

Program : Diploma in Automobile Engineering	
Course Code : 5052	Course Title: Vehicle Diagnostics and Service.
Semester : 5	Credits: 4
Course Category: Program Core	
Periods per week: 4 (L:3, T:1, P:0)	Periods per semester: 60

Course Objectives:

- To provide knowledge on diagnostic and maintenance procedure for automobile systems.
- To get familiarized to logical diagnostic processes and practices and acquire guidance to develop troubleshooting skills.

Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge about vehicle systems		IC Engines	3
		Automobile Electrical and Electronics Systems	3
		Automotive Chassis and Transmission	4

Course Outcomes:

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

CO _n	Description	Duration (Hours)	Cognitive Level
CO1	Make use of the methods of engine reconditioning.	15	Applying
CO2	Identify the diagnostics of fuel and electrical systems	15	Understanding
CO3	Summarize the diagnostics of transmission and drive line components.	14	Understanding
CO4	Identify the diagnostic procedures for suspension, steering and brake systems.	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	Make use of the methods of engine reconditioning		
M1.01	Explain engine decarbonizing methods	2	Understanding
M1.02	Summarize the basic engine tests.	3	Understanding
M1.03	Identify the methods for engine dismantling.	3	Applying
M1.04	Explain servicing of various engine components.	5	Understanding
M1.05	Identify the steps in engine assembling	2	Applying
<p>Contents:</p> <p>Engine decarbonizing methods-mechanical and chemical, engine condition diagnosis - engine tests - dry compression test, wet compression test, oil pressure test, vacuum test, cylinder leakage test, exhaust restriction test, engine removal and dis - assembly - removal of engine from vehicle, dismantling of engine.</p> <p>Cylinder head reconditioning - head inspection, head resurfacing, valve seat refacing, valve guide reconditioning, valve spring inspection, valve reconditioning, cylinder block reconditioning - align boring of saddle bore, block surface reconditioning, cylinder boring and honing, crankshaft servicing, camshaft servicing, piston and connecting rod servicing, flywheel reconditioning,</p> <p>Engine assembly - preparation for assembly, steps for assembling, testing on dynamometer, engine installation, break - in.</p>			
CO2	Identify the diagnostics of fuel and electrical systems		
M2.01	Summarize the features of on-board diagnostic system	2	Understanding

M2.02	Utilize the servicing procedure of ignition system components	5	Applying
M2.03	Demonstrate the servicing of fuel system components	6	Understanding
M2.04	Identify the inspection of emission control systems	2	Applying
	Series Test – I	1	

Contents:

On-board diagnostic systems-monitors and self-diagnosis, MIL and DLC, scan tools, basic diagnosis of electronic engine control systems.

Engine misfiring causes, visual inspection of ignition system, primary circuit checking, secondary circuit checking, ignition coil checking, pickup coil checking, distributor cap and rotor checking, coil over plug checking, spark plug inspection, no start diagnosis of EI system, usage of engine analyzer, ignition timing setting.

Preliminary checks for fuel system, fuel system possible faults and remedy, fuel system testing-fuel pressure testing, fuel delivery testing, pressure regulator diagnosis, air induction system checking, sensor diagnosis, throttle body servicing, injector servicing, IAC inspection and service, Diesel injection fault diagnosis, basic inspection of emission control systems.

CO3	Summarize the diagnostics of transmission and drive line components.		
M 3.01	Explain the service procedures of clutch.	3	Understanding
M 3.02	Outline the troubles and remedies of transmission system.	4	Understanding
M 3.03	Demonstrate the servicing of propeller shaft and differential.	4	Understanding
M 3.04	Summarize the methods for tyre rotation and wheel balancing.	3	Understanding

Contents:

Clutch maintenance- clutch linkage adjustment, clutch linkage lubrication, clutch problem diagnosis - slippage, dragging and binding, chatter, pedal pulsation, vibration, clutch service.

Transmission and transaxle removal and refitting, transmission possible faults and remedy, dismantling of propeller shaft and universal joint, defects in propeller shaft, servicing of differential and rear axle, differential troubles and adjustments, causes of tyre wear, tyre rotation, wheel balancing.

CO4	Identify the diagnostic procedures for suspension, steering and brake systems.		
M4.01	Identify the method for suspension system diagnosis.	3	Applying

M4.02	Make use of the procedure for MacPherson strut replacement.	1	Applying
M4.03	Outline the servicing of steering system.	5	Understanding
M4.04	Explain the servicing procedure of brake system.	5	Understanding
	Series Test – II	1	

Contents:

Suspension system diagnosis, front suspension component servicing - coil springs, torsion bar, ball joints, bushings, shock absorbers, removal and refitting of MacPherson strut, rear suspension component servicing - solid rear axle, semi-independent and independent, basic diagnosis of electronic suspension.

Steering system diagnosis - common complaints and reasons, tyre wear pattern and steering troubles, steering gear adjustments, rack and pinion service, steering system component servicing, power steering system servicing, checking of wheel alignment.

Drum brake diagnosis - drum brake disassembly, brake lining inspection, wheel cylinder inspection and service, drum brake adjustment, disk brake diagnosis-visual inspection, caliper service, master cylinder servicing, brake bleeding procedure, basic diagnosis procedure for ABS.

Text / Reference:

T/R	Book Title/Author
T1	Automotive Technology: A Systems Approach by Jack Erjavec, Cengage Learning
R1	Automotive Technology: Principles, Diagnosis, and Service by James D. Halderman, Prentice Hall
R2	Advanced Automotive Fault Diagnosis, Automotive Technology: Vehicle Maintenance and Repair, Tom Denton, Routledge
R3	Automobile Engg vol 1 and II, Kirpal Singh, Standard Publication
R4	Automotive Mechanics, Anglin And Crouse, McGraw-Hill

Online Resources:

Sl.No	Website Link
1	https://www.wikihow.com/Rebuild-an-Engine
2	https://drivinglife.net/how-to-use-automotive-scan-tools/
3	https://www.youtube.com/watch?v=gPotEQDJhsk