

GANPAT UNIVERSITY

FACULTY OF U. V. PATEL COLLEGE OF ENGINEERING

Programme	Degree Engineering			Branch/Spec.	Automobile Engineering				
Semester	III			Version	1.0.0.0				
Effective from Academic Year		2018-19			Effective for the batch Admitted in			July 2017	
Subject code	2AE301		Subject Name		Fundamentals of Automobile Engines				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:

None

Learning Outcome:

Learning Outcomes:

After completion of this course, student will be able to

- Understanding of the basic working principles of engines and its Construction and Operation
- To learn about the phenomena of Combustion and Design of Combustion Chambers
- Engine Testing and Performance and Performance characteristics.
- learn the new technology instead of the pure I.C. Engine.

Theory syllabus

Unit	Content	Hrs
1	Engine Construction and Operation: Constructional details of 4-stroke engines. Working principle, Otto, Diesel cycle, Valve timing diagrams and actual indicator diagram. Diesel and Petrol fuels, Ignition quality. Octane & Cetane numbers	6
2	Two Stroke Engine Construction and operation. Comparison of four stroke and two-stroke engine operation. Port timing diagrams. Firing order and its significance.	6
3	SI Engine Fuel System Carburetor working principle. Requirements of an automotive carburetor; Starting, Idling, Acceleration and normal circuits of carburetors, Maximum power devices, Constant choke and constant vacuum carburetors. Fuel feed systems, Mechanical and electrical pumps. Petrol injection. LPG and CNG fuel systems. MPFI systems for petrol.	6
4	CI Engine Fuel System Fuel Injection System: Requirements, Air and solid injection, Function of components, Jerk and distributor type pumps. Pressure waves, Injection lag, Unit injector, Mechanical and Pneumatic governors. Fuel injector-types of injection nozzle, Spray characteristics, Injection timing, Pump calibration. CRDI systems for diesel.	6
5	Cooling and Lubrication System Need for cooling system. Types of cooling system, Liquid cooled system, Thermo-siphon system, and Pressure cooling system. Lubrication system, Mist lubrication system, Wet sump and dry sump lubrication. Properties of lubricants. Properties of coolants.	5
6	Combustion and Combustion Chambers Combustion in IC engines, Stages of combustion, Flame propagation, Rate of pressure rise, Abnormal combustion, Knocks. Effect of engine variables on knock. Combustion chambers, Factor controlling combustion chamber design.	6
7	Types of Scavenging: Theoretical scavenging methods. Scavenging pumps.	3
8	Supercharging and Turbo charging: Necessity and limitation, Charge cooling, Types of supercharging and turbo charging, relative merits, Matching of turbocharger	4

9	Engine Testing and Performance: Automotive and stationary, Engine testing and related standards. Engine power and efficiencies.	3
10	Performance Characteristics Variables affecting engine performance. Methods to improve engine performance. Heat balance. Performance maps and drivability diagnosis.	3
Practical content		
The practical work shall be based on experimental work on the topics mentioned above and will be defended by the candidates.		
Text Books		
1	Automobile Engines, R.B. Gupta	
2	Automobile Engines, Anil Chikara Vol.1 and 2	
Reference Books		
1	Ganesan.V.Internal Combustion Engines, Tata-McGraw Hill Publishing Co., New Delhi, 1994.	
2	Automotive Engines (McGraw-Hill International Editions: Automotive Technology Series) Paperback – International Edition, September 1, 1994 by William H. Crouse and Donald Anglin.	
3	Ellinger.H.E, Automotive Engines, Prentice Hall Publishers, 1992	
4	Maleev.V.M, Diesel Engine Operation and Maintenance, McGraw Hill, 1974	