

**MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI**

1	Name of Course	<b>CERTIFICATE COURSE IN ELECTRIC VEHICLE TECHNICIEN (2019-2020)</b>												
2	Course Code	<b>306118</b>												
3	Max. No. of Students Per Batch	25 Student												
4	Duration	6 Month												
5	Type	Full Time												
6	No Of Days / Week	6 Days												
7	No Of Hours / Days	7 hrs.												
8	Space Required	Class Room – 200 sq.ft, <u>Laboratory – 200 sq.ft</u> Total - 400 sq. ft												
9	Minimum Entry Qualification	SSC												
10	Age Limit	Minimum 18 Years												
10	Objective Of Course	To Create skilled man power in <b>ELECTRIC VEHICLE</b>												
11	Employment Opportunities	Details given in syllabus attached hereby												
12	Teacher's Qualification	Diploma & Degree in Electrical /Electronics/with one year Experience in relevant field												
13	Training System	<b>Training System Per Week</b> <table border="1"> <tr> <td>Theory</td> <td>Practical</td> <td>Total</td> </tr> <tr> <td>6 hrs</td> <td>18 hrs</td> <td>24 hrs</td> </tr> </table>							Theory	Practical	Total	6 hrs	18 hrs	24 hrs
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6 hrs	18 hrs	24 hrs												
14	Exam. System	<b>Sr. No.</b>	<b>Paper Code</b>	<b>Name of Subject</b>	<b>TH/ PR</b>	<b>Hours</b>	<b>Max. Marks</b>	<b>Min. Marks</b>						
		1	30611811	<b>MECHANIC ELECTRIC VEHICLE (Trade Theory)</b>	TH - I	3 hrs.	100	35						
		2	30611821	<b>MECHANIC ELECTRIC VEHICLE (Trade Practical)</b>	PR - I	4 hrs.	200	100						
				<b>Total</b>			<b>300</b>	<b>135</b>						

*Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.*

## **GENERIC LEARNING OUTCOME (Employment Opportunities)**

1. Recognize & comply with safe working practices, environment regulation and housekeeping.
2. Select and ascertain measuring instrument and measure dimension of components and record data.
3. Diagnose, detect and repair the defects occurs in the electrical circuits and batteries.
4. Diagnose, detect and repair the defects occurs in AC and DC motors.
5. Diagnose, detect and repair the electric vehicle.
6. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day-to-day work to improve productivity & quality.
7. Explain energy conservation, global warming and pollution and contribute in day-to-day work by optimally using available resources.
8. Explain personnel finance, entrepreneurship and manage/ organize related task in day-to-day work for personal & societal growth.
9. Plan and organize the work related to the occupation.

## SYLLABUS FOR MECHANIC ELECTRIC VEHICLE FOR 6 MONTHS

Week No.	Learning Outcome	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
1 & 2	RECOGNIZE & COMPLY WITH SAFE WORKING PRACTICES, ENVIRONMENT REGULATION AND HOUSEKEEPING	1. FAMILIARISATION WITH INSTITUTE, JOB OPPORTUNITIES IN THE AUTOMOBILE SECTOR, MACHINERY USED IN TRADE. TYPES OF WORK DONE BY THE STUDENTS IN THE SHOP FLOOR. 2. IMPORTANCE OF MAINTENANCE AND CLEANLINESS OF WORKSHOP. 3. INTERACTION WITH HEALTH CENTRE AND FIRE SERVICE STATION TO PROVIDE DEMO ON FIRST AID AND FIRE SAFETY, USE OF FIRE EXTINGUISHERS. 4. PRACTICE OPERATION OF DIFFERENT WORKSHOP EQUIPMENTS. 5. DEMONSTRATE ENERGY SAVING TIPS OF ITI ELECTRICITY USAGE	ADMISSION & INTRODUCTION TO THE TRADE: INTRODUCTION TO THE COURSE DURATION, COURSE CONTENT, STUDY OF THE SYLLABUS. GENERAL RULE PERTAINING TO THE INSTITUTE, FACILITIES AVAILABLE-- HOSTEL, RECREATION, MEDICAL AND LIBRARY WORKING HOURS AND TIME TABLE OCCUPATIONAL SAFETY & HEALTH IMPORTANCE OF SAFETY AND GENERAL PRECAUTIONS TO BE OBSERVED IN THE SHOP. BASIC FIRST AID, SAFETY SIGNS - FOR DANGER, WARNING, CAUTION & PERSONAL SAFETY MESSAGE. SAFE HANDLING OF FUEL SPILLAGE, FIRE EXTINGUISHERS USED FOR DIFFERENT TYPES OF FIRE. SAFE DISPOSAL OF TOXIC DUST, SAFE HANDLING AND PERIODIC TESTING OF LIFTING EQUIPMENT, AUTHORIZATION OF MOVING & ROAD TESTING VEHICLES. ENERGY CONSERVATION-DEFINITION, ENERGY CONSERVATION OPPORTUNITIES (ECOS)-MINOR ECOS AND MEDIUM ECOS, MAJOR ECOS), SAFETY DISPOSAL OF USED ENGINE OIL, ELECTRICAL SAFETY TIPS. INTRODUCTION TO ROAD SAFETY AND AUTOMOTIVE EMISSIONS.
3	CHECK & PERFORM MEASURING & MARKING BY USING VARIOUS MEASURING & MARKING TOOLS(VERNIER CALLIPER, MICROMETER, TELESCOPE GAUGES, DIAL BORE GAUGES, DIAL INDICATORS, STRAIGHTEDGE, FEELER GAUGE, THREAD PITCH GAUGE, VACUUM GAUGE, TIRE PRESSURE GAUGE.)	6. CARRYOUT MEASURING PRACTICE ON VEHICLE PARTS DIA WITH OUTSIDE MICROMETERS. 7. CARRYOUT MEASURING PRACTICE ON THE HEIGHT OF THE ROTOR OF AN OIL PUMP FROM THE SURFACE OF THE HOUSING OR ANY OTHER AUTO COMPONENT MEASUREMENT WITH DEPTH MICROMETER. 8. PRACTICE TO CHECK THE AIR PRESSURE INSIDE THE VEHICLE TIRES IS MAINTAINED AT THE RECOMMENDED SETTING.	SYSTEMS OF MEASUREMENT, DESCRIPTION, CARE & USE OF - MICROMETERS- OUTSIDE AND DEPTH MICROMETER, MICROMETER ADJUSTMENTS, VERNIER CALLIPERS, TELESCOPE GAUGES, DIAL BORE GAUGES, DIAL INDICATORS, STRAIGHTEDGE, FEELER GAUGE, THREAD PITCH GAUGE, VACUUM GAUGE, TIRE PRESSURE GAUGE.
4	TRACE AND TEST ALL ELECTRICAL & ELECTRONIC COMPONENTS & CIRCUITS AND ASSEMBLE CIRCUIT TO ENSURE FUNCTIONALITY OF SYSTEM	9. PRACTICE IN JOINING WIRES USING SOLDERING IRON, CONSTRUCTION OF SIMPLE ELECTRICAL CIRCUITS, MEASURING OF CURRENT, VOLTAGE AND RESISTANCE USING DIGITAL MULTIMETER, PRACTICE CONTINUITY TEST FOR FUSES, JUMPER WIRES, FUSIBLE LINKS, AND CIRCUIT BREAKERS.	BASIC ELECTRICITY, ELECTRICITY PRINCIPLES, GROUND CONNECTIONS, OHM'S LAW, VOLTAGE, CURRENT, RESISTANCE, POWER, ENERGY. VOLTMETER, AMMETER, OHMMETER MULTIMETER, CONDUCTORS & INSULATORS, WIRES, SHIELDING, LENGTH VS. RESISTANCE, RESISTOR RATINGS

5	DO	10. DIAGNOSE SERIES, PARALLEL, SERIES-PARALLEL CIRCUITS USING OHM'S LAW, CHECK ELECTRICAL CIRCUIT WITH A TEST LAMP, PERFORM VOLTAGE DROP TEST IN CIRCUITS USING MULTIMETER, MEASURE CURRENT FLOW USING MULTIMETER /AMMETER, USE OF SERVICE MANUAL WIRING DIAGRAM FOR TROUBLESHOOTING.	FUSES & CIRCUIT BREAKERS, BALLAST RESISTOR, STRIPPING WIRE INSULATION, CABLE COLOUR CODES AND SIZES, RESISTORS IN SERIES CIRCUITS , PARALLEL CIRCUITS AND SERIES-PARALLEL CIRCUITS, ELECTROSTATIC EFFECTS, CAPACITORS AND ITS APPLICATIONS, CAPACITORS IN SERIES AND PARALLEL.
6	DO	11. TEST DIODE FOR FUNCTIONALITY. 12. PRACTICE CHECKING TRANSISTORS. 13. PLAN AND PERFORM DIFFERENT TYPES OF BATTERIES 14. TEST BATTERY FOR FUNCTIONALITY 15. TROUBLESHOOT VARIOUS DEFECTS OCCURS IN BATTERIES	INTRODUCTION TO BATTERY CHEMISTRY, COMPOSITION AND CONSTRUCTION, HIGH VOLTAGE BATTERY TECHNOLOGY, EV AUXILIARY BATTERY TECHNOLOGY, DIAGNOSIS AND SERVICE, ELECTRICAL THEORY CALCULATION, HIGH VOLTAGE INTERLOCK AND SAFETY SYSTEMS, HIGH VOLTAGE SAFETY CIRCUITS AND WIRE SHIELDING, FLUID DETECTION SYSTEM, BATTERY PACK CONTACTOR SYSTEM, BATTERY PACK MANAGEMENT SYSTEM, ENERGY MANAGEMENT SYSTEM, NETWORK COMMUNICATION AND SCAN TOOL DIAGNOSTICS,
7.	DO	16. TEST RELAYS, DIODES, THERMO COUPLERS, AND TRANSFORMER FOR FUNCTIONALITY	ROUTINE MAINTENANCE OF AEDTVS, COMPONENTS AND SERVICE ON THE EV AC SYSTEM, DIAGNOSE AND TEST THE EV BATTERY, USE OEM SCAN TOOL TO MONITOR AND CHECK FOR DTC, MAGNETIC EFFECTS, HEATING EFFECTS, THERMO-ELECTRIC ENERGY, THERMISTERS, THERMO COUPLES, ELECTROCHEMICAL ENERGY, PHOTO-VOLTAIC ENERGY, PIEZO-ELECTRIC ENERGY, ELECTROMAGNETIC INDUCTION, RELAYS, SOLENOIDS, PRIMARY & SECONDARY WINDINGS, TRANSFORMERS, STATOR AND ROTOR COILS. BASIC ELECTRONICS: DESCRIPTION OF SEMI CONDUCTORS, SOLID STATE DEVICES- DIODES, TRANSISTORS, THYRISTORS, UNI JUNCTION TRANSISTORS ( UJT), METAL OXIDE FIELD EFFECT TRANSISTORS ( MOSFETS).
8 & 9	DO	17. IDENTIFY HYDRAULIC AND PNEUMATIC COMPONENTS USED IN VEHICLE. 18. TRACE HYDRAULIC CIRCUIT ON HYDRAULIC JACK, HYDRAULIC POWER STEERING, AND BRAKE CIRCUIT. 19. IDENTIFY COMPONENTS IN AIR BRAKE SYSTEMS.	INTRODUCTION TO HYDRAULICS & PNEUMATICS: - DEFINITION OF PASCAL LAW, PRESSURE, FORCE, VISCOSITY. DESCRIPTION, SYMBOLS AND APPLICATION IN AUTOMOBILE OF GEAR PUMP-INTERNAL & EXTERNAL, SINGLE ACTING, DOUBLE ACTING & DOUBLE ENDED CYLINDER; DIRECTIONAL CONTROL VALVES-2/2, 3/2, 4/2, 4/3 WAY VALVE, PRESSURE RELIEF VALVE, NON RETURN VALVE, FLOW CONTROL VALVE USED IN AUTOMOBILE. PNEUMATIC SYMBOLS, DESCRIPTION AND FUNCTION OF AIR RECIPROCATING COMPRESSOR. FUNCTION OF AIR SERVICE UNIT (FRL-FILTER, REGULATOR & LUBRICATOR).
10	CHECK & INTERPRET VEHICLE SPECIFICATION DATA AND VIN. SELECT & OPERATE	20. CARRYOUT IDENTIFICATION OF DIFFERENT TYPE OF VEHICLE.	AUTO INDUSTRY - HISTORY, LEADING MANUFACTURERS, DEVELOPMENT IN AUTOMOBILE INDUSTRY, TRENDS, NEW PRODUCT. BRIEF ABOUT MINISTRY OF ROAD TRANSPORT & HIGHWAYS, THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA (ARAI), NATIONAL AUTOMOTIVE TESTING AND R&D INFRASTRUCTURE PROJECT (NATRIP), & AUTOMOBILE ASSOCIATION. DEFINITION: - CLASSIFICATION OF VEHICLES ON THE BASIS

	VARIOUS SERVICE STATION EQUIPMENTS.		OF LOAD AS PER CENTRAL MOTOR VEHICLE RULE, WHEELS, FINAL DRIVE, AXLES, STEERING TRANSMISSION, BODY AND LOAD. BRIEF DESCRIPTION AND USES OF VEHICLE HOISTS – TWO POST AND FOUR POST HOIST, ENGINE HOISTS, JACKS, STANDS.
11 & 12	PLAN & PERFORM MAINTENANCE, DIAGNOSIS AND SERVICING OF TRANSMISSION SYSTEM	<p>21. IDENTIFY AUTOMATIC TRANSMISSION COMPONENTS</p> <p>22. CHECK AUTOMATIC TRANSMISSION FLUID AND REPLACE TRANSMISSION FLUID &amp; FILTER.</p> <p>23. PRACTICE ON OIL PRESSURE CONTROL CABLE PLAY ADJUSTMENTS, INSPECTION OF SHIFT LEVER SWITCH, THROTTLE POSITION SENSOR, SPEED SENSOR AND AUTOMATIC TRANSMISSION WIRING HARNESS COUPLER.</p>	<p>AUTOMATIC TRANSMISSIONS - TORQUE CONVERTERS, TORQUE CONVERTER PRINCIPLES, DRIVE PLATE, CONVERTER OPERATION, TORQUE MULTIPLICATION, FLUID FLOW, HEAT EXCHANGER, LOCK-UP CONVERTERS, CLUTCHES.</p> <p>PLANETARY GEARING- PLANETARY GEARS, SIMPLE PLANETARY GEAR SETS, COMPOUND PLANETARY GEAR SETS, AUTOMATIC TRANSMISSION BRAKE BANDS, MULTI-DISC CLUTCHES, ELECTRONIC CONTROL TRANSMISSION - ELECTRONIC CONTROL UNIT, FULLY HYDRAULICALLY CONTROLLED TRANSMISSION, ELECTRONIC SHIFT PROGRAMS, MANUAL SELECTION.</p> <p>LAYOUT &amp; OPERATION FOR P,R,N&amp;D (1ST &amp; 2ND) SELECTOR POSITIONS, PLANETARY GEAR SET, HIGH RANGE POWER FLOW, LOW RANGE POWER FLOW SERVOS &amp; CLUTCHES-REAR SERVO, FRONT SERVO, ONE WAY CLUTCH, AUTOMATIC TRANSMISSIONS - TORQUE CONVERTERS, TORQUE CONVERTER PRINCIPLES, DRIVE PLATE, CONVERTER OPERATION, TORQUE MULTIPLICATION, FLUID FLOW, HEAT EXCHANGER, LOCK-UP CONVERTERS, CLUTCHES.</p> <p>PLANETARY GEARING- PLANETARY GEARS, SIMPLE PLANETARY GEAR SETS, COMPOUND PLANETARY GEAR SETS, AUTOMATIC TRANSMISSION BRAKE BANDS, MULTI-DISC CLUTCHES, ELECTRONIC CONTROL TRANSMISSION - ELECTRONIC CONTROL UNIT, FULLY HYDRAULICALLY CONTROLLED TRANSMISSION, ELECTRONIC SHIFT PROGRAMS, MANUAL SELECTION.</p> <p>LAYOUT &amp; OPERATION FOR P,R,N&amp;D (1ST &amp; 2ND) SELECTOR POSITIONS, PLANETARY GEAR SET, HIGH RANGE POWER FLOW, LOW RANGE POWER FLOW SERVOS &amp; CLUTCHES-REAR SERVO, FRONT SERVO, ONE WAY CLUTCH,</p>
13	PLAN & PERFORM MAINTENANCE, DIAGNOSIS AND SERVICING OF VEHICLE CONTROL SYSTEM	<p>FOLLOWING PRACTICAL TO BE PRACTICED ON LIGHT &amp; HEAVY VEHICLE.</p> <p>24. PRACTICE ON REMOVING THE DROP ARM, CHECK AND ADJUST THE TURNING ANGLE, ALIGN THE DROP ARM AND STEERING WHEEL WITH THE FRONT WHEEL. CHECK AND CORRECT TOE-IN.</p> <p>25. PRACTICE ON REMOVING STEERING WHEEL, STEERING GEARBOX.</p> <p>26. INSPECT AND OVERHAUL STEERING BOXES, ADJUSTING STEERING GEAR BACKLASH, PRE-LOAD AND ADJUST TOE- IN, TOE-OUT, CAMBER ANGLE, CASTOR ANGLE, KINGPIN INCLINATION AND WHEEL RUN OUT.</p> <p>27. CHECK &amp; TOP UP POWER STEERING FLUID,</p> <p>28. CARRYOUT PRESSURE TESTING A POWER STEERING SYSTEM, FLUSHING A POWER STEERING SYSTEM,</p>	<p>STEERING SYSTEMS: - DESCRIPTION AND FUNCTION OF STEERING SYSTEMS, PRINCIPLES OF STEERING, RACK-AND-PINION STEERING SYSTEM, RECIRCULATION BALL &amp; NUT STEERING SYSTEM, FOUR-WHEEL STEERING SYSTEMS, COLLAPSIBLE STEERING SYSTEM.</p> <p>STEERING BOXES &amp; COLUMNS - DESCRIPTION AND FUNCTION OF STEERING COLUMNS, RACK-AND-PINION GEARBOX, HELIX, VARIABLE RATIO STEERING, WORM GEARBOX, POWER ASSISTED STEERING, STEERING PROCESS, FLOW-CONTROL VALVE, ELECTRIC POWER ASSISTED STEERING, BASIC ELECTRIC POWER STEERING OPERATION</p> <p>STEERING ARMS &amp; COMPONENTS- FORWARD CONTROL VEHICLE STEERING, STEERING LINKAGES, JOINTS, BUSHES/BUSHINGS</p> <p>WHEEL ALIGNMENT FUNDAMENTALS:- BASIC PRINCIPLES OF WHEEL ALIGNMENT, WHEEL BASE, WHEEL TRACK, KING PIN INCLINATION, CASTER, CAMBER, SCRUB RADIUS, TOE- IN &amp; TOE OUT, TOE-OUT ON TURNS, TURNING RADIUS, THRUST ANGLE &amp; CENTRELINES.</p>

		<p>29. CARRYOUT INSPECTING &amp; ADJUSTING AN ENGINE DRIVE BELT,</p> <p>30. CARRYOUT SERVICING A STEERING SYSTEM,</p> <p>31. PRACTICE SERVICING WHEEL BEARINGS.</p> <p>32. PERFORM TROUBLESHOOTING-CAUSES AND REMEDY FOR ABNORMAL WEAR OF TYRE, WHEEL WOBBLING, POOR SELF CENTRING, HARD STEERING, AND VEHICLE PULLING TO ONE SIDE.</p>	
14 & 15	DO	<p>33.FOLLOWING PRACTICAL TO BE PRACTICED ON LIGHT &amp; HEAVY VEHICLE</p> <p>34. PRACTICE ON VISUAL INSPECTION OF CHASSIS FRAME FOR CRACK, BENT AND TWISTS.</p> <p>35. CARRYOUT OVERHAULING AND INSPECTION OF SHACKLE, LEAF SPRING, FRONT &amp; REAR SUSPENSION.</p> <p>36. PRACTICE ON REMOVING, INSPECTION AND ASSEMBLING OF SHOCK ABSORBER</p> <p>37. PRACTICE LUBRICATING A SUSPENSION SYSTEM.</p> <p>38. PERFORM TROUBLE SHOOTING FOR SUSPENSION SYSTEM DEFECTS: WHEEL HOP, RIDE HEIGHT (UNEQUAL AND LOW), NOISES UNDER OPERATION, FLUID LEAKAGE, EXCESSIVE TRAVEL, BOUNCE, WORN DAMPERS, WORN JOINTS/DAMAGED LINKAGES, VEHICLE "CRABBING".</p>	<p>SUSPENSION SYSTEMS:-</p> <p>PRINCIPLES OF SUSPENSION, SUSPENSION FORCE, UNSPRUNG WEIGHT, WHEEL UNIT LOCATION, DAMPENING. TYPES OF SUSPENSION-SUSPENSION SYSTEMS, SOLID AXLE, DEAD AXLE, DESCRIPTION, FUNCTION AND ADVANTAGES OF NON INDEPENDENT SUSPENSION INDEPENDENT SUSPENSION, REAR INDEPENDENT SUSPENSION, REAR-WHEEL DRIVE INDEPENDENT SUSPENSION, ELECTRONICALLY CONTROLLED AIR SUSPENSION (ECAS), ADAPTIVE AIR SUSPENSION OPERATION. TYPES OF SPRINGS DESCRIPTION AND FUNCTION OF COIL SPRINGS, LEAF SPRINGS, TORSION BARS, RUBBER SPRINGS. SHOCK ABSORBER TYPES- DESCRIPTION AND FUNCTION OF HYDRAULIC SHOCK ABSORBERS, GAS-PRESSURIZED SHOCK ABSORBERS, LOAD-ADJUSTABLE SHOCK ABSORBERS, MANUAL ADJUSTABLE-RATE SHOCK ABSORBERS, ELECTRONIC ADJUSTABLE-RATE SHOCK ABSORBERS, AUTOMATIC LOAD-ADJUSTABLE SHOCK ABSORBERS FRONT SUSPENSION TYPES &amp; COMPONENTS- MC PERSON STRUT SUSPENSION, SHORT/LONG ARM SUSPENSION, TORSION BAR SUSPENSION REAR SUSPENSION TYPES &amp; COMPONENTS-RIGID AXLE LEAF SPRING SUSPENSION, RIGID AXLE COILSPRING SUSPENSION, INDEPENDENT TYPE SUSPENSION, RIGID NON-DRIVE SUSPENSION.</p>
16	DO	<p>39. PRACTICE ON REMOVING WHEELS FROM LIGHT &amp; HEAVY VEHICLE, DISMANTLING TYRES AND TUBES CHECKING PUNCTURE.</p> <p>40. PRACTICE ASSEMBLING &amp; INFLATING TYRES TO CORRECT PRESSURE.</p> <p>41. CHECK &amp; ADJUST TIRE PRESSURE BY USE OF AIR OR BY NITROGEN</p> <p>42. ROTATE THE WHEELS IN VEHICLE MINOR REPAIRS TO WHEELS AND TYRES, WHEEL BALANCING &amp; ALIGNMENT.</p> <p>43. CHECK FOR TYRE WEAR PATTERNS.</p>	<p>WHEELS &amp; TYRES-WHEEL TYPES &amp; SIZES WHEELS, RIM SIZES &amp; DESIGNATIONS, TYPES OF WHEELS TYRE TYPES &amp; CHARACTERISTICS- TYRES, RADIAL PLY TYRES, RADIAL PLY TYRE SIDEWALLS, TYRE PRESSURE MONITORING SYSTEMS, RUN FLAT TYRES, SPACE-SAVER TYRES, TYRE DISTORTION, CENTER OF GRAVITY.</p> <p>TYRE CONSTRUCTION-TYRE CONSTRUCTION, TYPES OF TYRE CONSTRUCTION, TYRE MATERIALS, HYSTERESIS, TYRE SIZES &amp; DESIGNATIONS, TYRE INFORMATION, TYRE TREAD DESIGNS, TYRE RATINGS FOR TEMPERATURE &amp; TRACTION. DESCRIPTIONS TIREWEAR PATTERNS AND CAUSES NITROGEN VS ATMOSPHERIC AIR IN TYRES ES &amp; CHARACTERISTICS- TYRES,</p>
17 & 18	DO	<p>44. PRACTICE ON ADJUSTING BRAKE PEDAL PLAY, OVERHAULING AND INSPECTION OF TANDEM MASTER CYLINDER ASSEMBLY.</p> <p>45. PERFORM OVERHAULING AND</p>	<p>BRAKING SYSTEMS :- PRINCIPLES OF BRAKING, DRUM &amp; DISC BRAKES, LEVER/MECHANICAL ADVANTAGE, HYDRAULIC PRESSURE &amp; FORCE, BRAKE PAD, REGENERATIVE BRAKING.</p> <p>BRAKING SYSTEMS - BRAKE TYPE - PRINCIPLES, AIR</p>

		<p>INSPECTION OF FRONT AND REAR BRAKE ASSEMBLY, OVERHAULING AND INSPECTION OF WHEEL CYLINDER ASSEMBLY.</p> <p>46. BLEED HYDRAULIC BRAKES &amp; DISK BRAKES.</p> <p>47. CARRYOUT OVERHAULING AND INSPECTION OF VACUUM ASSISTED BRAKE ASSEMBLY.</p> <p>48. PERFORM OVERHAULING AND INSPECTION OF DISC BRAKE.</p> <p>49. PRACTICE ADJUSTING AIR BRAKES-REPAIR TO TANK UNIT, AIR COMPRESSOR, WHEEL BRAKE ADJUSTER- LOCATING AIR LEAKS IN THE BRAKE LINES AND RECTIFYING – GENERAL MAINTENANCE AND CARE.</p> <p>50. PERFORM BRAKES SERVICE PROCEDURES-CHECKING &amp; ADJUSTING BRAKE FLUID, REPLACING BRAKE FLUID, CHECKING BRAKE PADS, REPLACING BRAKE PADS, REMOVING &amp; REPLACING A ROTOR, REPLACING BRAKE LININGS, ADJUSTING A PARKING BRAKE CABLE.</p> <p>51. CARRYOUT TROUBLE TRACING IN BRAKING SYSTEM OF A HEAVY VEHICLE ADJUSTING BRAKES AND BALANCING ALL FOUR WHEEL BRAKES, PRECAUTIONS TO BE OBSERVED WHILE TESTING BRAKES POINTS TO BE REMEMBER WHILE PREPARING THE VEHICLE FOR BRAKE CERTIFICATE.</p> <p>52. PRACTICE OF MAINTAINING OF ABS SYSTEM.</p>	<p>BRAKES, EXHAUST BRAKES, ELECTRIC BRAKES, PARKING BRAKES, ENGINE BRAKES, REGENERATIVE BRAKING BRAKING SYSTEM COMPONENTS-PARK BRAKE SYSTEM, BRAKE PEDAL, BRAKE LINES, BRAKE FLUID, BLEEDING, MASTER CYLINDER, DIVIDED SYSTEMS, TANDEM MASTER CYLINDER, POWER BOOSTER OR BRAKE UNIT, HYDRAULIC BRAKE BOOSTER, ELECTRO HYDRAULIC BRAKING (EHB), APPLYING BRAKES, BRAKE FORCE, BRAKE LIGHT SWITCH DRUM BRAKES &amp; COMPONENTS -DRUM BRAKE SYSTEM, DRUM BRAKE OPERATION, BRAKE LININGS &amp; SHOES, BACK PLATE, WHEEL CYLINDERS</p> <p>DISC BRAKES &amp; COMPONENTS -DISC BRAKE SYSTEM, DISC BRAKE OPERATION, DISC BRAKE ROTORS, DISC BRAKE PADS, DISC BRAKE CALLIPERS, PROPORTIONING VALVES, PROPORTIONING VALVE OPERATION, BRAKE FRICTION MATERIALS</p> <p>ANTILOCK BRAKING SYSTEM &amp; COMPONENTS-ABS BRAKE SYSTEM, ANTILOCK BRAKING SYSTEM OPERATION, PRINCIPLES OF ABS BRAKING, ABS MASTER CYLINDER, HYDRAULIC CONTROL UNIT, WHEEL SPEED SENSORS, ABS WITH EBD ELECTRONIC CONTROL UNIT.</p> <p>THE CONSTRUCTION AND OPERATION OF HEAVY VEHICLE ANTI-SLIP REGULATION / TRACTION CONTROL (ASR) SYSTEM.</p> <p>INTRODUCTION TO ELECTROMAGNETIC RETARDER BRAKE (EMR) AND ENGINE EXHAUST BRAKE.</p>
19	TESTING OF ELECTRONIC CONTROL SYSTEM AND CHECK FUNCTIONALLY.	<p>53. CARRYOUT IDENTIFICATION OF ELECTRONIC CONTROL UNIT.</p> <p>54. PERFORM SET UP FOR TESTING, TESTING OF ELECTRONIC CONTROL CIRCUIT.</p> <p>55. PERFORM IDENTIFICATION OF VARIOUS SENSORS INSTALLED IN ENGINE &amp; IT'S MOUNTING.</p> <p>56. CHECK INSTRUMENTS &amp; GAUGES ON DASH BOARD &amp; REPLACE DEFECTIVE GAUGES.</p> <p>57. TEST TEMPERATURE SENSOR, PRESSURE SENOR, POTENTIOMETER, MAGNETIC INDUCTION SENSOR</p>	<p>INTRODUCTION TO ELECTRONIC CONTROL UNIT (ECU) - ECU, ELECTRONIC CONTROL UNIT SETTINGS,, MALFUNCTION INDICATOR LAMP.</p> <p>IMPORTANCE OF DIAGNOSTIC TROUBLE CODE (DTC) &amp; ITS GENERAL FORMAT. USE OF SCAN TOOL AND RETRIEVALS OF CODES.,HALL EFFECT VOLTAGE SENSOR.</p>
20	DO	<p>58. PERFORM TESTING OF A BATTERY MANAGEMENT SYSTEM.</p> <p>59. PERFORM HIGH VOLTAGE SAFETY ON BEV.</p> <p>60. ASEEMBLE BEV FOLLOWING WIRING DIAGRAMS AND SERVICE INFORMATION.</p> <p>61. OPERATE ASSEMBLED BEV ON CHASIS DYNAMETER.</p>	<p>ELECTRIC MACHINE ( MOTOR ) USE IN EV, TESTING ELECTRIC MACHINE INTERNAL COMPONENTS, COMPONENTS OF A BATTERY ELECTRIC VEHICLE ( EV ), POWERING UP AND POWER SHUT DOWN PROCEDURE OF EV,</p>

21	DO	<p>62 MEASURE MOTOR TORQUE AND CALCULATE FORCE AND LEVER ARM TORQUE.</p> <p>63. PLAN AND PERFORM TO CHANGE THE SPEED OF A MOTOR DRIVING A LOAD USING PULLEYS.</p> <p>64. PLAN AND PERFORM TO START A SINGLE PHASE AC INDUCTION MOTOR.</p> <p>65. TO OBSERVE THE EFFECT OF VOLTAGE ON THE SPEED OF A DC MOTOR.</p>	<p>INTRODUCTION TO ELECTRIC VEHICLES AND MOTORS, DC SERIES MOTORS, DC SHUNT AND COMPOUND MOTOR, MOTOR SPEED AND TORQUE, MOTOR PERFORMANCE, SPLIT PHASE AC MOTORS, CAPACITOR START AC MOTOR, PERMANENT CAPACITOR AND TWO CAPACITOR AC INDUCTION, THREE PHASE AC INDUCTION MOTOR, SYNCHRONOUS MOTORS, VARIABLE FREQUENCY AC DRIVES,</p>
22	<p>TROUBLESHOOT ELECTRICAL COMPONENTS</p> <p>O</p> <p>F</p> <p>VEHICLE</p> <p>AN</p> <p>D ASCERTAIN REPAIR</p>	<p>66. TRACE THE LIGHT CIRCUIT - TEST BULBS, ALIGN HEAD LAMPS, AIMING HEADLIGHTS. CHANGING A HEADLIGHT BULB, CHECKING OF A HEAD LIGHT SWITCH AND TO REPLACE IF FAULTY.</p> <p>67. PERFORM TROUBLE SHOOTING AND REMEDY FOR HEADLIGHT - HEADLIGHT DO NOT LIGHT UP, ONLY ONE HEADLIGHT DOES NOT LIGHT UP, ONLY ONE BEAM ("HI" OR "LO") DOES NOT LIGHT.</p>	<p>LIGHTING SYSTEM, LAMPS/LIGHT BULBS, LAMP/LIGHT BULB INFORMATION, LED LIGHTING, HEADLIGHTS- DESCRIPTION OF STANDARD SEALED BEAM, HALOGEN SEALED BEAM, COMPOSITE AND HIGH INTENSITY DISCHARGE (HID) HEADLIGHTS. HEADLIGHT &amp; DIMMER CIRCUITS, PARK &amp; TAIL LIGHT CIRCUITS, BRAKE LIGHT CIRCUITS, TURN SIGNAL CIRCUIT, CORNERING LIGHTS, FOG LIGHTS CIRCUIT, INTERIOR LIGHTS- COURTESY, READING AND INSTRUMENT PANEL LIGHTS, SMART LIGHTING ,REVERSE LIGHTS</p>
23		<p>68. PERFORM TROUBLE SHOOTING AND REMEDY FOR TURN SIGNAL AND HAZARD WARNING LIGHTS -FLASH RATE HIGH OR ONE SIDE ONLY FLASHES, NO FLASHING, FLASH RATE LOW.</p> <p>69. PERFORM TROUBLE SHOOTING AND REMEDY FOR CLEARANCE, TAIL AND LICENSE PLATE LIGHTS - ALL LIGHTS DO NOT LIGHT UP, SOME LIGHTS DO NOT LIGHT UP.</p> <p>70. PERFORM TROUBLE SHOOTING AND REMEDY FOR BACK-UP LIGHT - BACK-UP LIGHTS DO NOT LIGHT UP.</p> <p>71. PERFORM TROUBLE SHOOTING AND REMEDY FOR BRAKE LIGHTS - BRAKE LIGHTS DO NOT LIGHT UP, BRAKE LIGHT STAY ON.</p> <p>72. PERFORM TROUBLE SHOOTING AND REMEDY FOR FUEL METER AND FUEL GAUGE UNIT - FUEL METER SHOWS NO OPERATION OR INCORRECT OPERATION.</p> <p>73. PERFORM TROUBLE SHOOTING AND REMEDY FOR ENGINE COOLANT TEMP (ECT) METER AND ECT SENSOR – ENGINE COOLANT TEMP METER SHOWS NO OPERATION OR INCORRECT OPERATION.</p> <p>74. PERFORM TROUBLE SHOOTING AND REMEDY FOR OIL PRESSURE LIGHT – OIL PRESSURE WARNING LIGHT DOES NOT LIGHT UP WHEN IGNITION SWITCH IS ON AT ENGINE OFF.</p> <p>75. PERFORM TROUBLE SHOOTING AND REMEDY FOR BRAKE AND PARKING</p>	<p>LIGHTS -FLASH RATE HIGH OR ONE SIDE ONLY FLASHES AND</p>

		<p>BRAKE WARNING LIGHT- BRAKE WARNING LIGHT DOES NOT LIGHT UP WHEN FLUID FLOW LEVEL, BRAKE WARNING LIGHT DOES NOT LIGHT UP WHEN PARKING BRAKE PULL UP, BRAKE WARNING LIGHTS STAY ON.</p> <p>76. PERFORM TROUBLE SHOOTING AND REMEDY FOR INTERIOR LIGHT- INTERIOR LIGHT DO NOT LIGHT UP.</p> <p>77. PERFORM TRACE THE WIRING CIRCUIT OF TRAFFIC SIGNAL FLASHERS LIGHT CIRCUIT-TRACING DEFECTS IN THE FLASHER CIRCUITS, REPLACING FUSE BULB.</p>	
24	<p>OVERHAUL, SERVICE AND TESTING VEHICLE AIR CONDITIONING SYSTEM, ITS PARTS AND CHECK FUNCTIONALITY.</p>	<p>78. IDENTIFY AIR CONDITIONING COMPONENTS, PERFORMANCE TEST ON A/C UNIT,</p> <p>79. CHECK CHARGED STATE OF REFRIGERANT, INSPECTING &amp; ADJUSTING AN ENGINE DRIVE BELT, REPLACING AN ENGINE DRIVE BELT.</p> <p>80. CHECK HEATING SYSTEM, COMPRESSOR ROTATION TEST, AIR GAP CHECK,</p> <p>81. PERFORM REFRIGERANT RECOVERY –EVACUATING –CHARGING OF A/C SYSTEM. REPLENISHING COMPRESSOR OIL LEVEL. TROUBLES DIAGNOSE AND REMEDY FOR NO COOLING OR WARM AIR, COOL AIR COMES OUT ONLY INTERMITTENTLY, INSUFFICIENT COOLING,</p> <p>82. CHECK ABNORMAL NOISE FROM COMPRESSOR, MAGNETIC CLUTCH, CONDENSER, EVAPORATOR, BLOWER MOTOR.</p> <p>83. CARRYOUT DIAGNOSIS TEST FOR HIGH PRESSURE GAUGE –PRESSURE HIGH AND LOW, LOW PRESSURE GAUGE FOR PRESSURE HIGH AND LOW.</p>	<p>HEATING VENTILATION AIR CONDITIONING (HVAC) LEGISLATION, VEHICLE HEATING, VENTILATION &amp; COOLING SYSTEMS, BASIC AIR-CONDITIONING PRINCIPLES, AIR- CONDITIONING CAPACITY, AIR-CONDITIONING REFRIGERANT, HUMIDITY DESCRIPTION AND FUNCTION OF FIXED ORIFICE, CONTROL DEVICES, THERMOSTATIC EXPANSION VALVE SYSTEM, THERMAL EXPANSION VALVES, AIR-CONDITIONING COMPRESSORS, CONDENSERS &amp; EVAPORATORS, RECEIVER DRIER, LINES &amp; HOSES, TX VALVE CONSTRUCTION, TEMPERATURE MONITORING THERMOSTAT, REFRIGERANTS, PRESSURE SWITCHES, HEATING ELEMENTS</p> <p>AIR-CONDITIONING ECU, AMBIENT AIR TEMPERATURE SENSOR, SERVO MOTORS, ELECTRIC SERVO MOTORS, AUTOMATIC CLIMATE CONTROL SENSORS, EVAPORATOR TEMPERATURE SENSOR, BLOWER SPEED CONTROL, VENTILATION SYSTEMS.</p>
25	<p>DRIVE VEHICLE FOLLOWING TRAFFIC REGULATIONS AND MAINTENANCE OF GOOD ROAD CONDUCT</p>	<p>DRIVING PRACTICE.</p> <p>84. PRACTICE IN STRAIGHT DRIVING ON WIDE ROADS.</p> <p>85. DRIVING THROUGH LANES AND CURVES.</p> <p>86. PRACTICE IN REVERSING.</p> <p>8. PRACTICE OVERTAKING ANOTHER VEHICLE.</p> <p>87. PRACTICE IN DRIVING THROUGH SAND AND WET SURFACES. PRACTICE IN PARKING AND DIAGONAL PARKING.</p>	<p>LOCATING VEHICLE INFORMATION, OBTAINING &amp; INTERPRETING SCAN TOOL DATA, USING A REPAIR MANUAL, USING A SHOP MANUAL, USING AN OWNER'S MANUAL, USING A LABOUR GUIDE, USING A PARTS PROGRAM, USING A SERVICE INFORMATION PROGRAM</p>
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## ELECTRIC VEHICLE TOOLS AND EQUIPMENT LIST

S No.	Name of the Tool & Equipment with Specification	Quantity
1	Allen Key set of 12 pieces 2 mm to 14 mm	5+1
2	Calliper inside with spring 15 cm	6 nos.
3	Callipers outside with spring 15 cm	6 nos.
4	Center Punch.10mm.dia* 100 mm	6 nos.
5	Dividers with spring 15 cm	6 nos.
6	Electrician Screw Driver 250 mm	6 nos.
7	Hammer ball peen with handle 0.5 kg	6 nos.
8	Hands file for Second cut flat 20 cm	6 nos.
9	Philips Screw Driver set of 5 pieces 100 mm to 300 mm	6 nos.
10	Pliers combination 20 cm	6 nos.
11	Screw driver Blade 20 cm * 9 mm	6 nos.
12	Screw driver Blade 20 cm * 9 mm	6 nos.
13	Scriber 15 cm	6 nos.
14	Spanner D.E. set of 12 pieces 6 mm to 32 mm	6 nos.
15	Spanner, ring set of 12 pieces 6 mm to 32 mm (metric)	6 nos.
16	Spanners socket with speed handle, T-bar, ratchet and universal set of 28 pieces with box up to 32 mm	6 nos
17	Steel rule 30 cm inch and metric	6 nos.
18	Steel tool box with lock and key (folding type) 400 * 200 * 150 mm	6 nos
19	Wire cutter and stripper	6 NOS

### **B. INSTRUMENTS AND GENERAL SHOP OUTFIT - For 2 (1+1) units**

**no additional items are required**

#### **TOOLS & EQUIPMENT**

20	Adjustable spanner (pipe wrench) 350 mm	2 nos.
21	AC alternator slip ring puller Variable	1 no.
22	Air blow gun with standard accessories - Trigger operated with interchangeable Nozzles	1 no.

23	Allen Key set of 12 pieces 2mm to 14mm	2 nos.
24	Ammeter DC with external shunt 300A/ 60A	4 nos.
25	Air ratchet with standard accessories	2 nos.
26	Air impact wrench with standard accessories	2 nos.
27	Anvil with Stand 50kgs	1 no.
28	Auto Electrical test bench For checking Dynamo, Alternator & Starter. With minimum 2HP AC Motor, Digital Voltmeter & ammeter.	1 no.
29	Battery –charger Capable to charge batteries from 5AH – 150AH	2 nos
30	Blow Lamp 1 litre	2 nos
31	Belt Tensioner gauge 1 no.	31.
32	Car Jet washer with standard accessories Minimum 3 Phase 1HP 1400RPM Motor, 3 Reciprocating Plungers with pressure regulator & gauge. 8m Water hose with pressure adjustable brass nozzle.	1 no.
33	Chain Pulley Block capacity with tripod stand 3 ton	1 no.
34	Chisel flat 10 cm	4 nos.
35	Circlip pliers Expanding and contracting 15cm and 20cm	4 each
36	Cleaning tray 45x30 cm.	4 nos.
37	Compression testing gauge suitable for diesel Engine with standard accessories	2 nos
38	Copper bit soldering iron 0.25 Kg	2 nos.
39	Cylinder bore gauge capacity 20 to 160 mm	1 no
40	Dial gauge type 1 Gr. A (complete with clamping devices and with magnetic stand) 1 no	42.
41	Drift Punch Copper 15 Cm	2 nos
42	Drill twist (various sizes) 1.5 mm to 8 mm by 0.5mm	4 nos
43	Electric Soldering Iron 230 V 60 watts 230 V 25 watts	2 each

44	Electric testing screw driver	4 nos
45	Engineer's square Blade size 15 cm	4 nos.
46	Engineers stethoscope	
47	Feeler gauge 20 blades (metric)	4 nos.
48	File flat , bastard 20 cm	4 nos.
49	File, half round ,second cut 20 cm	4 nos.
50	File, Square second cut 20 cm	4 nos.
51	File, Square round 30 cm	4 nos.
52	File, triangular , second cut 15 cm	4 nos.
53	Files assorted sizes and types including safe edge file (20 No's)	2 each
54	Flat File , second cut 25 cm	4 nos.
55	Flat File , bastard 35 cm	4 nos.
56	Grease Gun heavy duty trolley type 10 kg capacity	1 no.
57	Hacksaw frame adjustable 20-30 cm	10 nos.
58	Hammer Ball Peen 0.75 Kg	4 nos.
59	Hammer Chipping 0.25 Kg	5 nos.
60	Hammer copper with handle 1 Kg	4 nos
61	Hammer Mallet	4 nos
62	Hammer Plastic	4 nos
63	Hand operated crimping tool/wire (i) up to 4mm (ii) up to 10mm	2 each
64	Hand vice Up to 37 mm	2 nos.
65	Hollow Punch set of seven pieces 6mm to 15mm	2set
66	Multimeter digital LCD Display	5 nos.
67	Oil can 0.5/0.25 liter capacity	4 nos.
68	Outside micrometer 0 to 25 mm	2 nos.
69	Outside micrometer 25 to 50 mm	2 nos.
70	Outside micrometer 50 to 75 mm	1 no.
71	Outside micrometer 75 to 100 mm	1 no.
72	Philips Screw Driver set of 5 pieces (pozidriv and torx drive) 100 mm to 300 mm	2 nos.
73	Pliers flat nose 15 cm	2 nos.
74	Pliers round nose 15 cm	2 nos.
75	Pliers side cutting 15 cm	2 nos.
76	Portable electric drill Machine Upto 10mm (heavy duty)	1 no.
77	Prick Punch 15 cm	4 nos.
78	Punch Letter 4mm (Number)	2 sets
79	Scriber with scribing black universal	2 nos.
80	Set of stock and dies -Metric	2sets

81	Steel measuring tape in a case 10 meter	2 nos
83	Surface gauge with dial test indicator plunger type 0.01 mm	4 nos.
84	Stud extractor set of 3	2sets
85	Stud remover with socket handle	1 no.
86	Tachometer (Counting type) 1 no.	117.
87	Torque wrenches 5-35 Nm, 12-68 Nm & 50-225 Nm	1 each
88	Tyre pressure gauge with holding nipple	2 nos.
89	Vernier caliper 0-300 mm with least count 0.02mm	4 nos
90	Vice grip pliers	2 nos
91	Work bench 250 x 120 x 60 cm with 4 vices 12cm Jaw	4 nos.
92	Cut section models of shock Absorbers	1 no.
93	Cut section of cross ply and radial Tyres	1 no.
94	Disk brake in working condition with caliper assembly with all parts - Exhibiting Brake disc, Caliper assembly, tandem master cylinder, brake hoses, oil bottle, pedal, etc.	1 nos.
95	Drum brake assembly in Working Condition - Brake drum, tandem master cylinder, oil container, brake hose, brake pedal.	1 no.
96	Front axle ( Rzeppa Joint) with stand for Dismantling and assembly - Rzeppa joint of LMV.	1 no
97	Steering assembly – 1. Electric Assisted Power Steering 2. Rack & Pinion with steering wheel, column, tie rod end. 3. Worm & Roller steering assembly with drop arm. 4. Recirculating Ballsteering with pitman shaft and drop Arm. Hydraulic working power steering with steering wheel, column, flow pipe, hydraulic pump, oil reservoir. 5. Electric Assisted Power Steering with Rack and pinion, Electric Motor and Motor Control Module	1 each

98	Tandem master cylinder with booster Working model	1 no
99	Tubed tyre of car, trucks & Motorcycle	1 each
100	Tubeless tyre of cars & trucks	1 each
101	Tyre & split rim wheel assembly	1 no.
102	Working Model of power windows Showing parts like door, glass with motor and its gear arrangement and operating switch.	1 no.

### **GENERAL SHOP OUTFIT**

103	Arbor press hand operated 2 ton capacity	1 no
104	Hydraulic jack HI-LIFT type 3 ton capacity, and 5 Ton capacity	1each
105	Air bag simulator - Driver & Co Driver Air Bags, Seat belts with front seats, crash sensors, air bag ECU, Wiring Harness	1 no.
106	Air conditioning service Unit (Car) - Suitable for R134A. Recovery with vacuum pump, automatic drain & stop after recovery.	1 no.

107	Tube/ tyre vulcanizing machine - 220 V, Heater Capacity 400 W x 2 With different types of Die & Mould	1 no.
108	Two post car lift – capacity 4000 kg Hydraulic Type with Mechanical Arms Locking.	1 no
109	Tyre Changer Machine – Motorized Pneumatic Type, Rim clamping facility, and bead breaking facility with air inflating device.	1 no.
110	Ultrasonic Injection cleaning Equipment - Flow analysis & spray pattern test, leak test, auto programming mode, ultrasonic test with timer, Min 500 ML Lit SS Tank with Lid, SS Stand.	1 no.
111	Wheel alignment Machine computerized 3D (Optional) - Latest machine for four wheel alignment. With connected camera , IR Lighting Source min. 8mm, Reflector metal based, should work in sunlight	1 no.
112	Wheel balancing machine - For wheel balancing of LMV. Motor 0.5 HP Shaft Diameter min 38mm. Hardened flange assy. Balancing catch nut of metal.	1 no.
113	Battery	As required
114	Brake fluids	As required
115	Chalk, Prussian blue	As required
116	Chemical compound for fasteners	As required
117	Diesel	As required
118	Different type gasket material	As required
119	Different type of oil seal	As required
120	Drill Twist (assorted)	As required
121	Emery paper - 36–60 grit , 80–120	As required
122	Hydrometer	5 nos
123	Gear oils	As required

124	Hacksaw blade (consumable)	As required
125	Petrol	As required
126	Power steering oil	As required
127	Safety glasses	As required
128	Steel wire Brush 50mmx150mm	5 nos
129	Instructor's table and Chair Steel	1 set
130	Students chairs with writing pads	20 nos.
131	White board size 1200mm X 900 mm	1 no.
132	Instructors lap top with latest configuration pre-loaded with operating system and MS Office package.	1 no.
133	LCD projector with screen.	1 no.
134	Trainees locker 6½ ' x 3' x 1½'	1 set each (optional)

**NAME OF COURSE :- SYLLABUS OF ELECTRIC VEHICLE  
SYLLABUS COMMITTEE MEMBER**

SR.NO.	NAME OF THE MEMBER	DESIGNATION & ORGANISATION	COMMITTEE DESIGNATION
1	SAYGAONKAR P L	PRINCIPAL, ITI AUNDH,PUNE	CHAIRMAN
2	KOTHEKAR W V	PRINCIPAL, ITI KHED, PUNE	MEMBER
3	KULKARNI D V	SR.TRAINING OFFICER, HI-TECH TRAINING CENTRE, AUNDH,PUNE	MEMBER
4	JADHAV M B	GROUP INSTRUCTOR, ITI AUNDH,PUNE	MEMBER
5	JADHAV V D	INSTRUCTOR, ITI AUNDH,PUNE	MEMBER
6	GHHATE R A	INSTRUCTOR, ITI AUNDH,PUNE	MEMBER
7	JADHAV C S	INSTRUCTOR, ITI AUNDH,PUNE	MEMBER
8	WAGHMARE ANIL	MARUTI TRAINER	MEMBER
9	GHONGADE C S	CHB INSTRUCTOR, ITI AUNDH,PUNE	MEMBER