Lok Jagruti Kendra University
University with a Difference

Diploma
in
Automobile Engineering

LJ Polytechnic

Course Code: 025010603

Automobile Diagnosis & Testing

Programme / Branch Name	Diploma in Automobile Engineering					
Course Name	Automobile Diagnosis & Testing				**Course Code**	025010603
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week					**Evaluation Scheme**				
L	**T**	**P**	**Total Teaching Hours**	**Total Credit**	**CA**	**CCE**	**SEE (TH)**	**SEE (PR)**	**Total**
2	0	4	6	4	10	40	50	100	200

Legends: L: Lectures T: Tutorial P: Practical
CA: Continuous Assessment (Attendance + Activity)
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Internal Combustion Engine
- ✓ Automobile Powertrain and Automobile Systems
- ✓ Automobile Electrical Systems

3. Rationale

The main objective of automobile diagnosis and testing subject is to provide students with knowledge and skills related to diagnosing and testing automotive systems, such as engine, transmission, suspension, brakes, and electrical systems. It enhances the skills and knowledge required to become proficient automotive technicians who can diagnose and repair a wide range of automotive problems.

4. Objectives

- ✓ Students can Understand the principles of operation of different automotive systems.
- ✓ Identify and diagnose problems in automotive systems using appropriate diagnostic tools and techniques.
- ✓ Analyze and interpret diagnostic results to determine the cause of the problem and recommend appropriate repairs.
- ✓ Perform tests on different automotive systems to evaluate their performance and functionality.
- ✓ Understand the importance of preventive maintenance and learn how to perform routine maintenance tasks.
- ✓ Gain hands-on experience in diagnosing and testing automotive systems in a safe and controlled environment.

Contents

Unit No.	Unit Name	Topics	Learning Outcome	% Weightage	Hours
1.	**Diagnosis & Testing Automobile Engines - 1**	1.1. Inspection, Testing and Reconditioning of Engine Components. 1.2. Inspection, Service and Repaire of Petrol and Diesel Fuel Supply System.	• Explain various tests for testing the automobile engines. • Apply knowledge of fuel system parts/ assemblies Carburetor system, MPFI, LPG & CNG system to solve problems.	20	5
2.	**Diagnosis & Testing Automobile Engines - 2**	2.1.Inspection, Service and Repaire of Cooling and Lubricating System. 2.2.Engine Trouble Shooting.	• Explain engine overheating causes. • Explain servicing of various components of lubricating system.	20	6
3.	**Diagnosis & Testing Automobile Transmission - 1**	3.1.Trouble Shooting of Clutch 3.2.Inspection, Testing and Overhauling of Gearbox. 3.3.Inspection, Testing and Overhauling of Propeller Shaft, Universal Joint and Rear Axle Assembly.	• Analyse and Rectify various troubles in clutch unit. • Explain overhauling of Gear box. • Analyse and Rectify various troubles in rear axle assembly	20	5
4	**Diagnosis & Testing Automobile Transmission - 2**	4.1 Inspection, Testing and Overhauling of Steering System. 4.2 Inspection, Testing and Overhauling of Braking and Wheels & Tyres.	• Analyse and Rectify various troubles in front axle and steering system. • Analyse and Rectify various troubles in brake	20	6
5	**Diagnosis & Testing Automobile Electrical System**	5.1 Inspection and Testing of Automobile Battery 5.2 Inspection and Testing of Ignition System 5.3 Inspection and Testing of Starter Motor and Its circuit 5.4 Inspection and Testing of Alternators and Regulators 5.5 Inspection and Testing of Indicating and Warning Devices	• Explain different tests carried out on battery. • Explain servicing & adjustment of the ignition system timing & components. • Explain various tests on the starter motor. • Explain various tests on the alternator & regulator.	20	6

		5.6 Inspection and Testing of Wiring Installation and Lighting	• Desribe testing Procedure of various electrical equipment.		
				Total Hours	**28**

5. List of Practicals / Exercises

The practicals/exercises have been properly designed and implemented in an attempt to develop different types of skills, so that students can acquire the competencies/programme outcomes. Following is the list of practicals/exercises.

Sr. No.	Practical / Exercises	Key Competency	Hours
1.	Demonstration of cylinder boring and honing	To be able to bore and hone a cylinder, having the good understanding of the various components of an engine, including the cylinder, piston, and connecting rod.	2
2.	To perform Servicing of lubrication system	To be able to perform inspection of the various components of a lubrication system, such as the oil pump, oil filter, oil cooler, and oil pressure regulator.	2
3.	To perform Servicing of Diesel Engine Fuel Supply system.	To be able to perform servicing of diesel engine fuel supply system, such as fuel pressure gauges, fuel injection timing tools, fuel injector removal tools, and fuel system cleaning equipment.	2
4.	To Perform servicing of clutch.	To be able to perform servicing of single plate clutch, various checks to be made on clutch plate,pressure plate and release bearing.	2
5.	To Perform servicing of Synchromesh Gearbox	To be able to perform servicing of synchromesh gear box various checks to be made on different parts of gearbox along with gear overhauling.	2
6.	Perform bleeding of hydraulic braking system and pedal adjustment	To be able to perform bleeding of hydraulic braking system and adjustment of brake pedal free play of the hydraulic braking system.	2
7.	Test ignition coil, condenser, dwell angle, etc.	To be able to Test ignition coil, condenser, dwell angle, distributor etc.	2
8.	Test an automobile battery for its serviceability.	To be able to maintain Lead Acid Battery, charging methods and testing procedures.	2
9.	Test starter motor and its circuit for voltage drop, noload and torque.	To be able to conduct various tests such as voltage drop, noload test,bench test etc on starter motor.	2
10.	To perform checks of CAN wiring, ECM Diagnostics Trouble Code clearing and scanning.	Perform OBD-II Scanning of vehicle and clearing fault codes and identification of problem from scan codes.	2
		Total Hours	**20**

6. Suggested Specification Table for Evalaution Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	Ap %	C %	E %	An %
1.	Diagnosis & Testing Automobile Engines - 1	40	40	10	0	10	0
2.	Diagnosis & Testing Automobile Engines - 2	35	45	10	0	10	0
3.	Diagnosis & Testing Automobile Transmission - 2	30	50	10	0	10	0
4.	Diagnosis & Testing Automobile Transmission - 2	30	50	10	0	10	0
5.	Diagnosis & Testing Automobile Electrical System	40	40	10	0	10	0

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

7. Reference books

1) "Automotive Mechanics" by William Crouse and Donald Anglin.
2) "Automotive Technology: A Systems Approach" by Jack Erjavec and Rob Thompson
3) "Automotive Service: Inspection, Maintenance, Repair" by Tim Gilles
4) "Automotive Diagnostic Systems: Understanding OBD-I & OBD-II" by Keith McCord
5) "Advanced Automotive Fault Diagnosis" by Tom Denton
6) "Automotive Electrical and Engine Performance" by James D. Halderman

8. Open Sources (Website, Video, Movie)

1) https://www.youtube.com/watch?v=7YzHG1JmVHw
2) https://www.youtube.com/watch?v=9CPqbaSgcok
3) https://www.youtube.com/watch?v=y6mFtkrbB4A
4) https://www.youtube.com/watch?v=tRf5wODp5Mg
5) https://www.youtube.com/playlist?list=PLAFYVCyenqcoYmzNL8MubMBhaeCNz1g9m
6) https://www.youtube.com/watch?v=Au6e41G7uQI
7) https://www.youtube.com/watch?v=9CPqbaSgcok
8) https://www.youtube.com/watch?v=9CPqbaSgcok
9) https://www.youtube.com/watch?v=UvXSjfwZ1f0
10) https://www.youtube.com/watch?v=yNtKwOFr_7k
11) https://www.youtube.com/watch?v=9CPqbaSgcok
12) https://www.youtube.com/watch?v=zsZjOg9JV5M
13) https://www.youtube.com/watch?v=IffAPz-5OpA
14) https://www.youtube.com/watch?v=6RQ9UabOIPg