

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Mechanical Engineering		
Semester		VIII			Version		2.0.0.0		
Effective from Academic Year				2021-22		Effective from the batch Admitted in			July 2018
Subject code		2ME81PE2		Subject Name		Automobile Engineering			
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:									
Basic Knowledge of I.C Engines and Thermal Engineering									
Course Objective:									
<ul style="list-style-type: none"> • Understand anatomy of the automobile in general and importance of each part. • Get the knowledge of various parts like engine, transmission, clutch, brakes, the steering and the suspension systems operate. • Get the Knowledge of vehicle dynamics and electronic system of automotive. • Understand about Emissions controls and Vehicle Maintenance. 									
Theory syllabus									
Unit	Content								Hrs
1	VEHICLE STRUCTURE AND PERFORMANCE: Automotive components, subsystems and their positions- Chassis, frame and body, front, rear and four wheel drives, Operation and performance, Traction force and traction resistance, Power required for automobile - Rolling, air and gradient resistance.								4
2	TRANSMISSION SYSTEM: Clutch: Function of Clutch Constructional features & Components of each type of clutch, Clutch Linkages. Gear Box: Sliding, Constant mesh and Synchromesh type gear box, Automatic transmission, torque converter, Overdrive and its working, Dual clutch Transmission. Driveline and Rear Axle: Propeller shaft, Universal joints, Slip joint, Constant velocity joint, Hotchkiss & Torque tube Drives, Differential.								9
3	AXLE, SUSPENSION AND STEERING SYSTEM: Front Axle: Types, Construction, Components and their functions. Suspension System: Principle, Type of suspension system, Conventional and independent front and rear axle, Leaf springs, coil springs, damper, Air suspensions and Active suspension system. Steering System: Steering Layout, Types of steering gears, Steering linkages, Steering mechanism, Definitions, and Significance of camber, Caster, king pin inclination, Toe in and toe out on turn. Steering ratio, Under steering and over steering, wheel alignment and balancing.								9
4	BRAKES, WHEELS AND TYRES: Brakes: Forces on vehicles, tyre grip, load transfer, brake force distribution between axles, stopping distance, Types of brakes, Mechanical, Hydraulic, Air brakes, Disc & Drum brakes, Engine brakes and anti-lock braking system(ABS). Wheels and Tyres: Types of wheels – spoke, rim and alloy, Tyre types and construction, Specification, Tyre wear and causes.								5
5	ELECTRICAL AND ELECTRONICS SYSTEM:- Battery: Construction, working, methods of rating, charging methods of lead-acid and lithium ion battery. Lighting system: Wiring system, head lights, aiming of head lights, indicating lights. Accessories like direction indicators, hazard flashes, horn, speedometer, tachometer, wind screen wiper, central locking system, power windows and vehicle tracking system. Automobile Electronics:- Types of sensors and actuators, OBD-I and OBD-II, vehicle								5

	management system.	
6	SILENCER: Mufflers types: Baffle type, Wave cancellation type, Resonance type, Absorber type, Combined resonance and absorber type, Their construction and capacity to damp high and low frequency waves	4
7	VEHICLE TESTING, MAINTENANCE AND REGULATION: Need of vehicle testing, Vehicle tests standards, Different vehicle tests. Maintenance and trouble shooting and service procedure, Over hauling ,Engine tune up, Tools and equipment for repair and overhaul ,Organization and management of service station , Testing equipment, Selection of power unit and engine performance characteristics troubleshooting and rectification.	5
8	EMISSION FROM AUTOMOTIVE ENGINES: Emission formation in S.I. engines – Hydrocarbons – Carbon monoxide – Nitric Oxide, Controlling of pollutant formation in engines , After-treatment Devices DOC,SCR, EGR Systems Valve types , EGR Circuit types , EGR Cooler types, EGR- Types Internal , Low pressure , High pressure and Air injection, Bharat stage emission norms- III, IV and VI.	4
Practical content		
The term work shall be based on experimental and analytical work on topics mentioned above Field work.		
Text Books		
1	Dr.K. M. Gupta, “Automobile Engineering Vol- I & II”, Umesh Publications, Delhi. 2002.	
2	Dr. Kirpal Singh, “Automobile Engineering Vol- I & II”, Standard Pub. & Dist. New Delhi. 2008.	
Reference Books		
1	William Crouse, “Automotive Mechanics”, Tata McGraw Hill, New Delhi. 2006.	
2	G. B. S. Narang, “Automobile Engineering”, Khanna Pub, Delhi. 2005.	
3	H. G. Katariya, “Automobile Engineering”, J.P. Hadiya, Books India, Ahmedabad. 1 st Edition 2012.	
4	R. B. Gupta, “Automobile Engineering”, Satya Prakashan, New Delhi. 2015.	
Mooc Links:		
https://nptel.ac.in/courses/107/106/107106080/		
https://www.digimat.in/nptel/courses/video/108102121/L01.html		
Course Outcomes:		
After learning this course, student should be able to:		
<ol style="list-style-type: none"> 1. Understand the working of Battery, Lighting Systems and Electronic components of vehicle. 2. Possess the knowledge about various vehicle frames and vehicle sub systems 3. Apply the fundamental knowledge to develop modern vehicle systems 4. Assess the transmission systems required for any given vehicle 		