

LESSON PLAN : 2023-24

SUBJECT :ELECTRIC& HYBRID VEHICLE and EMISSION CONTROL (6TH SEM)

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Class No.	Topic	Subtopics	Teaching Aids/Activities
1–2	Introduction to EV	Need, importance, evolution of EVs	PPT, charts, videos
3–4	Need for EVs	Global warming, pollution, fuel crisis	Case studies, discussions
5	Problems of EVs	Range, charging, performance, cost, safety	Group activity, mind map
6	Advantages & Disadvantages	Pros and cons of EVs	Debate, comparative chart
7–8	Major Components of EVs	Motor, battery, charger, controller, DC-DC converter	Real parts display, component diagram
9–10	Energy Management System	Concept, function, integration	Animation/video explanation
11	BEV Overview	Definition, working principle	PPT, video demo
12–13	BEV Pros & Cons	Advantages, disadvantages	Brainstorming session
14	BEV Applications	2W, 3W, 4W EV use cases	Case study: Indian market
15–16	Energy Sources for EVs	Battery, ultracapacitor, flywheel, fuel cell	Demonstration with models
17–18	Energy Source Requirements	Power, energy density, efficiency	Charts, formula-based explanation
19–21	Battery Requirements	Battery selection, deep cycle battery	Sample battery inspection
22–23	Types of Batteries	Lead-acid, Li-ion; pros and cons	Battery teardown, comparison chart
24	Ultra Capacitor	Working principle, uses	Simulation software
25	Flywheel Energy Storage	Principle, advantages/disadvantages	Animation, group discussion
26	EV Motor Requirements	Torque, efficiency, speed characteristics	Whiteboard explanation
27	Brushed DC Motor	Operation, merits, demerits	Cut-section, motor video
28	Brushless DC Motor	Construction, operation	Comparison with brushed DC
29	Switched Reluctance Motor	Construction, pros & cons	Simulation, schematic
30	AC Induction Motor	Operation, features	Motor models, animations
31	Motor Comparison	Torque, control, efficiency, cost	Comparative table
32	Indian EV Examples	Ather, Ola, Tata Nexon EV, Piaggio Ape	Videos, Indian market examples
33	HEV Introduction	Definition, structure	Animated overview
34–35	HEV Components	Engine, motor, battery, controller	Functional diagram, animation
36	Working of HEV	Parallel, series, series-parallel	Flow diagrams, group explanation
37	HEV Pros & Cons	Fuel economy, complexity, maintenance	Discussion, summary table
38	Hybridization Levels	Micro, mild, full hybrid	Comparative chart

39–40	Fuel Cell Electric Vehicle (FCEV)	Working principle, advantages/disadvantages	Video demo, hydrogen cell model
41	Overview of Emission Control	Need for emission regulations	Norm charts (BS/Euro)
42	Advanced Engine Design	Technologies to reduce emissions	Animated engine model
43	Variable Valve Timing (VVT)	Mechanism, emissions benefit	Diagram, video lecture
44	Turbocharging	Working, performance boost, impact on emissions	Animation, turbo model
45	Catalytic Converters	Structure, function	Converter models, animations
46	2-Way & 3-Way Catalysts	Differences and applications	Tabulated comparison
47	Diesel Oxidation Catalyst (DOC)	Function, role in emissions	Exhaust model, DOC chart
48–49	Selective Catalytic Reduction	Urea dosing, NOx conversion	Flowchart, SCR model
50	NOx Adsorber Catalyst	Working cycle, mechanism	Diagram, system layout
51	Diesel Particulate Filter (DPF)	Soot trapping, regeneration process	Filter samples, animations
52	Exhaust Gas Recirculation (EGR)	Function, high/low pressure EGR	Engine layout diagram
53	Crankcase Emission Control	Closed/open loop system, vapour control	Diagram, example vehicle
54–56	Revision of Chapters 1–3	EV basics, BEV, Motors, Batteries	Group quiz, MCQs, Q&A
57–58	Assignments / Model Presentation	Project models of EV/HEV systems	DIY models, classroom presentation
59	Sample Internal Test	Chapters 1–3	Practice test, answer review
60	Viva & Final Review	Q&A, recap, viva prep	Oral questions, interactive session