

**BU-COMMUNITY COLLEGE CONSULTANCY CENTRE**

**REVISED SYLLABUS – 2021-22  
FOR  
DIPLOMA IN FOUR WHEELER MECHANISM**



**BHARATHIAR UNIVERSITY  
COIMBATORE-641046**

**BHARATHIAR UNIVERSITY: COIMBATORE**

**DIPLOMA IN FOUR WHEELER MECHANISM  
(Community College)**

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

**Minimum qualification for admission** to Diploma Course in Four wheeler mechanism 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 Engineering -I	4	100
3	Automobile Engineering -II	4	100
4	Automotive Electricals & Electronics	4	100
5	Engine testing and troubleshooting lab	4	100
6	Vehicle serving and testing lab	4	100
7	Automotive Electricals & Electronics 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 community service 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 ENGINEERING -1**

<b>Unit:1</b>		
<b>Engine:</b> Two stroke engine , Four stroke engine, Cylinder Head, Cylinder block, Crank case, sump, Cylinder liners, Piston types, Piston rings, Connecting rods, Crank shaft, Valves, Valve actuating mechanisms, Drive mechanisms, Combustion CI and SI engine. Type of Engine, Vibration Damper, Super charger, Turbo Charger.		
<b>Unit:2</b>		
<b>Fuel Feed System:</b> Carburetor, Air / Fuel mixture , Cold Starting, Idle, Normal Running, Acceleration and Transfer Circuits, Multi Point Fuel Injection System ,Diesel fuel injection pump, Construction and working of governor, Fuel injector – types of nozzle, Common Rail Direct Injection.		
<b>Unit:3</b>		
<b>Cooling System:</b> Engine Heat transfer, Necessity of cooling – air cooling, water cooling, system, Pumps cooling, Radiator, Thermostat Valve, Antifreeze solution, Radiator Fan.		
<b>Unit:4</b>		
<b>Lubrication System:</b> Properties of lubricants, Lubrication system – splash, Forced, Dry Sump and Wet Sump, Oil Filters, Oil Pumps. Flywheel, Clutch, Gear Box: Need of Fly Wheel, Types of Clutch's – Cone clutch, Single plate dry clutch, Multi plate clutch, Diaphragm.		
<b>Unit:5</b>		
<b>Type of gear box</b> – Constant mesh gearbox, Sliding mesh gear box, Synchronizer gear box, Automatic gear box.		
<b>Reference Books</b>		
1	V.GANASAN (10th edition 2010)“Internal Combustion Engine”, Tata McGraw, New Delhi	
2	Kirpal singh ”AUTOMOBILEENGINEERING“ Volume-1,. Standard Publishers. Robert Bosch (2004 )“	
3	Automotive Hand book” 5th edition	

**PAPER III**  
**AUTOMOBILE ENGINEERING -II**

<b>Unit:1</b>	<b>Propeller Shaft, Final Drive and Axle</b>	
Need of Propeller shaft, Type of propeller shaft – Torque tube Drive, Hotchkiss Drive, Universal Joint , slip Joint, Need of Differential, Final Drive, Axle – Semi floating axle, fully floating axle, Three Quarter Floating axle.		
<b>Unit:2</b>	<b>Steering and Suspension</b>	
Steering Geometry - camber, caster, king pin angles, Toe In, Toe out, Steering – Ackerman Steering Mechanism, Rack and pinion gear box, Recirculating ball type, Suspension – Independent suspension system, Dependent suspension system.		
<b>Unit:3</b>	<b>Brakes and Tyres</b>	
Distribution of brake force on front and rear wheel, Disc brake, Drum brake, Tyre – Tube Tyre, Tubeless Tyre.		
<b>Unit:4</b>	<b>Electrical And Electronic System</b>	
Application of electricity in automobiles, Starting, Charging, Lighting and Accessory system, Application of basic electronic components in automobiles.		
<b>Unit:5</b>	<b>Advance Technology in Automobiles</b>	
Global Positioning System, Navigation system, Air bags, Seat Belt, Anti-lock braking system, Adaptive cruise control, Hybrid Vehicles – Lay out's, Fuel cell.		
<b>Reference Books</b>		
1	Kirpal Singh "AUTOMOBILE ENGINEERING "Volume-2, 10th edition 2010. Standard Publishers.	
2	Keith Owen and Trevor Coley "Automotive fuel Reference book", SAE 1995	

**PAPER IV****AUTOMOTIVE ELECTRICALS & ELECTRONICS**

<b>Unit:1</b>	<b>Electrical &amp; Electronic Components</b>	
Purpose and operation of electrical components like Switches, relays, solenoids, buzzers, and resistors-Purpose of circuit protection devices like fuses, maxi fuses, circuit breakers (Manual and automatic resetting types.) and fusible links - Testing of circuit defects like open circuit, shorts, shorts to grounds, voltage drop. - - Features of scan tester. - Working of electrical accessories like wind shield wiper, washer pumps, blower motor, electro chromic mirror, power window, power seat, power door lock.		
<b>Unit:2</b>	<b>Battery</b>	
Lead acid battery – construction & operation. - Concept of Low maintenance, maintenance free & Hybrid Battery- Battery – voltage, battery ratings and battery specifications. - Battery testing – Battery terminal test, Leakage test, Specific Gravity Test, Open circuit voltage test, High discharge test & Capacity test. - Battery charging – Initial charging procedure, dry charged battery- precautions. - Battery maintenance and safety precautions		
<b>Unit:3</b>	<b>Starting System and Charging System</b>	
Purpose, construction and working of starting system. - Starting motor torque and power requirement- Testing of starting system – Cranking voltage test, Voltage drop test, Current draw test, starting motor bench test, & no-load test. - Starting Motor troubleshooting- Purpose of charging system- Operation of charge indicator light circuit- General construction & operation of Automotive alternator.		
<b>Unit:4</b>	<b>Ignition Systems</b>	
Purpose of ignition system- Classification of ignition systems - Contact point Ignition System & Electronic ignition system- Contact point Ignition system (Battery Ignition and Magneto ignition). Elements and construction of battery oil ignition system-Ignition coil types, Distributor, sparkplug, cords, and Condenser, Cam angle & Ignition timing- Ignition		
<b>Unit:5</b>	<b>Lighting System &amp; Advanced Lighting Accessories</b>	
Fundamentals-Variou lighting circuits- Vertical and Slide control of lights. - Fog light, Slide light, Brake light, indicator lights, and instrument light, reverse light, parking light, Trailer lighting, Florescent lighting, Interior lighting. - Operation of automatic headlight dimming. - Operation of automatic on/off headlight with time delay- Wiring diagram of vehicle Faults - Purpose & operation of automatic door lock system.		
<b>Reference Books</b>		
1	P.L. Kohli Automotive Electrical ,Tata-McGraw-Hill(1983)	
2	Crouse & Anglin Automotive Mechanics 10 th edition,Tata-McGraw-Hill (2006)	
3	Barry Hollenbeck Automotive Electricity, Electronics & Computer Controls Delmar Publishers	

4	Jack Erjavec, Robert Scharff Automotive Technology: A System Approach Delmar Publisher Inc
5	Trevor Mellard Automotive electronic systems ELBS
6	Ken Pickerill Today's Technician: Automotive Engine Performance Classroom and ShopManuals ASE (NATEF)
7	Kirpal singh "AUTOMOBILEENGINEERING "Volume-2, 10th edition 2010. Standard Publishers.
8	Keith owen and Trevr coley "Automotive fuel Reference book", SAE 1995

**PAPER V****ENGINE TESTING AND TROUBLESHOOTING LAB**

1	Carburetor trouble shooting and servicing.
2	Ignition system trouble shooting and servicing.
3	Cylinder bore, connecting rod, crank shaft, cam shaft measurement.
4	Tappet clearance measurement.
5	Nozzle testing and fuel injection pump testing.
6	Battery testing, hones servicing and testing, gauges and lighting setting.
7	Servicing of Dynamo and alternator.
8	Starting system trouble shooting.
9	Compression test, Vacuum test, diesel and Petrol Engine.
10	Engine assembling and dismantling.

**PAPER VI****VEHICLE SERVING AND TESTING LAB**

1	Servicing of diaphragm clutch, Single plate clutch, multi plate clutch.
2	Servicing of constant mesh gear box, sliding mesh gear box and synchromesh gear box.
3	Differential unit assembly and servicing.
4	Transaxle assembly servicing.
5	Servicing of different type of rear axle assembling (light duty and heavy duty vehicles).
6	Brake system servicing and troubleshooting (hydraulic brake, air brake – disc brake, drum brake).
7	Wheel alignment testing.
8	Acker Mann steering geometry verification.
9	Servicing of steering gear box (re-circulating ball type and rack and pinion gear box).
10	Servicing of accessories such as wiper system and air conditioning unit.

**PAPER VII****AUTOMOTIVE ELECTRICALS & ELECTRONICS LAB**

1	Study, testing (Specific gravity of electrolyte, High rate discharge test of battery & Load test of battery) and sketching of constructional details and working principle of battery.
2	Study, testing and sketching of various components and the functions of coil ignition systems.
3	Inspection of spark plug cords, Servicing of spark plugs and distributor.
4	Study, testing and sketching of starting system and the constructional details of self-starter.
5	Starter Motor –component identification, starter current draw test and voltage drop test.
6	Alternator-component identification and output test, Regulated Voltage Output Test, charging circuit resistance test. Electrical testing of rotor and stator of alternator.
7	Study, testing and sketching of charging system and the constructional of dynamo.
8	Testing dipper switch, flasher unit and indicator circuits and fault tracing.
9	Study, testing and sketching of different types of horn and relay.
10	Study, testing & sketching of various components and their function of Electronic Ignition system.