LESSON PLAN 2023-24

SUBJECT :AUTOMOBILE COMPONENT DESIGN (5TH SEM)

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Class No.	Topic	Subtopics	Teaching Aids/Activities
1-2	Introduction to Design	Need, scope, objectives	PPT, lecture, case studies
3-4	Classification & Consideration	Types of design, design consideration (strength, safety, ergonomics, aesthetics)	Diagrams, whiteboard discussion
5-6	Design Procedure	Steps in machine component design	Flowcharts, group discussions
7-8	Types of Loads & Stresses	Tensile, compressive, shear, bending, torsion, crushing, bearing, thermal, creep etc.	Animations, load demos
9-10	Stress-Strain Diagram	For ductile & brittle materials	Material testing video, charts
11-12	Variable Stress & Fatigue	Fatigue failure, S-N curves, endurance limit, stress-time diagrams	Problem solving, lab demonstration
13-14	Working Stresses & FoS	Working stress, static/variable loads, factor of safety	Case problems, stress tables
15-16	Stress Concentration	Causes, stress raisers, remedies	Models, case study examples
17-18	Theories of Failure	Maximum principal stress, shear stress, strain energy theories	Comparison tables, solved numericals
19-20	Material Selection	For automotive components, advanced materials	Sample materials, catalog references
21	Standardization	Preferred numbers, interchangeability	ISO charts, coding practice
22-23	Fasteners	Types, designations, stresses in bolts, bolts of uniform strength	Samples, threading chart
24	Bearings	Types, selection, location in automobile	Ball bearing cut section models
25	Ergonomics & Aesthetics	Design shape, color, surface finish	Case study of car interiors, design critique
26-27	Cotter Joint	Design of socket & spigot type	3D drawing/model, DDB use
28	Knuckle Joint	Design procedure	Interactive worksheet
29	Turnbuckle	Design method	Group activity, calculations
30	Applications	Use in automobile systems	Vehicle part examples
31-32	Shaft Design	Concept of shafts, axles, spindles, design for torsion, bending	Sample shafts, torque wrench demo
33-34	Shaft Types	Solid vs hollow shafts, comparison	Models, shaft comparison worksheet
35	Propeller Shaft	Design & whirling/critical speed	Animation/video demonstration

36	Rear Axle	Design method	3D drawing/model, calculation exercise
37-38	Keys & Keyways	Sunk, woodruff; effect of keyways on shafts	Real samples, key and shaft fit demo
39	Couplings	Muff, flange, bush pin flexible couplings	Demonstration kit, exploded view handouts
40	Types of Levers	First, second, third type	Lever arm setup model
41	Rocker Arm	Design procedure	Engine diagram, calculations
42	Bell Crank Lever	Use and design	Bell crank mechanism video
43	Hand Lever	Dimensions and design	Tool demo, exercise
44	Pedal Design	Rectangular cross-section, fulcrum pin	Real part observation, calculation
45	Clutch Design	Single and multi-plate clutches	Cut section clutch model
46	Gear Teeth Design	Sliding mesh/constant mesh gear calculations	Gear profile chart, calculation tasks
47-48	Spring Design	Leaf spring, helical (compression & torsion)	Springs, fatigue testing video
49	Engine Specs & Cylinder	Power-based dimension calculation	Engine data sheet, design task
50	Cylinder Head	Thickness and bolt design	Sectional drawings
51	Valve Seat & Lift	Geometry and sizing	Real engine head display
52	Piston Crown Design	Bending & thermal stress considerations	Sample pistons, demo
53	Piston Rings & Skirt	Dimensions and tolerances	DDB activity
54	Piston Pin	Bearing, bending, shear calculations	Sample components
55	Connecting Rod	I-section, sizing	Real engine rod sample
56	Big End Cap & Bolt	Load calculation, bolt dimension	Assembly diagram
57	Crankshaft	Overhung crank design	Crank model, animation
58	IA Revision 1–3	Review Chapters 1 to 3 before IA	MCQs, mock test, quiz
59	Final Revision	All Chapters	Summary charts, previous year question discussion
60	Problem Solving & Assessment	Solving sample design problems across topics	Peer review, assignment submission