

GANPAT UNIVERSITY										
FACULTY OF ENGINEERING & TECHNOLOGY										
Programme		Diploma Engineering				Branch	Automobile Engineering			
Semester		VI				Version	1.0.0.0			
Effective from Academic Year				2020-21		Effective for the batch Admitted in			July 2018	
Subject code		1AU2602		Subject Name		AUTO TRANSMISSION MECHANISM DIAGNOSIS AND TESTING				
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:
No Pre-Requisites are required for understanding the subject.

Course Learning Outcomes:
<p>The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain so that they can demonstrate the following course outcomes.</p> <p>CO1. Identify probable faults/troubles and their causes in automobile transmission systems.</p> <p>CO2. Use suitable instruments, tools and service manuals for diagnosis and testing of automobile transmission systems.</p> <p>CO 3. Remove automobile units by using proper tools and procedures: gear box, brakes, suspension, final drive, etc.</p> <p>CO 4. Disassemble, inspect, and repair various automobile units by using proper tools and procedures: gear box, differential, brakes, suspension, steering, etc.</p> <p>CO 5. Follow safety rules for repair and maintenance of various transmission systems of automobile vehicle.</p>

Course Content				
Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
<b>Unit – I Trouble Shooting of Clutch</b>	1.1 Troubles in clutch units, its causes and rectification 1.2 Inspection procedure and rectification 1.3 Reconditioning of clutch components 1.4 Clutch adjustment 1.5 Lubrication of clutch units and linkages 1.6 Troubles in fluid coupling, its causes a	1a. Identify various troubles in clutch unit and fluid coupling, 1b. Analyse and Rectify various troubles in clutch unit 1c. Explain overhauling of Clutch	8	6
<b>Unit – II Inspection, Testing and Overhauling of Gear Box.</b>	2.1 Troubles in gear box unit, their causes and remedies 2.2 Inspection of components of gear box 2.3 Rectification of various troubles in components 2.4 Overhauling of gearbox	2a. Identify various troubles in gear box 2b. Analyse and Rectify various troubles in gear box 2c. Explain overhauling of Gear box	8	6

<b>Unit– III</b> <b>Inspection and Troubleshooting of Propeller Shaft -Universal Joint Rear Axle Assembly</b>	3.1. Troubles in propeller shaft assembly 3.2. Inspection procedure 3.3. Rectification of various troubles 3.4. Alignment of propeller shaft 3.5. Troubleshooting of Constant Velocity Joint 3.6. Troubles in rear axle assembly and their probable causes 3.7. Inspection procedure for rear axle assembly 3.8. rectification of troubles in rear axle assembly 3.9. Procedure for road testing for proper performance of rear axle assembly	3a) Identify various troubles in propeller shaft, 3b) Analyse and Rectify various troubles in propeller shaft 3c) Explain Inspection procedure of propeller shaft 3d) Identify various troubles in rear axle assembly, 3e) Analyse and Rectify various troubles in rear axle assembly 3f) Explain Inspection procedure of rear axle assembly	12	11
<b>Unit– IV</b> <b>Trouble Shooting of Front Axle and Steering System</b>	4.1 Troubles in front axle and steering system, and their probable causes 4.2 Inspection procedure for front axle 4.3 Rectification of various troubles 4.4 Procedure of testing for proper performance 4.5 Wheel alignment procedure 4.6 Troubles, its causes and remedies in power steering system (Hydraulic and Electronics) 4.7 Troubleshooting of various steering gear box	4a. Identify various troubles in front axle and steering system 4b. Analyse and Rectify various troubles in front axle and steering system 4c. Explain Inspection procedure of front axle 4d. Describe the procedure of Wheel alignment	10	10
<b>Unit– V</b> <b>Trouble shooting of Braking System &amp; Service of Wheels and Tyres</b>	5.1 Troubles in Mechanical, Hydraulic and Air braking system and their causes 5.2 External checks of braking system 5.3 Internal checks of system 5.4 Rectification of various troubles 5.5 Brake performance test 5.6 Trouble shooting of sub assemblies of various brake systems like Master Cylinder, Vacuum Booster and Unloaded Valve. 5.7 Trouble shooting of Antilock Braking System. 5.8 Different troubles and probable causes in Wheels and Tyres 5.9 Inspection of rim and tyres 5.10 Remedial Operation 5.11 Rotation of tyre 5.12 Tyre Retreading procedure 5.13 Various troubles, causes and remedies in alloy wheels	5a. Identify various troubles in different braking system, 5b. Analyse and Rectify various troubles in brake 5c. Explain brake performance test 5d. Identify various troubles in wheels, 5e. Analyse and Rectify various troubles 5f. Describe the procedure of tyre rotation and Wheel balancing 5g. Explain the procedure of tyre retreading	12	11

	5.14 Wheel balancing procedure			
<b>Unit– VI Inspection, Servicing and Repair of Suspension System&amp; Chassis Frame.</b>	6.1 Various troubles and their probable causes in suspension system 6.2 Inspection procedure 6.3 Remedial operation 6.4 Lubrication of coil spring and leaf spring 6.5 Various troubles and causes in chassis frame 6.6 Inspection procedure 6.7 Remedial operation 6.8 Repairs and alignment of frame 6.9 Schedule for chassis lubrication 6.10 Types of instrument used	6a. Identify various troubles in suspension system 6b. Analyse and Rectify various troubles in suspension system 6c. Identify various troubles in chassis frame, 6d. Analyze and Rectify various troubles in chassis and frame 6e. Explain repair and alignment procedure of frame	10	12
		Total	60	56

List of Practical		
Sr. No.	Practical Exercises (Any Seven)	Hours
I	Perform servicing of clutch	4
II	Perform servicing of gear box	4
III	Perform servicing of gear shifting mechanism	4
IV	Perform servicing of final drive	4
V	Perform servicing of steering system	4
VI	Perform servicing of braking system	4
VII	Perform bleeding of hydraulic braking system and pedal adjustment	4
VIII	Perform servicing of air brake system	4
IX	Perform wheel alignment and balancing	4
X	Wash and service the car	4

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	Automobile Engineering	R. B. Gupta	Satya Prakashan, New Delhi
2	Automotive Mechanics	W.H.Crouse & D.L. Anglin	Tata Mc-Graw Hill Publishing Co. Ltd.
3	Maintenance Engineering And Management	R.C. Mishra, K. Pathak	PHI Learning Pvt. Ltd., 2004
4	Automobile Engineering	C.P. Nakra	Dhanpat Rai Publication Co. (P) Ltd.
5	Automotive Technology	N.K.Giri	Khanna Publication Co. (P) Ltd.

Link of Learning Web Resource	
1	<a href="http://youtu.be/J-vrjgKqqSQ">http://youtu.be/J-vrjgKqqSQ</a>
2	<a href="http://youtu.be/vJVrFjzNj3w">http://youtu.be/vJVrFjzNj3w</a>
3	<a href="http://youtu.be/JRDN6hwCljs">http://youtu.be/JRDN6hwCljs</a>
4	<a href="https://www.youtube.com/playlist?list=PLPvqVA0h0J6gqQc2XkNjYzaCwbimt4aaA">https://www.youtube.com/playlist?list=PLPvqVA0h0J6gqQc2XkNjYzaCwbimt4aaA</a>

## List of Software/Learning Websites

Sr. No	Topic / Video Title	URL Address
1	Connecting brake lines with a compression fitting	<a href="http://youtu.be/rF9p0KoYU4E?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/rF9p0KoYU4E?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
2	Checking a pressed in lower ball joint for wear	<a href="http://youtu.be/RWZq9WapzrM?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/RWZq9WapzrM?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
3	Changing a vehicle brake line	<a href="http://youtu.be/1ltBpXORbhU?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/1ltBpXORbhU?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
4	Car O Liner Mark 6 Frame Alignment Bench	<a href="http://youtu.be/w-j6T_Yj18g?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/w-j6T_Yj18g?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
5	Bench bleeding a brake master cylinder	<a href="http://youtu.be/KglpDbSI2F8?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/KglpDbSI2F8?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
6	ABS Brakes & More How to Troubleshoot ABS Disc Brakes	<a href="http://youtu.be/CqXmrex-DD4?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/CqXmrex-DD4?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
7	1998 Ford Ranger Rear Differential Reassembly	<a href="http://youtu.be/tQQ6OorGI4E?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/tQQ6OorGI4E?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
8	1998 Ford Ranger Rear Differential Disassembly	<a href="http://youtu.be/ISqhuAh8Eus?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/ISqhuAh8Eus?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
9	3D Wheel Alignment Manatec FOX 3D	<a href="http://youtu.be/iA327NEjwYw?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/iA327NEjwYw?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
10	Wheel balancing	<a href="http://youtu.be/yRoXUI3UR0k?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/yRoXUI3UR0k?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
11	Wheel balancer	<a href="http://youtu.be/Hl6Oy6jViEs?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/Hl6Oy6jViEs?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
12	Wheel Alignment Why cars need four wheel alignment	<a href="http://youtu.be/59aJ3YERo_I?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/59aJ3YERo_I?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
13	Symptoms of unbalanced tires	<a href="http://youtu.be/m9f63m31bVs?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/m9f63m31bVs?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
14	Symptoms of a worn wheel bearing while driving the vehicle	<a href="http://youtu.be/3ly_QReFOg0?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/3ly_QReFOg0?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
15	Symptoms of a warped brake rotor	<a href="http://youtu.be/F5Epq1wZ5Do?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/F5Epq1wZ5Do?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
16	MGB Differential Repair Part 2	<a href="http://youtu.be/xA6kA09XTIY?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/xA6kA09XTIY?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
17	How To Test, Troubleshoot, Remove & Replace a Power Steering Gear Box	<a href="http://youtu.be/QsbNTjqSjpk?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/QsbNTjqSjpk?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
18	How to Perform an Alignment on Your Car at Home	<a href="http://youtu.be/C8lnafFxtE4?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/C8lnafFxtE4?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
19	How To Diagnose A Clutch Problem	<a href="http://youtu.be/eqrFtnSZIMU?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/eqrFtnSZIMU?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
20	How to connect brake lines with new fittings & a union	<a href="http://youtu.be/kBwQPoHWmyE?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/kBwQPoHWmyE?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
22	How to bend brake lines with a pulley	<a href="http://youtu.be/T7pxI2RtpQ?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/T7pxI2RtpQ?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
23	Troubleshooting brake chamber	<a href="http://youtu.be/9r1b1_9T7L4?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/9r1b1_9T7L4?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
24	What Are Typical Steering and Suspension Problems	<a href="http://youtu.be/vdmdGQcbh50?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://youtu.be/vdmdGQcbh50?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>
Complete Playlist URL		<a href="http://www.youtube.com/playlist?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz">http://www.youtube.com/playlist?list=PLPvqVA0h0J6ib8WNSsv11TOQKOMAQVHNz</a>

## PO & CO Mapping

Sr.No.	Name of PO	Description	Co1	Co2	Co3	Co4	Co5
1	PO 1	An ability to apply knowledge of mathematics and engineering science.	Slight	Slight	Slight	Slight	Slight
2	PO 2	An ability to demonstrate, develop and conduct experiments, as well as to analyze and interpret data.	Slight	Slight	Slight	Slight	Slight
3	PO 3	An ability to design a system component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	High	High	High	High	High
4	PO 4	An ability to perform with multidisciplinary teams.	Moderate	Moderate	Moderate	Slight	Slight
5	PO 5	Use of appropriate modern tool and application software that pertain to Automobile engineering technology systems.	Moderate	Slight	Moderate	Moderate	Slight
6	PO 6	An ability to identify, formulates, execute and solve engineering problems.	Moderate	Slight	Slight	Slight	Slight
7	PO 7	An ability to communicate and present effectively in both verbal and written forms.	Slight	Moderate	Slight	Slight	Slight
8	PO 8	The broad education necessary to understand the impact of engineering solutions in global, economic, environmental and societal context.	High	Slight	Moderate	Moderate	Slight
9	PO 9	Recognition of need for self-improvement, and an ability to engage in life-long learning.	Slight	Slight	Moderate	Slight	Moderate
10	PO 10	Ability to aware about the contemporary issues.	High	High	High	High	High
11	PO 11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	High	High	Moderate	Moderate	Moderate
12	PO 12	Demonstrate to analyse and apply unconventional processes, automation, robotics Nanotechnology, Computer-Aided-Design & Manufacturing and knowledge in Automobile Engineering, Thermodynamics, Refrigeration & Air Conditioning and Jet Propulsion & Rocket Engineering to analyse and solve complex problems and to work professionally in such systems and plants.	High	Moderate	Slight	Slight	Slight