LESSON PLAN 2023-24

SUBJECT :AUTOMOTIVE SYSTEM & HEAVY EQUIPMENTS (6TH SEM)

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Class No.	Topic	Subtopics	Teaching Aids/Activities
Class 1	Introduction to Front Axle	Function, importance, position in chassis	Diagrams, real-life examples
Class 2	Front Axle Construction	Materials, I-section design, types (dead/live axle)	Cut-sections/images of axle designs
Class 3	Types of Stub Axles	Elliot, Reverse Elliot, Lamoine, Reverse Lamoine – working and identification	Charts, physical components (if available)
Class 4	Front Wheel Assembly	Wheel hub, bearings, brake drum/disc, tyres, stub axle connection	Sample assembly, 3D models
Class 5	Introduction to Steering System	Need for steering, basic components overview	Steering column demo (real or video)
Class 6	Functions and Principle of Correct Steering	Ackermann steering principle, conditions for correct steering	Diagram explanation, model demonstration
Class 7	Steering System Components	Steering wheel, column, gear, knuckle, tie rods, linkage	Actual dismantled steering setup or videos
Class 8	Types of Steering Gears	Rack & Pinion, Worm & Roller, Recirculating Ball	Comparison charts, cross-sections
Class 9	Introduction to Steering Geometry	What is geometry? Why it is important? Overview of key terms	Animated video of wheel movement
Class 10	Camber, Caster & King-Pin Inclination	Definitions, effects on driving, how to measure	Chart illustrations, alignment tools demo
Class 11	Understeer, Oversteer, Combined Angle	Effects on vehicle behavior, cornering safety	Animated explanation, car simulation if possible
Class 12	Toe-in, Toe-out, Wheel Alignment	Proper settings, measurement methods, alignment tools	Practical demonstration with alignment gauge
Class 13	Steering Angles, Turning Radius & Revision	Steering angle, turning circle, total revision & Q&A session	Case study, worksheet, oral quiz or MCQ
Class 14	Introduction to Suspension System	What is a suspension system? Need in automobiles.	Charts, videos, physical car parts
Class 15	Functions of Suspension System	Absorbing shocks, maintaining stability, improving ride comfort	Diagram explanation, real-life video examples
Class 16	Requirement of Suspension System	Why suspension is needed, challenges of road contact and vehicle dynamics	Group discussion, concept illustrations

Class 17	Leaf Spring	Structure, materials, working, applications in heavy vehicles	Real spring demo, videos, models
Class 18	Coil Spring	Working principle, use in light vehicles, comparison with leaf spring	Spring samples, comparative charts
Class 19	Torsion Bar Suspension	Straight bar mechanism, torque twist absorption, vehicle applications	Diagrams, real bar demo if available
Class 20	Rubber Torsion Unit	Compact suspension type, low maintenance, typical uses	Cut model or component photos
Class 21	Independent Suspension System	Wheel movement independence, benefits, examples (MacPherson strut, etc.)	Animated videos, real vehicle demo if possible
Class 22	Rigid Axle Suspension System	Solid axle linkage, use in trucks, advantages / disadvantages	Diagram, comparison tables
Class 23	Shock Absorber	Types (hydraulic, gas), role in damping vibrations	Physical shock absorber, workshop demo
Class 24	Stabilizer Bar & Final Revision	Anti-roll bar function, full topic revision, Q&A	Cross-sectional views, revision worksheet, oral quiz
Class 25	Introduction to Brakes	Purpose, importance in vehicles	Diagrams, introductory video
Class 26	Principle of Operation	Friction and energy conversion	Animations, whiteboard demo
Class 27	Requirements of Good Brakes	Efficiency, reliability, heat resistance	Discussion, checklist
Class 28	Drum Brakes	Construction, working	Real drum brake demo
Class 29	Leading & Trailing Shoes	Shoe position and braking force	Diagrams, cut section models
Class 30	Disc Brakes	Construction, comparison with drum brakes	Disc demo, video explanation
Class 31	Brake Fade	Causes, effects, solutions	Thermal video, real-life cases
Class 32	Hydraulic Brakes Introduction	Concept and role	Diagrams, flow chart
Class 33	Master Cylinder	Design, piston function	Component demo, chart
Class 34	Tandem Master Cylinder	Dual circuit system for safety	System schematic, diagrams
Class 35	Wheel Cylinder	Location, function	Real component inspection
Class 36	Brake Fluid	Function, hydraulic pressure transmission	Samples, safety tips
Class 37	Brake Fluid Grades	DOT 3, 4, 5.1 - boiling point & usage	Spec sheets, charts
Class 38	Hydraulic Brake Advantages	Better efficiency, self-adjusting, smooth operation	Class discussion, real examples

Class 39	Hydraulic Brake Disadvantages	Leakage, fluid aging, cost	Case studies, Q&A
Class 40	Power Brakes Overview	Vacuum or hydraulic assist	Introductory video
Class 41	Air Brakes System	Construction, working, trucks/buses	Air brake working demo kit
Class 42	Handbrake System	Mechanical operation, parking brake	Vehicle demo, cable system
Class 43	Brake Adjustment & Bleeding	Manual and automatic adjustment, air removal	Workshop demo, live video
Class 44	Common Problems & ABS	Squealing, low pedal, air in line; ABS working principle	Fault diagnosis sheet, ABS module sample
Class 45	Introduction & Tyre Construction	Overview of tyre and its function; Parts: tread, bead, carcass, sidewall	Cut tyre model, videos, chart display
Class 46	Tyre Dimension & Classification	Width, aspect ratio, rim size; Cross-ply vs radial-ply, bias-belted etc.	Tyre samples, measuring scale, comparison charts
Class 47	Radial vs Cross Ply Tyres	Structure difference, performance, pros & cons	Cross-sectional models, animated videos
Class 48	Tyre Size Designation & Damage	Reading tyre code (e.g. 185/70 R14); Types of damages (bulges, cuts, wear)	Used tyre examples, sidewall code decoding exercise
Class 49	Wheels & Types	Steel, alloy, wire-spoked, forged etc.; Matching wheels with tyres	Physical wheels demo, image slides
Class 50	Wheel Dimensions & Designation	Rim width, diameter, offset, bolt pattern; Wheel marking reading	Demo rim, caliper use, whiteboard explanation
Class 51	Introduction to Chassis	Purpose, layout overview, load distribution	Diagrams, chassis frame model, animations
Class 52	Main Components of Chassis	Frame, engine, transmission, suspension, axles, fuel tank	Labelled layout charts, videos
Class 53	Types of Chassis	Ladder frame, backbone, monocoque, tubular	Comparison table, real vehicle examples
Class 54	Types of Frames & Layouts	Integral, conventional frames; Front-engine RWD, FWD, mid-engine, rear-engine layouts	Chassis models, 3D animations
Class 55	Introduction to Heavy Equipment	What is heavy equipment, uses in construction and mining	Video overview, pictures of real machines
Class 56	Tractor - Construction & Classification	Engine, clutch, gearbox, axle, classification (utility, garden, industrial)	Tractor cut section demo, field image discussion
Class 57	Dump Truck	Body type, tipping mechanism, hydraulic system	Video demonstration, animation of dumping process
Class 58	Grader & Road Roller	Blade operation (grader), compaction methods (road roller), types	Equipment photos, working principles, role play/explainer

Class 59	Dozer, Loader, and Scraper	Bulldozer types, bucket operations, earthmoving mechanism	Animated working video, working principles
Class 60	Cranes – Construction & Applications	Tower, truck-mounted, crawler cranes; pulleys, hoist, boom	Diagram breakdown, video demonstration