LESSON PLAN 2023-24

SUBJECT :STRENGTH OF MATERIALS (3RD SEM)

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Class No.	Topic	Subtopics	Teaching Aids/Activities
1	Types of Load	Axial, Tangential, Tensile, Compressive, Shear	Diagrams, Real-life Examples
2	Types of Stress & Strain	Axial and Tangential, Linear, Shear, Volumetric	Chart, Animation
3	Hooke's Law	Stress-Strain Curve, Elastic Limit, Proportional Limit	Graph Demonstration
4	Elastic Constants	Young's modulus, Bulk modulus, Modulus of rigidity, Poisson's ratio	Sample materials, Table
5	Elastic Constant Relation	Derivation of E = 3K(1-2μ) etc.	Derivation on Board
6	Superposition Principle	Definition and Application to Axial Loads	Problem Solving
7	Composite Section	Stresses in Composite Bars	Examples, Charts
8	Temperature Stress	Thermal Expansion, Composite Bars under Temperature	Formula Derivation, Problem Solving
9	Strain Energy	Gradual, Sudden, and Impact Loads, Resilience	Real-Life Examples, Diagrams
10	Numerical Practice	Mixed Problems on All Topics Above	Worksheets, Group Activity
11	Basic Concepts	Definitions of Hoop and Longitudinal Stress	Real Models, Charts
12	Hoop & Longitudinal Stress	Derivation of Formulas	Step-by-step Derivation
13	Strains in Shell	Hoop, Longitudinal, Volumetric Strain	Animated Diagrams
14	Change in Dimensions	Length, Diameter, Volume Computations	Formula Sheet
15	Example Problems I	Thin Cylinders under Pressure	Problem Solving
16	Example Problems II	Spherical Shells	Numerical Practice
17	Mixed Concept Practice	Application Based Questions	Worksheets
18	Revision & Quiz	Review of Full Unit	Quiz, Group Discussion
19	Stress on Oblique Plane	Normal & Shear Stress Equations	Plane Diagrams, Formula Board
20	Resultant Stress	Inclined Plane Stress Analysis	Examples, PPT
21	Principal Planes	Location and Equations	Step-by-step Calculation
22	Principal Stresses	Computation via Equations	Sample Problems
23	Mohr's Circle I	Construction of Mohr's Circle	Graph Sheets, Compass
24	Mohr's Circle II	Maximum Shear Stress from Mohr's Circle	Problem Set
25	Numerical Problems I	Direct Application of Equations	Worksheet

26	Numerical Problems II	Mohr’s Circle Based	Group Solving
27	Mixed Examples	Principal Stresses and Mohr's Together	Mixed Worksheets
28	Practice & Revision	Review and Quiz	MCQs, Recap Sheets
29	Types of Beam & Loads	Cantilever, Simply Supported, Overhanging	Diagrams, Models
30	Concept of SF & BM	Definitions and Sign Conventions	Board Diagrams
31	SF & BM Diagrams (Point)	Cantilever & Simply Supported under Point Load	Chart, Sketch Practice
32	SF & BM Diagrams (UDL)	Drawing under UDL	Animation
33	SF & BM in Overhanging	Point Load and UDL Combination	Worksheets
34	BM Max/Min Locations	Zero Shear Condition, Bending Stress Regions	Derivation + Problem
35	Step Loading	SF & BM under Varying Loads	Board Practice
36	Numerical Practice I	SF/BM in Cantilever and Simple Beams	Problems
37	Numerical Practice II	SF/BM in Overhanging Beams	Class Practice
38	Quiz & Discussion	Full Unit Review	Worksheets, Quiz
39	Assumptions in Bending	Linear Elasticity, Plane Sections	Theory Board, Diagrams
40	Derivation of Bending Eq.	From Geometry to Final Equation	Derivation
41	Moment of Resistance	Concept and Example	Worked Examples
42	Section Modulus	Rectangular, Circular, I-section	Chart, Physical Sections
43	Neutral Axis	Definition, Location	Diagram with Axis
44	Bending Stress	Use of Formula, Application	Problem Set
45	Beam Sections Analysis	Compare Different Sections	Diagrams and Comparison Table
46	Numerical Problems I	Simple Problems on Bending Stress	Worksheets
47	Numerical Problems II	More Problems on Moment and Modulus	Assignments
48	Review & Test	Summary of Unit	Quiz
49	Column Definition	Short vs Long Column	Chart
50	Axial & Eccentric Load	Nature of Load and Stress Distribution	Diagram, Real Object Illustration
51	Bending Stresses	Max & Min Stresses on Faces	Calculation Board
52	Numerical Problems I	Eccentric Load on Rectangular Sections	Problem Sheet
53	Euler Formula Application	Buckling Load (Given Formulas)	Chart of End Conditions
54	Problems on Euler Formula	Different End Conditions	Sample Problems
55	Assumptions in Torsion	Circular Shaft, Pure Torsion Concept	Diagram, Real Shaft

56	Derivation of Equation	$T/J = \tau/R = G\theta/L$ for Solid Shaft	Formula Derivation
57	Hollow Shaft Analysis	Comparison with Solid Shaft	Calculation, Charts
58	Strength Comparison	Weight-Saving, Torque-Carrying Capacity	PPT
59	Problem Solving I	Solid & Hollow Shaft Problems	Worksheets
60	Final Quiz & Review	Recap Entire Syllabus	Full Syllabus Test