

Program : Diploma in Automobile Engineering	
Course Code : 4053	Course Title: Automobile Chassis and Transmission
Semester : 4	Credits: 4
Course Category: Program Core	
Periods per week: 4 (L:3, T:1, P:0)	Periods per semester: 60

Course Objectives:

- To acquire knowledge about the operation of various components in driveline, suspension, steering and braking system of automobiles.
- To acquire the knowledge about fundamentals regarding automobile driveline, suspension, steering and braking systems along with modern features.
- To enable the student to perform troubleshooting and servicing of the parts.

Course Prerequisites:

Topic	Course code	Course Title	Semester
Knowledge in Basic Automobile engineering		Basic Automobile Engineering	2
Engine construction and other systems and its working		Internal Combustion Engines	3

Course Outcomes:

On completion of the course, the student will be able to:

CO _n	Description	Duration (Hours)	Cognitive level
CO1	Outline the working of clutch and transmission system	15	Understanding
CO2	Make use of the features of drive line components	14	Applying
CO3	Identify various suspension and steering systems	15	Applying
CO4	Outline the working of brake system	14	Understanding
	Series Test	2	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	3						
CO3	3						
CO4	3						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	Outline the working of clutch and transmission system		
M1.01	Explain various clutch components and their functions	4	Understanding
M1.02	Outline various clutch linkages	3	Understanding
M1.03	Explain the purpose and operation of manual transmission and transaxle	4	Understanding
M1.04	Explain the operation of automatic transmission	4	Understanding

Contents:

Functions of clutch, clutch operation, types of clutches, clutch components-clutch disc, throw out bearing, pressure plate assembly, clutch pedal linkage-levers and rods, cable, hydraulic, dual mass flywheel.

Need for transmission, transmission vs transaxle, transmission design, transaxle design, synchronizers, gear shift mechanisms, transmission and transaxle power flows.

Automatic transmission-torque converter, shift modes, planetary gear sets, planetary gear controls, hydraulic systems, dual clutch automatic transmission.

CO2	Make use of the features of drive line components		
M2.01	Outline the various drive line components	4	Understanding
M2.02	Explain the working of differential	3	Understanding
M2.03	Identify the features of wheels and tyres	3	Applying
M2.04	Outline the factors in wheel alignment geometry	4	Understanding
	Series Test I	1	

Contents:

Drive line, universal joint operation, constant velocity joints-purpose and function, outer and inner cv joints, drive axle shafts, differential-parts and operation, limited slip

differential, four-wheel drive systems, all-wheel drive, transfer case, inter axle differential. Wheels-types, construction, wheel dimensions, tyres-types, construction, tread designs, tyre ratings, tyre designations, tyre care, tyre pressure monitor, tyre repair, wheel alignment geometry-caster, camber, toe, steering axis inclination, turning radius.

CO3	Identify various suspension types and steering systems		
M3.01	Identify various suspension components and conclude their features	4	Applying
M3.02	Outline the features of front and rear suspension types	4	Understanding
M3.03	Identify various steering components.	4	Applying
M3.04	Explain the working of various power steering systems	3	Understanding

Contents:

Suspension system-purpose and function, suspension principles, suspension parts-steering knuckle, control arms, ball joints, strut rods, stabilizer bars, front suspension types-solid axle, McPherson strut, rear suspension types-solid axle, leaf spring, trailing arm, independent rear suspension, electronic suspension-types, air suspension-components, working.

Steering linkages-parallelogram steering linkage-components, rack and pinion steering linkage-components, steering gears-recirculating ball, worm and roller, tilt steering wheel, collapsible steering column, power steering systems-integral piston system, power assisted rack and pinion systems, electronic power steering systems.

CO4	Outline the working of brake system		
M4.01	Identify the components in hydraulic brake system	4	Understanding
M4.02	Explain the working of master cylinder and wheel cylinder	3	Understanding
M4.03	Explain the features of drum brake and disc brake	4	Understanding
M4.04	Summarize the working of power assisted brake systems	3	, Understanding
	Series Test II	1	

Contents

Factors governing braking, hydraulic brake system -components, brake pedal, dual piston master cylinders-construction and operation, wheel cylinder-construction and operation, split hydraulic systems, hydraulic lines, pressure differential switch, metering and proportionating valves, brake friction lining materials.

Drum brake-components and function, disc brake-components and function, types of caliper assembly, hydraulic system bleeding, power assisted brakes, vacuum brake booster, hydraulic brake booster, air brake-components, working

Text / Reference:

T/R	Book Title/Author
R1	Automotive Technology: Principles, Diagnosis, and Service by James D. Halderman, Prentice Hall
R2	Automotive Technology: A Systems Approach by Jack Erjavec, Cengage Learning
R3	P.L.Kohli - Automobile Chassis & body – Tata McGraw-hill
R4	Kirpal Singh - Automobile Engg vol 1 – Standard Publication
R5	W H Crouse - Automotive Chassis, McGraw-Hill Book Company
R6	Anil Chhikara - Automobile Engineering – Satya Prakasan

Online Resources:

Sl.No	Website Link
1	https://www.youtube.com/watch?v=devo3kdSPQY
2	https://www.youtube.com/watch?v=u_y1S8C0Hmc
3	https://www.youtube.com/watch?v=SOgoejxzF8c
4	https://www.youtube.com/watch?v=bMg_j5_AGMg