

<b>GANPAT UNIVERSITY</b>									
<b>FACULTY OF ENGINEERING &amp; TECHNOLOGY</b>									
Programme		Bachelor of Technology			Branch/Spec.		<b>Automobile Engineering</b>		
Semester		VII			Version		1.0.0.0		
Effective from Academic Year			2020-21		Effective for the batch Admitted in			July 2017	
Subject code		<b>2AE701</b>		Subject Name		<b>Automobile System Design</b>			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	1	0	0	4	Theory	40	60	100
Hours	3	1	0	0	4	Practical	0	0	0
Pre-requisites:									
Automobile Systems and Fundamentals of Machine Design									
Objective of the Course:									
<ol style="list-style-type: none"> <li>To standardize the automobile part after designing the system component like clutch, propeller shaft,</li> <li>To design components like axle, steering linkages, braking parts, suspension system, etc.</li> <li>To design vehicle system within the space limitations and optimize it.</li> </ol>									
Theory syllabus									
Unit	Content								Hrs
1	<b>Design of Clutch System:</b> Design of various clutch system components (Single plate, multiple plates, centrifugal clutch, lining material) and Pressure Plate Assembly components. Hydraulic Clutch system components (Master Cylinder, Slave cylinder, reservoir clutch fluid – its properties, hydraulic pipes. Clutch Pedal & Clutch hand lever design. Clutch cable Design / selection considerations.								7
2	<b>Design of propeller Shaft</b> Design of propeller shaft for bending, torsion, rigidity and critical speed criteria. Design of universal joint and slip joint. Propeller shaft Assembly testing for balancing.								4
3	<b>Design of Axle</b> Front Axle beam, Steering Knuckle, King pin. Rear Axle (drive Axle) tube, Design of fully floating, half floating axle and dead axle. Design of Final drive and differential: Design of spiral bevel and hypoid type of final drive/differential.								6
4	<b>Design of Steering System</b> Condition for true rolling, Turning circle radius, Principle of Ackermann steering, Ackermann-linkage geometry, Steering gear ratio, Steering box torque, Design of various steering gear box.								4
5	<b>Design of Braking System</b> Brake balance, Stopping distance, Brake fade, Work done in braking, Braking efficiency, Braking of vehicle, Braking of vehicle moving in a curved path, Design of drum brake, Design of disc brake, Design of hydraulic brake system, Design of hand brake or parking brake.								9
6	<b>Design of Suspension System</b> Function of suspension, Forces act on suspension, Suspension springs (laminated or leaf, coil, torsion bar, rubber spring, pneumatic spring), Design of laminated or leaf spring, Design of helical or coil spring, Design of torsion bar spring.								9
7	<b>Optimum Design</b> Optimum design for automotive elements like shaft-springs etc., Johnson's method of optimum design.								6
Practical content									
Tutorials and assignments are based on above syllabus.									
Text Books:									
1	R S Khurmi J.K.Gupta, "Machine Design", S Chand & Co., 25th revised edition, 2014.								
2	Pandya and Shah, "Machine Design", Charotar Publishing House, 20th edition, 2015.								

Reference Books	
1	Dean Averno, "Automobile Chassis Design", Llife Books Ltd, 3rd edition, 1992.
2	K.M.Agrawal, "Auto design Problems", Satyaprakashan, 4th edition, 2000.
3	P.Lukin, "Automobile Chassis Design and calculations", Mir Publishers, 2nd edition, 2004.
4	Joseph E. Shigley & Larry, "Mechanical Engineering Design", 4th edition, 2003.
ICT/ MOOCs references	
1	NIL
Course Outcomes:	
<p>After completion of this course, student will be able to</p> <ol style="list-style-type: none"> <li>1. Select and design the different automobile system for given conditions</li> <li>2. Standardize different parts of automobile system</li> <li>3. Optimize the parts for given situation.</li> </ol>	