

Automobile Engines

Diploma in Automobile Engg

III Semester

Subject – Automobile Engines (3rdSem)

Subject Code : AUT303

L T P

3 4

Total Hours 42 Th

FM 100 Th 50 Pr

1. Introduction

Hrs. 06

- 1.1 Components of automobile, Engine systems, Basic engine terminology, Engine Cycles (Otto and Diesel), working of I.C engines, Firing order.
- 1.2 Effect of Engine size, effect of flywheel size, use of multi-cylinder engines, comparison of single and multi-cylinder engines.
- 1.3 Types of engines, Number and arrangement of cylinders, square engine, and Homogenous charge compression ignition engine.
- 1.4 Electric vehicle, Hybrid vehicle, wheel motors, fuel cell vehicle, RAC rating, SAE rating, DIN rating.

2. Engine Construction

Hrs. 06

- 2.1 Introduction, Cylinder Block and Crankcase, Cylinder Head, Oil Pan, Manifolds, Gaskets, connecting Rod, Piston Pin, Crankshafts, Vibration Dampers, Engine Bearings
- 2.2 Valve Timings, Maximum valve openings, Engine valve, Poppet valve, valve actuating mechanism, factors for Valve train components, details valve rotators.
- 2.3 Variable Valve Timing (VVT) Technologies, V-TEC technology, Fiat Multi air technology, Borg warner's VEMB, Cam-less engine, Mufflers, Latest trends.

3. Cooling Systems

Hrs. 04

- 3.1 Necessity, Methods of cooling, Air Cooling, Water Cooling
- 3.2 Components of water cooling system, Radiator, Pressure cap and expansion reservoir.
- 3.3 Thermostat, coolant pump, fan, coolants, and temperature gauges.

4. Lubricating Systems

Hrs. 05

- 4.1 Introduction, Necessity of lubrication, Requirements of lubricants, types of lubricants
- 4.2 Viscosity rating, service rating, testing of lubricants, oil additives, systems of engine lubrication.
- 4.3 Oil strainers, Oil pumps, Oil filters, Oil Coolers. Oil level Indicators, Oil Pressure gauges, Oil Pressure warning light, chassis lubrication.

5. Fuels, Combustion & Combustion Chambers

Hrs. 05

- 5.1 Properties of conventional fuels i.e petrol and diesel, alternative fuels- alcohols, CNG, LPG, Bio-Diesel, Hydrogen.
- 5.2 Combustion in SI engines, Detonation in SI engines, Theories of detonation, Factors influencing detonation, Effects of detonation, prevention of detonation, fuel rating, Octane Number, Pre-ignition, Terms relating to rate of combustion, factors affecting combustion chamber design, desirable factors for combustion chambers in SI engines.
- 5.3 Combustion in CI engine, Diesel Knock, Cetane Number, Diesel Index, Comparison between detonation and diesel knock, combustion chambers for CI engines.

6. Petrol engine fuel supply system

Hrs. 06

- 6.1 Fuel supply systems, fuel tank, vapour return line, air cleaners, Fuel filters, fuel gauge, brief introduction to carburettor.
- 6.2 Petrol injection- Introduction, comparison with carburettor, types, mechanical injection, electronic injection, main components of petrol injection systems.
- 6.3 Bosch motronic Gasoline system, DI motronic system, natural Gas motronic.
- 6.4 Super chargers, types of superchargers, Turbo charger, Comparison of super charged and Turbo charged engines.

7. Diesel engine fuel supply system

Hrs. 06

- 7.1 Introduction, common rail fuel injection system, Individual Pump fuel injection system, fuel filters, Air cleaners, Fuel feed pump, fuel injection pump, Fuel Injector, Governor.
- 7.2 Modern common Rail fuel injection system, Engine management in Common Rail System(CRS), Bosch third generation CRS, Volvo's i-ART technology, Unit Injection system, Unit Pump System.

8. Emission Control

Hrs. 04

- 8.1 Introduction, Euro Norms, Bharat Stage Norms, Methods of reducing the formation of pollutants, closed crank case ventilation, reducing evaporative emission, Exhaust gas recirculation, Catalytic convertors, Exhaust treatment for diesel engines.
- 8.2 Adsorbers, Use of alternative fuel.

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List of experiments

1. Demonstration of engine components and describe the working, function, Location and materials used for each component and method of disassembling and Assembling.
2. Demonstration of cooling system components and describe the working, function location and materials used for each component and method of disassembling and Assembling.
3. Demonstration of diesel engine fuel supply systems i.e, common Rail fuel supply system and individual pump fuel supply system and method of disassembling and Assembling.
4. Demonstration of multi point fuel injection system used in petrol engines.
5. Set the valve timing for both inlet and exhaust valve on a multi cylinder engine.
6. To find the Indicated Power (IP) on multi-cylinder petrol engine by Morse test.
7. Determination of the performance and heat balance characteristics of a diesel engine.
8. To diagnose Electronic Fuel Injection (EFI) with Diagnostic Read out Tester/engine Scanner.
9. Measure the emission of C.I engine using Smoke Meter and compare it with the emission norms.
10. Measure the emission of S.I engine using exhaust gas analysers and compare it with the emission norms.

Reference Books:

Sr. No	Author	Title	Publisher
01	Kirpal Singh	Automobile Engineering Vol.II	Standard Publication
02	Anthony Schwaller	Motor auto motive	Delmar PublisherInc.
03	Tim Gills	Automotive service	Delmar PublisherInc.
04	Anil Chikkara	Automobile Engineering	Satya Prakashan
05	Crouse/Anglin.	Automobile Mechanics	TATA McGraw–HILL
06	Harbans Singth Royat	The Automobile	S. Chand Publication
07	R.B. Gupta	Automobile Engineering	Satya Prakashan New
08	S. Srinivisan	Automotive Mechanics	TATA McGraw–HILL
09	HMSETHI	Automotive Technology	TATA McGraw–HILL

