Name of the Institute

Govt. Co. ed. polytechnic Raipur

Course File/Teacher's Diary

(Theory)

Subject :....Automobile....Engineering

Semester :.....5th.....

Session :.....July - December - 2024.....

Faculty :.....Rakesh Singh.....

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Lesson plan

Subject – Automobile Engineering

Unit No.	Topics to be Covered	Planned Date	Execution Date	Remark
	1.1 Introduction, classification of automobiles. Types of automobiles. Two-wheeler/Light Commercial Vehicle/Sport Utility Vehicle/ Heavy commercial Vehicles 1.2 Layout of automobile, importance of vehicle layout, types of vehicle layout (FEFWD, FERWD, RERWD, 4WD). Advantages, Disadvantages, Applications and Comparisons of Different types of vehicle layouts. Major components of the automobile and its functions and location.	28/8/24	28/8/24	
	1.3 Layout of chassis, Frame and Body: Requirement of Chassis, classification of chassis. Function of Chassis Frame and Body, Load acting on Frame, advantages, disadvantages and applications of different types of chassis, Basic Body Nomenclature.	29/8/24	29/8/24	
	1.4 Significance of Body Streamlining: Need and Importance of Aerodynamic Aspects, Basic terms related with Car Aerodynamics (e.g., Drag, Lift, Skin Friction, Form Drag, Wake, Coefficient of Drag etc.)	30/8/24	30/8/24	
	1.5 Types of Automobile Engines: Petrol Engine, Diesel Engine.	3/9/24	3/9/24	
	1.6 Engines locations - front, rear and transverse under floor with their advantages and disadvantages.	5/9/24	5/9/24	
	1.7 Engine Constructional features: Engine block, engine heads, crank case oil pan, cylinder liners, Gasket, combustion chambers with their types, piston, piston pin, gudgeon pin, connecting rod, crank shaft, cam shaft, Valve & valve mechanism. Valve timing /port timing diagram, timing gears, Inlet & Exhaust mufflers, concept of firing order in multi-cylinder engine.	10/9/24 to 11/9/24	10/9/24 to 11/9/24	Assignment 1 given
	1.8 Lubrication and cooling.		~~11/9/24~~	
	2.1 Introduction of fuel system for petrol engine. Gravity feed system, Fuel pump, Simple and Solex carburetor.	19/9/24	17/9/24	
	2.2 Concept of Petrol Injection (Mechanical and Electronic injection systems) & MPFI Petrol injection systems. Concept of supercharging	19/9/24	17/9/24	
	2.3 Introduction of fuel system for diesel engine 2.4 Concept of Fuel injection systems and Its Construction, Working of Fuel injection pump and their types, Fuel injector.	18/9/24	18/9/24	
	2.5 Basic Electrical- Electronics Components used in automobiles with their conventional symbols. 2.6 Main Components of the Electrical and electronic System. Function of Starting and charging systems, construction and Working of Alternator.	19/9/24	19/9/24	
	2.7 Ignition System,Function andRequirement of IgnitionSystem, Distributor,Ignition Coil, IgnitionTiming, IgnitionAdvance, coil andElectronic IgnitionSystem. 2.8 Lighting system,Automobile Battery-Function of Battery,Types of Battery,Principle of Lead AcidBattery,Constructionand Operation of LeadAcid Battery LowmaintenanceandMaintenance-freeBatteries., Significance ofBattery Rating & BatteryCapacity, Battery OpenVolt and Specific GravityTest. Types of	21/9/24 to 23/9/24	21/9/24 to 23/9/24	

		Lights,Necessity andImportance of CableColor Codes, WiringHarness.			
		2.9 Different types ofGauges, Windscreenwiper, Function &Location of MajorSensors and Actuatorsused in AutomobileElectronics	24/9/24	24/9/24	
	Unit 3	3.1 Need & function of braking system, principle of braking system, Brake efficiency, stopping distance and basic terms related to braking	26/9/24	26/9/24	
		3.2 Electric and Electronic technology used in braking system	26/9/24	26/9/24	
		3.3 Foundation brakes - drum and disc brakes, Hydraulic and pneumatic brakes, Self energized brakes, Power brakes, Air brakes, Emergency & Parking Brakes	27/9/24	27/9/24	
		3.4 Floating-caliper brakes, ceramic pads, twin brake disc systems, hybrid systems, coated discs, anti-squeal technology	27/9/24	27/9/24	
		3.5 Electronic brakes - EPB (electric park brake), ESP (electronic stability control), braking assistance, predictive braking, brake-by-wire, slip control, regenerative braking, autonomous emergency braking	30/9/24	27/9/24	
		3.6 Anti lock braking System: Layout of ABS, Pressure Modulation, and Types of ABS.	1/10/24	1/10/24	
		3.7 Electric Driven Intelligent Brake-construction, working and its function	3/10/24	3/10/24	
		3.8 Shock Absorbers and Air Suspension: Layout, Construction and Working of Air Suspension, Function and Types of Shock Absorber, Principle of Hydraulic Shock Absorber, Construction and Working of Telescopic Shock	8/10/24	8/10/24	

		Features & working of Gas Filled Shock Absorber		
			14/10/24	14/10/24
	Unit 4	4.1 Need and functions of transmission system.	15/10/24	15/10/24
		4.2 Concept of various road resistances such as wind, Gradient, Resistance, Total resistance, Tractive- effort.	21/10/24	21/10/24
		4.3 Types of transmission systems.	22/10/24	22/10/24
		4.4 Need of gear box, function and working of gear box, construction of gear box, types of gear boxes - sliding mesh. Constant mesh, synchromesh gear boxes, mathematical analysis of gear boxes, Gear shifting mechanisms, five speed gear box.	23/10/24 & 24/10/24	23/10/24 & 24/10/24
		4.5 Function , construction and working of Torque converter, Overdrive automatic transmission, fluid flywheel and epicyclic gear trains.	4/11/24	4/11/24
		4.6 Functions of propeller shaft, types of propeller shaft, Universal joints & slip joints on propeller shaft.	4/11/24	4/11/24
		4.7 Function & need of differential Final drive and differential	11/11/24	11/11/24
		4.8 Axles: function and need of axles, types of axles,	11/11/24	11/11/24

		4.9 Function and need of rear axle such as semi floating, fully floating, Three quarter floating.	11/9/24	11/9/24	
	Unit -5	5.1 Function of the steering system, Steering wheel & column, Basic Terms related to Steering- Steering Ratio, Turning Radius, Under steering and Over steering, Basic Components of Steering Linkages	14/9/24	14/10/24	
		5.2 Steering geometry, adjusting the steering angles, Ackerman Principle.	14/11/24	14/11/24	
		5.3 Construction and Working of Rack and Pinion, Re-circulating Ball Type Steering Gear Box	18/11/24	18/10/24	
		5.4 Power steering, Principle of Power	18/11/24	18/10/24	
		5.5 Significance and ranges of Caster (Positive, Negative), Camber (Positive, Negative), Toe-in, Toe out, King Pin Inclination (KPI), Steering Axis Inclination (SAI) and Steering trouble shooting	19/11/24	15/10/24	
		5.7 Types of Automobile Wheels, Rims and Tyres, Construction and Working of Different Types of Wheels, Rims and Tyres, specifications. Criteria for Selection of tyre.	19/11/24	19/11/24	

		5.8 Wheel alignment and balancing, procedure of Wheel Alignment, Purpose of Wheel Balancing, Significance of Static and Dynamic Balancing, Procedure for Static and Dynamic Balancing.	20/11/24	20/11/24	
		5.9 Tyre Economy: Consideration in Tyre Tread Design, Factors affecting to Tyre Life, Tyre Wear and Rotation, Tyre Designation.	21/11/24	21/11/24	Assignment given
	Unit 6	6.1 Introduction, Complete and Incomplete Combustion.	28/9/24	28/9/24	
		6.2 Constituents of Exhaust Gases, Pollutant Formation	28/9/24	28/9/24	
		6.3 Effect of Air Fuel Ratio on Exhaust Emission, Effect of Driving Mode on Exhaust Emission, Sources of Pollutants in an Automobile 6.7 Passenger Comfort and Safety, Function and requirements of	31/9/24 (2C/ads)	31/9/24	
		6.4 Control Approaches for Automobile Emission	31/9/24	31/9/24	
		6.5 Muffler, Alternative FuelsLayout of Vehicle operated on Natural Gas (LPG & CNG): Need, Fuel Characteristics, Construction & Working, Advantages, and Limitations. Layout of Electric Vehicles: Need, Working, Advantages, Limitations. Hydrogen as fuel.	1/10/24	1/10/24	
		6.6 Motor Vehicle Act Salient Features of M. V. Act 1988 and Central Motor Vehicle Rules 1989. 6.1.2, Types and Significance of Traffic Signs, Important Transport Terms in M. V. Act (Motor Vehicle, Motor Cycle, HGV, MGV, LGV, Public Service Vehicle, Transport Vehicle, Driver, Passenger, Accident)	3/10/24	3/10/24	

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