BU-COMMUNITY COLLEGE CONSULTANCY CENTRE

REVISED SYLLABUS – 2021-22
FOR
DIPLOMA IN AUTO ELECTRICIAN

BHARATHIAR UNIVERSITY
COIMBATORE-641046

BHARATHIAR UNIVERSITY: COIMBATORE

DIPLOMA IN AUTO ELECTRICIAN
(Community College)

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

Minimum qualification for admission to Diploma Course in Auto Electrician is a pass in Standard X.

SCHEME OF EXAMINATIONS

S.No	Title of the Course	Credits	Maximum Marks
1	Human Resource Development	4	100
2	Automobile Technology	4	100
3	Auto Electrical And Electronics Technology	4	100
4	Basic Electricity	4	100
5	Automobile Technology Lab	4	100
6	Auto Electrical And Electronics Technology Lab	4	100
7	Basic Electricity Lab	4	100
8.	Internship/ Apprentice/ Teaching Practice/ Project	4	100
	Total	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

Unit:1		
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.		
Unit:2		
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.		
Unit:3		
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		
Unit:4		
Communication Skills - Speaking skills - Conversational English - Interpersonal and Intrapersonal skills - Assertiveness Skills		
Unit:5		
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		

Reference Books	
1	Yogi Sudhanantha Bharathi (2001) – Thirumanthiram vilakkam – Manickavasakar publications – 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 Complied by Vision for Wisdom ,World communityservice centre Aliyar. Vethathiri publications(2009)
4	Introduction to the Constitution of India - 21st 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 TECHNOLOGY

Unit:1	**Basics of automobiles**	
Types of engine – IC engine - petrol engine - diesel engine - engine components - cooling system - lubrication system - chassis - clutch - gear box - propeller shaft - differential - axle - wheel and tyre		
Unit:2	**Suspension, Brakes, Aerodynamics And Safety**	
Air suspension - Closed loop suspension - compensated suspension - anti skid brakingsystem - retarders - regenerative braking - safety gauge air backs - crash resistance - Aerodynamics for modern vehicles - safety systems - adaptive cruise control system.		
Unit:3	**ECM and Sensors**	
ECM - Components of ECM - Actuators Inductive - Hall Effect - hot wire - thermostat piezo electric - piezo resistive based sensors - Throttle position - air mass flow - crank shaft position - camshaft position - engine and wheel speed - steering position - tire pressure - brake pressure - steering torque - fuel level – crash - exhaust oxygen level (two step and linear lambda)- knock - engine temperature - manifold temperature and pressure sensors – airbags sensors.		
Unit:4	**Vehicle Automated Tracks And Hybrid vehicle**	
Preparation and maintenance of proper road network - National highway network with automated roads and vehicles - Satellite control of vehicle operation for safe and fast travel – GPS - Navigation system – Electric vehicles - hybrid vehicles - flexible fuel vehicles (FFV) - solar powered vehicles - magnetic track vehicles - fuel cells vehicles.		
Unit:5	**Heating Ventilation Air Conditioning (HVAC)**	
Control devices - Thermostatic expansion valve system - Thermal expansion valves – Air conditioning compressors - Condensers - evaporators – Receiver - drier - Lines & hoses - TX valve construction - Temperature monitoring thermostat – Refrigerants - Pressure switches - Heating elements.		
Reference Books		
1	Automobile Engineering volume 1,2 - Dr Kirupal sing Standard publishers (2011)	
2	Automotive Mechanics - N K Giri , Khana Publishers, New Delhi (2016)	
3	A Textbook of Automobile Engineering – S.K. Gupta, S.Chand Publishing (2014)	

PAPER III

AUTO ELECTRICAL AND ELECTRONICS TECHNOLOGY

Unit:1	**Battery**	
Principle and construction of Lead Acid Battery - Li-ion Battery – Nickel Cadmium Battery - Nickel Metal - Hybrid Battery - Sodium Sulfur Battery and Aluminum Air Battery - Characteristics of Battery - Battery Rating - Capacity and Efficiency - Various Tests on Battery - Battery Charging Techniques - Maintenance of batteries.		
Unit:2	**Electrical Components**	
Requirements of Starter Motor - Starter Motor types - construction and characteristics - Starter drive mechanisms - Starter Switches and Solenoids - Generators - Alternators types - Construction - Voltage and Current Regulation - Cutout relays and regulators – Charging circuits for D.C. Generator - A.C. Single Phase and Three Phase Alternators.		
Unit:3	**Ignition and Injection Systems**	
Battery Coil and Magneto Ignition System - Circuit details - Components of Battery Coil and Magneto Ignition System - Centrifugal and Vacuum Advance Mechanisms - Spark Plugs - Constructional details and Types - CRDI		
Unit:4	**Electrical and Electronic Ignition Systems**	
Electronically Assisted and Full Electronic Ignition System (MPFI) - Noncontact type Ignition Triggering devices - Capacitive Discharge Ignition - Distributor less Ignition System- Digital Ignition System - Control Strategy of Electronic Ignition System.		
Unit:5	**Wiring, Lighting and Other Instruments and Sensors**	
Automotive wiring - insulated and earth return system - positive and negative earth systems - head lamp and indicator lamp details - electrical and electronic fuel lift pumps - theory and constructional details of dash board instruments - speedometer - odometer - fuel level indicator - oil pressure and coolant temperature sensors.		
Reference Books		
1	Automotive Mechanics – William H.Crouse , Donald L.Anglin, McGraw Hill Education (India) Private Limited, 10th Edition (2006)	
2	Automotive Air conditioning - Paul weisler, Reston Publication (1990)	
3	Bosch Automotive Hand Book ,6th Edition (2004)	

PAPER IV

BASIC ELECTRICITY

Unit:1	**Current Electricity**	
Definition of Resistance-Voltage- Current, Power- Energy and their units- Relation between electrical-mechanical and thermal units- Temperature variation of resistance- Difference between AC and DC voltage and current		
Unit:2	**D.C. Circuits and A.C Circuits**	
Circuits Ohm's Law, Series – parallel resistance circuits- calculation of equivalent resistance- Kirchhoff's Laws and their applications-A.C Circuits Generation of A.C. voltage- its generation and wave shape-Cycle- frequency- peak value R.M.S. value-form factor- crest factor- Phase difference- power and power factor- A.C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance, Q factor of R.L.C. series circuits.		
Unit:3	**Electric Cells**	
Primary cell-wet cell- dry cell-battery-Li-ion battery- series and parallel connections of cells- Secondary cells-Lead Acid Cell- Discharging and recharging of cells-preparation of electrolyte- care - maintenance of secondary cells.		
Unit:4	**Lighting and Capacitors**	
Lighting effect of electric current-filaments used in lamps,-Tube-light-LED- their working - applications. Capacitors : Capacitor and its capacity- Concept of charging and Discharging of capacitors-Types of Capacitors and their use in circuits- Series and parallel connection of capacitors-Energy stored in a capacitor.		
Unit:5	**Electromagnetic Effects**	
Permanent magnets and Electromagnets-their construction and use- Polarities of an electromagnet - rules for finding them-Faraday's Laws of Electromagnetic Induction-Dynamically induced e.m.f., its magnitude and induction-inductance and its unit. Mutually induced e.m.f.- its magnitude and direction- Energy stored in an inductance-Force acting on a current carrying conductor in magnetic field- its magnitude and direction- Principles and construction of dynamo.		
Reference Books		
1	Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House (2008)	
2	Pradeep Kumar, Basic Electrical Engineering, Khanna Publishing House (2016)	

PAPER V

AUTOMOBILE TECHNOLOGY LAB

1	Maintenance of automobile engine
2	Identification of various components of MPFI system
3	Identification of various sensors installed in engine, installation and testing
4	Testing actuators
5	Identification of various components of CRDI system
6	Air conditioning components performance test and gas filling
7	Air bag system servicing
8	Testing breaks
9	Testing tire pressure
10	Testing temperature monitoring thermostat

PAPER VI

AUTO ELECTRICAL AND ELECTRONICS TECHNOLOGY LAB

1	Cleaning and topping up of lead acid battery, Battery testing and charging
2	Starting motor servicing
3	Alternator servicing
4	Ignition system servicing
5	Trace the light circuit test bulbs aligning of head lights
6	Trouble shooting and remedy for horn operation
7	Check and replace of speedometer dash board meters
8	Wiper serving
9	Servicing of flash indicators
10	Testing of door auto-lock system

PAPER VII

BASIC ELECTRICITY- LAB

1	Verify that resistance of conductor is directly proportional to resistivity, length and inversely proportional to cross- sectional area of the conductor.
2	Verification of Ohm's Law.
3	Verification of temperature co-efficient of resistance: (i) Positive for Tungsten and Nichrome and (ii) Negative for carbon.
4	Study of series resistive circuits.
5	Study of parallel resistive circuits
6	Study of series and parallel connection of cells in circuits.
7	Preparation of Electrolyte for lead acid battery and its charging and measurement of Specific gravity with the help of hydrometer.
8	To find heat efficiency of an electric kettle.
9	Charging and Discharging of a capacitor.
10	Verification of magnetic field of a Solenoid with: (i) Iron core and (ii) Air core