COURSE TEACHING STRUCTURE
Course: Mechanics of Structure

Dept: CIVIL **Class: SE**

1) Simple Stress & Strain:

Sr. No.	Topic	Duration	Topic based
1	Materials used in construction and their nature, Hook's Law,	1	Numerical & theory
2	Stress-Strain Diagram for elastic, plastic materials and brittle material, Idealized stress-strain diagram ,	1	Numerical & theory
3	Concept of axial stresses (compression, tension), strains(linear, lateral, shear and volumetric), Elastic constants and their relations. Stresses and strains due to change in temperature.	1	Numerical & theory
4	Stresses, strains and deformations in determinate and	1	Numerical & theory
5	Indeterminate structures for homogeneous and composite structures under concentrated loads and	2	Numerical & theory
6	Temperature changes.	1	Numerical & theory

2) Shear Force and Bending Moment Diagram

Sr. No.	Topic	Duration	Topic based
7	Concept of shear force and bending moment.	1	Numerical & theory
8	Relation between shear force, bending moment and intensity of loading.	1	Numerical & theory
9	Shear force and bending moment diagrams for determinate beams due to concentrated	2	Numerical & theory
10	Uniformly distributed	2	Numerical &

			theory
11	Uniformly varying loads and couples.	1	Numerical & theory
12	Bending moment and loading diagram from given shear force diagram	1	Numerical & theory

3) Shear and Bending Stresses

Sr. No.	Topic	Duration	Topic based
13	Shear stresses in beams: concept of shear, complimentary shear, derivation of shear stress formula,	1	Numerical & theory
14	Shear stress distribution for various cross sections,	1	Numerical & theory
15	Maximum and average shear stress for circular and rectangular sections	1	Numerical & theory
16	Bending stresses in beams: theory of simple or pure bending, assumptions,	1	Numerical & theory
17	Derivation of flexure formula, bending stress distribution diagrams,	1	Numerical & theory
18	Moment of Resistance of cross-section.	1	Numerical & theory

4) Torsion of Circular Shafts and Principal Stresses and Strains

Sr. No.	Topic	Duration	Topic based
19	Torsion of circular shafts: theory of torsion, assumptions, derivation of torsion formula.	1	Numerical & theory
20	Stresses, strains and deformations in determinate and indeterminate shafts of hollow	1	Numerical & theory
21	solid, homogeneous cross-sections subjected to twisting moments. Power transmitted by shafts.	1	Numerical & theory
22	Principal stresses and strains: concept of principal planes and principal stresses,	1	Numerical & theory
23	Normal and shear stresses on an oblique plane,	1	Numerical & theory
24	Magnitude and orientation of principal stresses and maximum shear stress.	1	Numerical & theory

5) Axially and Eccentrically Loaded Columns

Sr. No.	Topic	Duration	Topic based
25	Axially loaded columns: concept of critical load and buckling,	1	Numerical & theory
26	Euler's formula for buckling load with hinged ends, concept of equivalent length for various end conditions,	1	Numerical & theory
27	Rankine's formula, safe load on column and limitations of Euler's formula.	1	Numerical & theory
28	Direct and bending stresses for eccentrically loaded short column and other structural components such as retaining walls, dams, chimneys, etc. Effect of lateral force and self-weight.	1	Numerical & theory
29	Resultant stress diagrams due to axial loads, uni-axial, and bi-axial bending.	1	Numerical & theory
30	Concept of core of section for solid and hollow rectangular and circular sections	1	Numerical & theory

6) Slope and Deflection of Beams and Trusses

Sr. No.	Topic	Duration	Topic based
31	Slope and deflection of determinate beams by Macaulay's method and	1	Numerical & theory
32	Slope and deflection of determinate beams by Macaulay's method and	1	Numerical
33	Strain energy method,	1	Numerical & theory
34	Strain energy method,	1	Numerical
35	Castigliano's first theorem.	1	Numerical & theory
36	Joint displacement of determinate trusses by Unit load method	1	Numerical & theory