

**BU-COMMUNITY COLLEGE CONSULTANCY CENTRE**

**REVISED SYLLABUS – 2021-22  
FOR  
DIPLOMA IN AUTOMOBILE MAINTENANCE**



**BHARATHIAR UNIVERSITY  
COIMBATORE-641046**

**BHARATHIAR UNIVERSITY: COIMBATORE**

**DIPLOMA IN AUTOMOBILE MAINTENANCE  
(Community College)**

**(for the candidates admitted from the academic year 2021-22 onwards)**

**Minimum qualification for admission** to Diploma Course in Automobile Maintenance is a pass in Standard X.

**SCHEME OF EXAMINATIONS**

<b>S.No</b>	<b>Title of the Course</b>	<b>Credits</b>	<b>Maximum Marks</b>
1	Human Resource Development	4	100
2	Automobile Engine Systems	4	100
3	Automobile Maintenance Service & Repairs – I	4	100
4	Automobile Maintenance Service & Repairs – II	4	100
5	Vehicle Performance & Testing Lab	4	100
6	Automobile Lab	4	100
7	Design of Automotive Systems Lab	4	100
8.	Internship/ Apprentice/ Teaching Practice/ Project	4	100
	<b>Total</b>	32	800

**Question paper Pattern: Theory**

**Section A:** (10 x 2=20 Marks)

Answer ALL the questions

**Section B:** (5 x 6 = 30 Marks)

Answer ALL the questions either (a) or (b)

**Section C:** (5 x 10 = 50)

Answer ALL the questions either (a) or (b)

Duration of examinations for all papers is three hours.

\*Minimum Pass Mark: 40 Marks

**PAPER I**  
**HUMAN RESOURCE DEVELOPMENT**

<b>Unit:1</b>		
HRD-Macro Perspective: HRD Concept, Origin and Need, HRD as a Total System; Approaches to HRD; Human Development and HRD; HRD at Macro and Micro Climate Entrepreneurial Development - Continuous effort to innovate - Everyday development - Developmental needs - Observing the market trend - Cooperative effort.		
<b>Unit:2</b>		
HRD-Micro Perspective: Areas of HRD; HRD Interventions Performance Appraisal, Potential Appraisal, Feedback and Performance Coaching, Training, Career Planning, OD or Systems Development, Rewards, Employee Welfare and Quality of Work Life and Human Resource Information; Staffing for HRD: Roles of HR Developer; Physical and Financial Resources for HRD; HR Accounting; HRD Audit, Strategic HRD.		
<b>Unit:3</b>		
Physical care - Securing and Maintaining the physical ability - Hath yoga – Iyama - Niyama- Asanas - Public Health – Food Health. Mental health care and training – Pranayama – Meditation - Nurturing good thoughts - Cohesion with nature - self realization		
<b>Unit:4</b>		
Communication Skills - Speaking skills - Conversational English - Interpersonal and Intrapersonal skills - Assertiveness Skills		
<b>Unit:5</b>		
Social responsibility - Public Welfare Importance of helping others - our cultural values of giving - knowledge of our legal and constitutional structure - Duties of the responsible citizens		
<b>Reference Books</b>		
1	Yogi Sudhanantha Bharathi (2001) – Thirumanthiram vilakkam – Manickavasakarpublications – Sidhambaram	
2	Technical communication - Principles and practice, Second edition by Meenakshi Raman and Sangeetha Sharma, Oxford Publications New Delhi(2012)	
3	Value Education-Third Edition Compiled by Vision for Wisdom ,World communityservice centre Aliyar. Vethathiri publications(2009)	
4	Introduction to the Constitution of India - 21 <sup>st</sup> Edition Durga Das Basu , Lexis Nexis Publication (2013)	
5	Nadler, Leonard : Corporat Human Resource Development, Van Nostrand Reinhold, ASTD, New York .	
6	Rao, T.V and Pareek, Udai: Designing and Managing Human Resource Systems, Oxford IBH Pub. Pvt.Ltd., New Delhi , 2005.	
7	Rao, T.V: Readings in HRD, Oxford IBH Pub. Pvt. Ltd., New Delhi , 2004	

**PAPER II**  
**AUTOMOBILE ENGINE SYSTEMS**

<b>Unit:1</b>	<b>Lubrication System</b>	
Lubrication in 2 stroke engines - petrol and oil-injection. Lubrication in 4 stroke multi-cylinder petrol/diesel engines. Dry and wet sump lubrication. Full pressure and semi-pressure lubrication. Oil pump types. Oil pump drive, relief valve; pressure gauge. Oil filters. Full-flow and by-pass type filtering systems. Crankcase dilution, crankcase ventilation. Positive Crankcase Ventilation.		
<b>Unit:2</b>	<b>Cooling System</b>	
Necessity of cooling of I.C. engines. Methods of cooling-air cooling, water cooling, liquid cooling. Shape of cooling fins. Field of application of air cooling. Water cooling system - Thermosiphon system, pump system, thermostat system of cooling. Thermostat - types. Radiators-different types, their construction and function. Pressurized cooling system; radiator pressure-cap, surge tank. Cooling water temperature gauge. Anti- freeze and anti-corrosive additives. Coolants. Flushing of cooling system.		
<b>Unit:3</b>	<b>Fuel System of Diesel Engines</b>	
Fuel supply system. Filters (primary and secondary); positioning of filters. Feed pump. Solid and air injection system. Fuel injection pump, different types- plunger, distributor pump, their construction and working. Injectors. Governors. Types of governing. Combustion process in diesel engine. Diesel knock. Electronically Controlled Diesel Injection Pump. Common Rail Direct Injection. Piezo electric effect and its use in CRDI.		
<b>Unit:4</b>	<b>Fuel System of Petrol Engines</b>	
Gravity feed system used in 2-wheelers. Fuel supply circuit of 4-wheelers. Mechanical and electrical fuel pump. Electric fuel gauge. Petrol fuel filter. Air/fuel ratio. Variation of air/fuel ratio with speed. Air cleaners (wet & dry). Cyclone filter. CARBURETOR - Function and principle of working of simple carburetor. Carburetor controls- throttle, choke. Types of Carburetors- fixed jet carburetor (Solex type) and constant vacuum carburetors used in YAMAHA motorcycle. Twin-barrel carburetors. Classification of carburetors. Disadvantages of carburetors. Phenomenon of combustion and detonation. Pre- ignition.		
<b>Unit:5</b>	<b>Fuel Injection Systems (Petrol Engine)</b>	
TBI, MPI; the Electronic Module. Advantages of Electronic Fuel Injection (EFI). Block diagram of the EFI. The Air Intake System and the Idle Air Control System. Fuel Delivery System. Various sensors used with the ECM, their location and purpose. Fuel Injector. Idea of Gasoline Direct Injection		
<b>Reference Books</b>		
1	Automotive Engines, A.K. Babu, Khanna Publishing House	

**PAPER III**

**AUTOMOBILE MAINTENANCE SERVICE & REPAIRS – I**

<b>Unit:1</b>	<b>Workshop Equipment</b>	
Equipment for testing electrical accessories: Electric test bench, growler, coil tester, ignition and cam-dwell-angle tester; wiring harness tester. Ampere-hour battery tester, voltmeter tester, Layout of diesel injector and F.I.P. reconditioning shop, Tools and equipment required		
<b>Unit:2</b>	<b>Lubrication and Maintenance Schedule</b>	
Necessity for routine maintenance, Importance of service manuals, Specification of engines- petrol and diesel vehicles (a) Engine (b) Clutch (c) Gear Box (d) Propeller shaft (e) Universal joints (f) Differential (g) Axles and hubs		
<b>Unit:3</b>	<b>Lubrication and Maintenance Schedule</b>	
(a) Suspension system (b) Steering system (c) Tire (d) Chassis (e) Brake-drum and disc (f) Battery (g) Self-starter (h) Dynamo		
<b>Unit:4</b>	<b>Fuel System</b>	
Maintenance Schedule of diesel engine fuel injector, hot plugs, rotary and reciprocating type of fuel injection pump, fuel injection pump of single cylinder engines, hoses & pipe lines, priming unit, tanks. Electricals: Maintenance Schedule of batteries, starter motor, dynamo, ignition system, wiper motor, electrical fuel pump, alternator, horn, flasher unit.		
<b>Unit:5</b>	<b>Engine Tuning</b>	
Engine tuning of conventional and MPFI petrol engine. Adjustments of spark plug gap, valve tappet clearance, head bolts, Use of vacuum and compression gauge, Air cleaner cleaning, Ignition timing setting by timing light, Pollution checking, Troubleshooting		
<b>Reference Books</b>		
1	Automobile Mechanics, A.K. Babu, S.C.Sharma, T.R. Banga, Khanna Publishing House	

**PAPER IV**  
**AUTOMOBILE MAINTENANCE SERVICE & REPAIRS – II**

<b>Unit:1</b>	<b>Fault Diagnosis</b>	
Diagnostic Trouble Codes, ECM Power and Ground Circuit Check, MAP Sensor Circuit, VSS Circuit Check, Fuel Pressure Check, Fuel Injection Circuit Check, Evaporative Emission Control system Check, Inspection of ECM & its Control.		
<b>Unit:2</b>	<b>Overhaul and Reconditioning Procedures -1</b>	
Overhaul and reconditioning procedures of engine, clutch, gear box		
<b>Unit:3</b>	<b>Overhaul and Reconditioning Procedures - 2</b>	
Propeller shaft & universal joints, differential, axles, and hubs, Overhaul and reconditioning procedures of steering and suspension system components including McPherson strut. Overhaul and reconditioning procedures of drum and disc brakes		
<b>Unit:4</b>	<b>Overhaul and Reconditioning Procedures -3</b>	
Service, overhaul and testing of starter motor, alternator, ignition system, wiper motor, electrical fuel pump, horn, flasher unit, wiring harness, condenser, H.T. coil, spark plug.		
<b>Unit:5</b>	<b>Reconditioning</b>	
Overhaul, and testing of diesel fuel injector, single and multi-cylinder fuel injection pumps. Calibration, phasing, and spray tests. Air-conditioning and heating equipment: Faults and their remedies.		
<b>Reference Books</b>		
1	Automobile Mechanics, A.K. Babu, S.C.Sharma, T.R. Banga, Khanna Publishing House	

**PAPER V**  
**VEHICLE PERFORMANCE & TESTING LAB**

1	Estimation of power requirement for vehicle propulsion by taking actual vehicle example.
2	Perform coast down test to find vehicle inertia.
3	On road fuel consumption test at different speeds.
4	Brake efficiency measurement
5	Pass- by noise test.
6	Free acceleration test.
7	Vibration measurement in passenger compartment
8	Laboratory testing of vehicle on chassis dynamometer for performance
9	Laboratory testing of vehicle on chassis dynamometer for emission.
10	Report based on visit to vehicle testing and research organization.
11	On road emission testing of petrol and diesel vehicles for PUC/RTO



**PAPER VI**  
**AUTOMOBILE LAB**

1	Find the mechanical efficiency of a multi-cylinder engine by Morse Test
2	Tune a multi-cylinder petrol engine and set dwell, rpm, ignition timing, CB point gap, spark plug gap, and tappet clearance.
3	Check the condition of the given battery as regards: (i) cell voltage (ii) specific gravity (iii) ampere- hour capacity (iv) Level of electrolyte. Use battery capacity tester. Clean the battery and charge it. Prepare a maintenance schedule.
4	Dismantle study, assemble and check for proper working the following: (a) Electric horn (b) Wiper motor (c) Starter motor (d) dynamo (e) alternator.
5	Test the following on electrical test bench: (a) Dynamo (b) Starter motor (c) Alternator. Also study the working of a growler.
6	Dismantle, inspect and assemble the magneto of a 2-wheeler. Set the ignition timing using dial gauge.
7	Dismantle and assemble the given electrical fuel pump. Check it for proper working.
8	Set the cut-out and regulator of a vehicle.
9	Dismantle, study, and re-assemble multi-cylinder F.I. pump.
10	Test a multi-cylinder F.I. pump on calibrating machine and check it for proper phasing. Set the injection timing on the engine.
11	Test a diesel fuel injector and set injection pressure. Grind needle and seat.
12	Study and sketch rotary F.I. pump.
13	Study of working of electric vehicle.
14	Study and sketch the Electrical Wiring System of a Car.

**PAPER VII**  
**DESIGN OF AUTOMOTIVE SYSTEMS LAB**

1	Design of automotive clutch assembly and component drawing using any drafting software (Two full imperial sheets along with design calculations report) consists of: <ul style="list-style-type: none"><li>• Functional design of clutch</li><li>• Design of clutch shaft, hub and flange</li><li>• Design of damper springs</li><li>• Design of sectors, rivets etc.</li><li>• Design of pressure plate assembly</li><li>• Design for linkage mechanism</li><li>• Details and assembly drawing</li><li>• Details and assembly drawing</li></ul>
2	Design of automotive gear box along with reverse gear (Two full imperial sheets along with design calculations report) consists of: <ul style="list-style-type: none"><li>• Calculation of gear ratios</li><li>• Determination of number of teeth on gear pair</li><li>• Determination of gear reductions</li><li>• Design of gear pairs</li><li>• Design of shafts</li><li>• Selection of bearings</li><li>• Details and assembly drawing</li></ul>
3	Design of suspension spring and its analysis using any analysis software.