson Plan

Name :- Abhishek Kumar

Designation:- Lecturer

Subject Name :- Theory of Structures

Subject Code:- 1615501

Semester:- 5th

S. No.	Unit	Lecture No.	Topics
1	6- Column	1	Definition, classification of column, Buckling of axially loaded compression member, types of end conditions for column, Effective length, Radius of gyration, slenderness ratio
2		2	Crippling load, factor of safety, safe load Assumptions in the theory of long column Euler's theory, Rankins theory
3		3	Buckling load for different end conditions
4		4	Buckling load for different end conditions
5		5	Application of Rankin's and Euler theory
6		6	Designing solid circular or hollow circular Sections
7	1-Direct And Bending Stresses	1	Concept of direct and eccentric loads, eccentricity about one principal axis,
8		2	Nature of stresses, maximum and minimum stresses, resultant stress distribution diagram
9		3	Numerical related maximum and minimum stresses
10		4	Condition for no tension or zero stress at extreme fiber
11		5	Condition for no tension or zero stress at extreme fiber
12		6	Columns, pillars and chimneys of uniform section subject to lateral wind pressure
13		7	limit of eccentricity, core of section for rectangular section
14		8	Core of section for circular cross section
15		9	Columns, pillars and chimneys of uniform section subject to lateral wind pressure
16		10	Coefficient of wind resistance, stress distribution at bases
17	2- Slope	1	Concept of slope and deflection, stiffness of beam
18		2	Relation between slope, deflection and radius of curvature, differential equation (no derivation)
19		3	Double integration method to find slope and deflection of simply supported beam
20		4	Double integration method to find slope and deflection of simply supported beam
21		5	Double integration method to find slope and deflection of cantilever beam

22	2- Slope and Deflection	6	Macaulay's method for slope and deflection, application to simply supported beam subjected to concentrated load
23		7	Macaulay's method for slope and deflection, application to simply supported beam subjected to concentrated load
24		8	Application to simply supported beam subjected to uniformly distributed load
25		9	Application to cantilever beam subjected to concentrated load
26		10	Application to cantilever beam subjected to uniformly distributed load
27		3-Fixed Beam	1
28	2		Principle of superposition.
29	3		Fixed end moments from first principle for beam subjected to UDL over entire span
30	4		Fixed end moment for central point load
31	5		Fixed end moment for point load other than mid span
32	6		Application of standard formulae in finding moments and drawing S.F. and B.M. diagrams for a fixed beam
33	4- Continuous Beam	1	Definition, effect of continuity practical example, nature of moments induced due to continuity, concept of deflected shape
34		2	Clapeyron's theorem of three moment (no derivation)
35		3	Application of theorem maximum up to three spans and two unknown support moment only
36		4	Application of theorem for support at same level, span having same moment of inertia subjected to concentrated loads
37		5	Application of theorem for support at same level, span having same moment of inertia subjected to concentrated loads
38		6	Application of theorem for support at same level, span having same moment of inertia subjected to uniformly distributed loads over entire span
39		7	Application of theorem for support at same level, span having same moment of inertia subjected to uniformly distributed loads over entire span
40		8	Drawing SF and BM diagrams for continuous beams.
41	5- Moment Distribution Method	1	Introduction, sign convention, Carry over factor, stiffness factor, distribution factor.
42		2	Application of moment distribution method for various types of continuous beams subjected to concentrated loads and UDL over entire span having same or different moment of inertia up to three spans and two unknown support moment only, SF and BM diagrams
43		3	
44		4	
45		5	
46		6	Application of moment distribution method to single storey single bay symmetrical portal frames, SF and BM diagrams
47		7	
48		8	Application of moment distribution method to single storey single bay symmetrical portal frames, SF and BM diagrams

***Note :- Class duration may be increases***

**Reference Books:-**

1. Ramamrutham S., "Theory of Structures", Dhanpatrai & Sons, Delhi
2. Vazirani V.N. & Ratwani M.M., "Analysis of Structures", Khanna Publishers Delhi
3. Rajput R.K., " Strength of Materials", S Chand