



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721106

AUTOMOBILE MAINTENANCE AND POLLUTION CONTROL SEMESTER: II

Type of course: Program Elective - III

Prerequisite: - Fundamentals of I.C. Engines & Automobile Engineering at under graduate level

Rationale: Concern in Automobile maintenance is a good intention to control pollution at preliminary stage in automotive industries. Automobiles exhaust emissions, which pollutes the atmosphere and Increase in number of automobiles day by day have resulted in atmospheric pollution beyond permissible limits. Thus automobile emissions have become a socioeconomic concern for all. Emission standards are therefore set in every country to control this problem. These standards specify maximum amount of pollutants that can be released into the environment by different types of vehicles. The PG students should therefore have thorough knowledge about Automobile Maintenance and Pollution Control. This course will provide knowledge about maintenance, reasons for automobile pollutants and means to reduce them.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Unit-I Engine Maintenance: Engine troubles, effects & remedies, different major & minor services for engine, inspection and checking of components visually and dimensionally, reconditioning methods of engine components, engine tune-up, special tools & advanced equipments.	8	19
2	Unit-II Chassis Drive-line Maintenance: Maintenance, repair and servicing of clutches, Fluid flywheel, gearboxes, Automatic transmission, CVT unit, propeller shaft, differential unit, front axle and rear axle, suspension systems, servicing of brake systems- hydraulic, air systems, brake bleeding and brakes adjustments, maintenance and servicing of steering system- Manual & Power Steering system, wheel balancing, wheel alignment, maintenance of tyres, tyre rotation, frame defects, chassis frame alignment.	9	22
3	Unit-III Maintenance, servicing of auxiliaries: Cooling system service, anti corrosion additives, anti freezing solutions, dry & wet liners, Petrol fuel and diesel fuel system maintenance, MPFI maintenance, lubrication system services, Chassis lubrication, lubrication chart, maintenance and care of storage batteries, battery testing methods, maintenance of ignition systems, tyre service & reconditioning.	8	19
4	Unit-IV Air Pollution due to Automobile Exhaust : Sources of Emission, Exhaust gas constituents & analysis, Ingredients responsible for air	8	19



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	pollution, Smoke , odor, Smog formation, Sources of pollution, effects, Analysis of air pollutants, Air pollution control models and equipments.		
5	Unit-V Exhaust Emission Control: Basic method of emission control, catalytic converter, After burners, reactor manifold, air injection, crank case emission control, evaporative loss control, Exhaust gas recirculation, Fuel additives. Pollution Norms : European pollution norms, Indian pollution norms as per Central Motor Vehicle Rules (C.M.V.R.). Characteristics of solid waste, Potential methods of solid waste disposal, Energy recovery from municipal and Industrial solid waste.	9	21

Reference Books:

1. Mechanics of Road Vehicles – W. Steed, Illefe Books Ltd. London
2. Automotive Chassis – P. M. Heldt, Chilton Co. NK
3. I. C. Engine – Litchy
4. I. C. Engine – Obert
5. Introduction to Internal Combustion Engines”, Richard Stone, McMillan, London
6. Vehicle and Engine Technology – HeinHeister
7. Advance Vehicle Technology - HeinHeister
8. S. I. Engine – Fuel Injection Development - Charles A. Fisher, Chapman & Hall
9. Automotive Engines - Herbert E. Ellinger
10. Automobile Engg. Volume – I - American Technical Society, Chicago
11. Internal Combustion Engines Fundamentals – John B. Heyhood, McGrawHill
12. Environmental Engineering, H.S. Peavy, D.R. Rowe, G. Tchobanoglous, McGraw-Hill Book Company, New York.
13. Introduction to Environmental Engineering and Science, G. Masters, Prentice-Hall International Editions.
14. Environmental Considerations in Energy Development, Asian Development Bank (ADB) Manila.

Course Learning Outcome:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand the basic concept of engine maintenance its remedies and causes	18
CO-2	Acquire basic understanding of Chassis Drive-line Maintenance	22
CO-3	Apply and analyse maintenance procedure of automobile auxiliaries	19
CO-4	Acquire basic knowledge of air pollution its causes, types, ingredients	21
CO-5	Understand Exhaust Emission Control its norms, Characteristics of solid waste, and its energy recovery	20

List of Experiments:

1. Study of Garage layouts, Workshop management and Automotive service equipments.
2. Cleaning and Testing of a Petrol Injector on MPFI test bench.
3. Overhauling of Carburetor and Gearbox.
4. Study working principle and perform operation of (a) Four post hoist (b) Electronic air inflator (c) Tyre changer (d) Car Washer.
5. Inspection and service of an Air conditioning system of a car using AC recovery unit and UV leak detector
6. Performance & emission test on Heavy duty diesel engine (transient Dyno)



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7. Study of Emission test for SI Engine (i) 2 wheelers (ii) 3 wheelers (iii) 4 wheelers on Chassis Dynamometer.
8. Performance & emission test on CNG engines.
9. To study Noise reduction in muffler



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