Course code	Course Name	L-T-P - Credits	Year of Introduction
AU212	Automobile Power Plant	3-0-0 - 3	2016

Prerequisite : Nil

Course Objectives

- To know the fundamentals of IC Engine and various components of the engine.
- To know about the various systems in automobile power plant

Syllabus

IC Engines – working – components - Lubrication system- Cooling system- Fuel supply system in petrol engines- Fuel supply system in diesel engines

Expected outcome.

- After this course the student will be able to understand clearly the various components and constructional details of automobile power plant.

Text Books:

1. M. L. Mathur, R. P. Sharma - Internal Combustion Engines, Dhanpat Rai Publications
2. R.K. Rajput, Internal Combustion Engines, Laxmi Publications.
3. V Ganesan, *Internal Combustion Engine* Tata McGraw Hill Publishing Company Ltd., New Delhi 2006.

References:

1. A.W.Judge, Modern diesel engine, Chapman and Hall, London
2. A.W.Judge, Modern petrol engine, Chapman and Hall, London
3. Heinz Heisler, Advanced EngineTechnology, Society of Automotive Engineers Inc
4. John B Heywood, Internal Combustion Engine Fundamentals, McGraw Hill Publishing Company
5. Joseph Heitner- Automobile mechanics, CBS Publishers, New Delhi
6. Kripal Singh, Automobile Engineering, Vol I and Vol II, Standard Publisher, New Delhi , 2006
7. Lichty , I.C.Engines ., McGraw Hill
8. Newton K / Steeds W / Garrett T.K – Motor Vehicle, Butterworth Heinemann Ltd
9. P. M. Heldt – High speed diesel engines, Chillon Co. New York.
10. William H Crouse / Donald L Anglin, Automotive Mechanics , Tata McGraw-Hill Publishers

Course Plan

Module	Contents	Hours	Sem.ExamMarks
I	Introduction: Types of power plant, Basic engine nomenclature, classification of IC engines (Classification by cylinder arrangement, Valve arrangement and Type of valves), Engine cycles, Comparison of SI and CI engines, working of 2 -stroke and 4 stroke engines with relative merits and demerits, Numbering of cylinders, firing order.	7	15%
II	Constructional details of engine components: Moving parts and stationary parts, engine block, Cylinder block and crank case-types, cylinder liners, types of cylinder head, gasket materials, piston types, piston rings, piston pins,	7	15%

	connecting rod, crank shaft, flywheel, vibration damper, Main Bearings, camshaft, camshaft drives, Types of valve and valve seats, valve actuating mechanisms (mechanisms with side camshaft and overhead camshaft), inlet and exhaust manifold construction, hydraulic tappets.		
FIRST INTERNAL EXAMINATION			
III	Lubrication system: Function of lubrication system, lubrication principles, classification of lubricants, types of lubricants, properties of lubricants, service ratings of oils, oil additives, specification of lubricants, crankcase ventilation, lubrication systems (Mist, Wet sump Dry sump lubrication systems), pre-lubrication systems, effect of engine conditions on lubricating oil, consumption of lubricating oil, Components of lubrication system (oil strainers, oil filters, oil pumps, oil coolers), chassis lubrication.	7	15%
IV	Cooling system: Necessity of engine cooling and correct operating temperatures, types of cooling systems like Direct air cooling, Indirect or water cooling, Liquid cooling, Pressure sealed cooling, Evaporative cooling or steam cooling, components of water cooling system (thermostat, water pump, radiator, cooling fan etc), antifreeze solution, temperature gauges.	7	15%
SECOND INTERNAL EXAMINATION			
V	Fuel supply system in petrol engines:Types of fuel feed systems, fuel tank, fuel pumps and fuel filters (types and construction), air filter types and construction, combustion and ignition limits in SI engines, carburetion, properties of air-petrol mixtures, mixture requirements for steady state operation, transient mixture requirements, simple carburetor, different circuits in carburetor, type of carburetors like Solex, SU, Carter etc, MPFI engines, GDI engines, Brief about TSI, Flex Fuel Vehicles	7	20%
VI	Fuel supply system in diesel engines: Requirements of diesel injection system, Components of diesel injection system, Diesel filters, fuel feed pump, hand pump, heavy duty air filters, Diesel injection pump types - simple and multiple unit pump, C-AV Bosch pump, Modem distributor type pumps, CRDI, injection nozzles and types of injectors, governors (mechanical, pneumatic and hydraulic governors), cold starting devices., Quadra Jet and Multijet principles	7	20%
END SEMESTER EXAM			

Question Paper Pattern

Maximum marks: 100 Time: 3 hours

The question paper shall consist of three parts

Part A
4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B
4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C
6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.