

Program : <b>Diploma in Automobile Engineering</b>	
Course Code : <b>5058</b>	Course Title: <b>Automobile Service Lab - II</b>
Semester : <b>5</b>	Credits: <b>1.5</b>
Course Category: <b>Program Core</b>	
Periods per week: <b>3 (L:0, T:0, P:3)</b>	Periods per semester: <b>45</b>

### Course Objectives:

- To provide hands on experience to students about special tools used in automobile workshop.
- To understand the complete procedure of servicing, inspection and rectification of components of Automobile transmission system, suspension system, steering system, and braking system.
- To enhance the automotive servicing skills of students.

### Course Prerequisites:

Topic	Course code	Course name	Semester
Basic knowledge of Automobile engineering.		Basic automobile engineering	2
Knowledge on automobile transmission system.		Automobile Chassis and transmission	4

### Course Outcomes:

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

CO <sub>n</sub>	Description	Duration (Hours)	Cognitive level
CO1	Make use of the procedures of inspection and servicing of automobile transmission system (Clutch and Gear box).	11	Applying
CO2	Apply the procedures of inspection and servicing of automobile transmission system (Differential, Propeller shaft front axle and rear axle).	11	Applying
CO3	Utilize the procedures of inspection and servicing of Suspension system and Steering system.	10	Applying
CO4	Apply the procedures of inspection and servicing of braking system.	10	Applying
	Lab Exam	3	

**CO – PO Mapping:**

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			2		2	2
CO2	3			2			
CO3	3			2		2	2
CO4	3			2		2	2

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

**Course Outline:**

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	<b>Make use of the procedures of inspection and servicing of Transmission system (Clutch and Gear box).</b>		
M1.01	Utilize the procedure of servicing on Clutch. (Inspection for clutch plate thickness, run-out, rivet depth, warpage of pressure plate)	4	Applying
M1.02	Apply the checking and adjustment of clutch. Identify clutch defects, its Causes and remedies.	4	Applying
M1.03	Make use of servicing of gearbox. Utilize the inspection procedure for run out of main shaft and lay shaft, wear of synchronizer and worn bearings, oil seals. Identify the defects, it's causes and remedies	3	Applying
CO2	<b>Apply the procedures of inspection and servicing of Transmission system (Differential, Propeller shaft, front axle and rear axle).</b>		
M2.01	Plan the servicing procedure on differential. (Inspect for ring gear run-out, backlash in ring gear, tooth Contact between ring gear and pinion, bearing preload.) Identify the defects, it's causes and remedies.	4	Applying
M2.02	Utilize the servicing procedure on Universal joint and Propeller shaft. Inspect the parts. Identify the defects, it's causes and remedies.	4	Applying

M2.03	Apply overhauling procedure on front axle and transaxle – replace king pin and bushes. Check and adjust the alignment of the axle. Make use of overhauling procedure on different types of rear axles. Identify defects, it's causes and remedies.	3	Applying
	Lab Examination - I	1.5	
<b>CO3 :</b>	<b>Utilize the procedures of inspection and servicing of Suspension system and Steering system.</b>		
M 3.01	Apply the overhauling procedure on different types of suspension system including front and rear.	3	Applying
M3.02	Identify the steering linkages. Plan overhauling of different types of steering gear boxes.	4	Applying
M3.03	Utilize the Checking procedure and do the adjustment of steering play.	3	Applying
<b>CO4</b>	<b>Apply the procedures of inspection and servicing of braking system.</b>		
M 4.01	Organize the servicing and inspection procedure on master cylinder, wheel cylinder, brake drum, brake disc, brake Linings and brake pads,	4	Applying
M4.02	Apply the procedure of bleeding in hydraulic brake system.	3	Applying
M4.03	Make use of wheels, tyres and tube ( Removal procedure)	3	Applying
	Driving practice – Able to drive and test the vehicle		Applying
	Open Ended Projects**		Applying
	Lab Examination – II	1.5	

\*\* - Suggested Open Ended Projects

(Not for End Semester Examination but compulsory to be included in Continuous Internal Evaluation. Students can do open ended experiments as a group of 2-3. There is no duplication in experiments between groups.

1. Identify the condition of clutch in a running condition vehicle, Solve and report about the defects. Conduct overhauling and adjustments of clutch, if necessary.
2. Identify the condition of steering system in a running condition vehicle, identify and report about the defects.

Also plan steering adjustments if required.

**Text / Reference:**

<b>T/R</b>	<b>Book Title/Author</b>
T1	Automobile Engineering vol. I – Kirpal Singh - Standard Publishers Distributors
R2	Automobile Engineering practical – N. Malhotra - Asian Publishers
R3	Vehicle Maintenance and Garage Practic - Jigar A. Doshi, Dhruv U. Panchal, Jayesh P. Maniar - PHI Learning Pvt. Ltd.
R4	Automotive mechanics – W. H. Crouse and Anglin - Tata Mc Graw Hill Education, W H Crouse and Anglin
R5	Automobile engineering Vol II – Anil Chhikara - Satya Prakashan New Delhi

**Online Resources:**

<b>Sl.No</b>	<b>Website Link</b>
1	<a href="https://www.youtube.com/watch?v=wCu9W9xNwtI">https://www.youtube.com/watch?v=wCu9W9xNwtI</a>
2	<a href="https://seabeemagazine.navylive.dodlive.mil/files/2014/05/14264A-Construction-Mechanic-Basic-Chapters-11.pdf">https://seabeemagazine.navylive.dodlive.mil/files/2014/05/14264A-Construction-Mechanic-Basic-Chapters-11.pdf</a>
3	<a href="https://dsauto.com.my/en/2018/11/13/common-steering-rack-problems/">https://dsauto.com.my/en/2018/11/13/common-steering-rack-problems/</a>
4	<a href="https://www.youtube.com/watch?v=9vbJX1MLrWY&amp;t=5s">https://www.youtube.com/watch?v=9vbJX1MLrWY&amp;t=5s</a>