Program : **Diploma in Mechanical Engineering**	
Course Code : **5029**	Course Title: **Automotive Lab**
Semester : **5**	Credits: **1.5**
Course Category: **Program Elective**	
Periods per week: **3 (L:0, T:0, P:3)**	Periods per semester: **45**

Course Objectives:

- To familiarize with the safety precautions to be followed in an automobile workshop.
- To familiarize with the uses of appropriate tools, gauges and equipments in automotive servicing.
- To practice the dismantling and assembling of two stroke and four stroke Petrol engines and associate equipments.
- To practice the dismantling and assembling of two stroke and four stroke Diesel engines and associate equipments.
- To practice the dismantling and assembling of automobile transmission system equipments.

Course Prerequisites:

Topic	Course Code	Course Name	Semester
Basic knowledge in tools, gauges and equipment.		Basic Workshop Practice	1 & 2
Basic knowledge in Automobile engineering.		Automobile Engineering, Thermal Engineering	4 & 5

Course Outcomes:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Aware of safety precautions to be followed in an automobile workshop and familiarize the use of tools, gauges and equipments in automotive servicing.	10	Understanding
CO2	Demonstrate the dismantling and assembling of two stroke and four stroke Petrol engines and their components	8	Applying

CO3	Demonstrate the dismantling and assembling of two stroke and four stroke Petrol engines and their components	10	Understanding
CO4	Apply the technical knowledge in dismantling and assembling of automobile transmission system.	14	Understanding
	Lab Exam	3	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						1
CO2	3			3			1
CO3	3			3			1
CO4	3						1

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

Course Outlines

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Aware of safety precautions to be followed in an automobile workshop and familiarize the use of tools, gauges and equipments in automotive servicing.**		
M1.01	Introduction, understand various safety precautions to be followed in Automobile workshop.	3	Understanding
M1.02	Understand the different tools and equipment used in Automobile workshop.	3	Understanding
M1.03	Identify the application of measuring tools and specific tools.	2	Understanding
M1.04	Carryout cleaning, greasing and oiling of equipments	2	Understanding
Contents: Awareness on safety precautions to be followed in Automobile workshop. Identify Open end spanners, Ring Spanners, Combination Spanners, Socket spanners, Torque wrench, Adjustable wrenches, Allen Wrenches., HEX Key, Plier, Screwdriver Sets			

Familiarize Trolley Jack, Oil Pan/Drip Tray and Funnel, Oil Filter Wrench, and engine hoist.
Understand Calipers, Micrometer, Laser Measure, Ruler, Compass, and Measuring Tape.
Understand cleaning, greasing and oiling of equipments.

CO2	**Demonstrate the dismantling and assembling of two stroke and four stroke Petrol engines and their components**		
M2.01	Familiarize the engine components and parts. Understand the working principle of two stroke and four stroke Petrol engines and associate equipments engines.	2	Understanding
M2.02	Acquire the basic skills related to engine servicing and maintenance. Create awareness about maintenance schedules.	2	Applying
M2.03	Perform the dismantling, cleaning and testing of A.C. mechanical pump	1	Applying
M2.04	Perform the dismantling, cleaning and tuning of carburetor and servicing of air cleaner	1	Applying
M2.05	Dismantling and assembling of the Distributor. Discover wiring in magneto ignition system Spark plug- removal, cleaning & gap resetting	1	Understanding
M2.06	Perform dismantling, cleaning and assembling of water pump	1	Understanding
	Lab Exam – I	1.5	

Contents:
Study of various makes of four-stroke and two-stroke spark-ignition engines and components by dismantling and assembling various parts. Comparison of engine components. Familiarize the Engine components - Cylinder block, cylinder liners- wet type and dry type, Cylinder head, cylinder head gasket, Pistons – types of pistons, Piston rings, compression ring, oil ring and special purpose ring, Gudgeon pin, Connecting rod. Crank shaft, Main bearings, Fly wheel, Valves, Cam shaft drives.
Perform the cleaning and testing of A.C. mechanical pump, carburetors, air cleaner, Distributor, magneto ignition system, Spark plug, and water pump.
Identify the components and fault diagnosis of air conditioning unit in an automobile

CO3	**Demonstrate the dismantling and assembling of two stroke and four stroke Petrol engines and their components.**		
M3.01	Identify the engine components and parts. Understand the working principle of of two stroke and four stroke Diesel engines and associate equipments.	2	Understanding
M3.02	Acquire the basic skills related to engine servicing and maintenance. Create awareness	2	Understanding

	about maintenance schedules.		
M3.03	Carryout dismantling and assembling of two stroke and four stroke diesel engines.	2	Understanding
M3.04	Carryout Dismantling and assembling of the Fuel Injection pump. Carryout Dismantling, assembling and over hauling of fuel injectors.	2	Understanding
M3.05	Carry out dismantling and assembling of the oil pump, fuel feed pump.	1	Understanding
M3.06	Carry out Bleeding of diesel fuel system.	1	Understanding
Contents: Familiarizationof various makes of four-stroke and two-stroke Compression-ignition engines and components by dismantling and assembling various parts. Comparison of engine components. Familiarize the Engine components - Cylinder block, cylinder liners-wet type and dry type, Cylinder head, cylinder head gasket, Pistons – types of pistons, Piston rings, compression ring, oil ring and special purpose ring, Gudgeon pin, Connecting rod. Crank shaft, Main bearings, Fly wheel, Valves, Cam shaft drives. Perform the cleaning and testing of Fuel Injection pump, fuel injectors, oil pump, and fuel feed pump. Bleeding of diesel fuel system.			
CO4	**Apply the technical knowledge in dismantling and assembling of automobile transmission system.**		
M4.01	Dismantling, assembling and over hauling of clutch assembly.	3	Understanding
M4.02	Dismantling, assembling and over hauling of Gear box.	3	Understanding
M4.03	Dismantling, assembling and over hauling of Differential assembly.	2	Understanding
M4.04	Dismantling, assembling and over hauling of slider joints.	2	Understanding
M4.05	Dismantling, assembling and over hauling of Master Cylinder.	2	Understanding
M4.06	Dismantling, assembling and over hauling of Brake & wheel cylinders.	2	Understanding
	Lab Exam – II	1.5	
Contents: Dismantling, assembling and over hauling of Single plate, Multi plate, and centrifugal clutch assembly. Dismantling, assembling and over hauling of sliding mesh, constant mesh and synchromesh Gear box. Dismantling, assembling and over hauling of Differential assembly, slider joints, Master Cylinder, and Brake & wheel cylinders.			

Text / Reference

T/R	Book Title/Author
T1	Automobile Engineering, I &II - Kirpal Singh - Standard Pub 12th Edition
T2	Automotive Mechanics- William H Crouse - Tata Mc Graw Hill Pub
R1	Encyclopedia of Motorcycling, 20 volumes, Marshall Cavensih, New York and London, 1989.
R2	Service manuals of Bosch, Caterpillar, TVS, MICO
R3	Automotive Mechanics – Joseph Heitner – CBS Publishers & Distributors
R4	Internal Combustion Engines – Domkundwar&Domkundwar – DhanpatRai& Co.(P) Ltd

Online Resources

Sl.No	Website Link
1	www.carparts.com
2	www.freelibrary.org
3	www.nptel.ac.in
4	https://www.youtube.com/watch?v=LGXfWdAZ0N4
5	https://safetyrisk.net/mechanics-workshop-safety/
6	https://www.britannica.com/technology/diesel-engine
7	https://www.youtube.com/watch?v=I7NXlZYvMik
8	https://www.youtube.com/watch?v=cxIuIqnupj8
9	https://en.wikipedia.org/wiki/Transmission_(mechanics)
10	https://www.youtube.com/watch?v=QPaUJfA1KsY
11	https://www.youtube.com/watch?v=GIWYkCOPAQ0
12	https://www.youtube.com/watch?v=SOgoejxzF8c